

The Growing Landscape of State Energy Efficiency Programs: A New Taxonomy

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ABSTRACT

The U.S. typically views energy efficiency through the lens of ratepayer-funded programs including utility and public benefits programs. The energy efficiency landscape is diversifying rapidly as more states take on energy efficiency commitments and new funding sources become available. Spending on ratepayer-funded programs has risen substantially, tripling from about \$900 million in 1998 to \$3.1 billion in 2008 and projected to double by 2020. Additional types of activities, new and old, are also increasing energy efficiency spending, but are often not captured by national assessments. In light of these new funding sources and other state program models, a broader lens is needed to capture the range of state energy efficiency activities. This paper categorizes traditional ratepayer-funded energy efficiency funding sources (utility cost recovery and public benefit funds) and administration models (utility, state, or third party). The paper then outlines a broader taxonomy of state energy efficiency activities. This includes a review of new sources of funding, including Federal stimulus and proceeds from regional carbon allowance auctions, together with other non-ratepayer funded efforts such as state bond issues, state tax and financial incentive programs, and research, development, and deployment. The paper also delineates administrative and funding models of these non-ratepayer-funded programs. A thorough taxonomy of both ratepayer- and non-ratepayer-funded state programs will enhance the community's understanding of the increasingly complex web of energy efficiency activity in the U.S.

Introduction

The readiest solution to mounting economic, environmental, and national security challenges, energy efficiency has become a major priority for policymakers at all levels. In its first year, the Obama Administration emphasized the critical role energy efficiency plays by making major investments through the American Recovery and Reinvestment Act (ARRA). Governors, state legislatures, and state utility commissions continue to lead the way in adopting aggressive energy efficiency policies and implementing innovative programs. At the local level, cities and communities have taken steps to decrease emissions by adopting policies and programs aimed at reducing energy usage. The newfound political attention brought to energy efficiency has resulted in substantial increases in both traditional and new sources of energy efficiency funding. The attention has also caused a multitude of state agencies to begin conducting energy efficiency programs, or ramp-up existing ones. In light of these new funding sources and diverse administrative models, a broader lens is needed to capture the range of state energy efficiency activities. This paper categorizes traditional ratepayer-funded energy efficiency funding sources (utility cost recovery and public benefit funds) and administration models (utility, state, or third party). The paper then outlines a broader taxonomy of state energy efficiency activities. This includes a review of new sources of funding, including Federal stimulus and proceeds from regional carbon allowance auctions, together with other non-

ratepayer funded efforts such as state bond issues, state tax and financial incentive programs, and research, development, and deployment. The paper delineates models of these non-ratepayer-funded programs, which include new programs as well as existing ones re-tooled or ramped up to focus on maximizing energy efficiency.

Sources of Energy Efficiency Funding

Ratepayer Funding: Utility Cost Recovery and Systems Benefits Charges

Traditionally, electric and natural gas utilities have funded energy efficiency programs through revenues and charges on customer utility bills. Prior to the wave of deregulation in the mid-nineties, utility cost recovery (UCR) was the primary funding model, which allows utilities to collect energy efficiency monies directly from ratepayers through a separate surcharge or through base rates. Energy efficiency funding from utilities reached \$1.8 billion in 1993, but uncertainty about newly deregulated markets and the expected loss of cost recovery mechanisms for energy efficiency caused program funding to plummet to \$900 million (nominal dollars) by 1998 (Eldridge et al. 2009). Since then, many state legislatures have adopted a system benefits charge (SBC), also known as a public benefits fund.¹ An SBC collects funds from ratepayers through a surcharge on consumption but differs from the UCR model in their typically legislative origin and the fact that they are levied at the distribution level rather than the generation level (EPA 2008, 23). Total estimated utility energy efficiency funding for 2008 is \$3.1 billion, including both UCR and SBC models, and a recent study estimates that by 2020, funding will rise to between \$5.4 billion and \$12.4 billion (Barbose, Goldman & Schlegel 2009). Utilities and state entities implement energy efficiency programs using these funds through a number of different program administration types, which are discussed below.

Federal Funding

The federal government has historically funded energy efficiency programs through state government channels. The Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) coordinates most federal efficiency programs, including the State Energy Program (SEP) and Weatherization Assistance Program (WAP), as well as others which do not flow to every state such as Industrial Assessment Centers. The State Energy Program uses both a formula grant to each state and a competitive funding pool for special projects. SEP formula grants between 1999 and 2008 averaged \$39 million per year and special project funding averaged \$17 million per year from 1999 to 2005. This money is granted to state energy offices (SEOs), which administer SEP as described below. The Weatherization Assistance Program received funding of \$200 - \$250 million per year since 2002. WAP funds are supplemented with up to 25 percent of federal funding to the states for the Low-Income Heating Assistance Program (LIHEAP), which has had a steadily increasing budget from almost \$2 billion in 2000 to \$5 billion in 2009². The WAP money flows to state community service programs (DOE 2010).

Other sources of federal funds include petroleum violation escrow funding, which supplemented SEP funds for a number of states in the mid-eighties and nineties. Some energy offices continue to rely on these funds today. Louisiana, Texas, and Nebraska, for example, used

¹ States still using UCR include Iowa, Minnesota, and Washington

² Includes Emergency Funds. <http://liheap.ncat.org/Funding/lhemhist.htm>.

the funding to establish revolving loan funds.³ For other SEO programs, however, this funding source is drying up and forcing state energy offices to look for new sources. Loan programs can benefit consumers with direct loans, matching loans, or interest rate buydown programs, and pay as you save financing (CESA 2009).

New and robust sources of federal funding are beginning to change the landscape of state-level energy efficiency programs. The American Recovery and Reinvestment Act (ARRA) passed in February 2009 included the largest single investment in energy efficiency in U.S. history. Approximately \$27 billion was aimed at programs to improve the country’s energy efficiency and much of this will flow from EERE to the states as listed in Table 1 (EPA 2009). Additional programs that may indirectly fund state and local government programs include the Advanced Research Projects Agency-Energy (ARPA-E), which has funded numerous energy efficiency research projects at state universities. The Obama administration’s 2011 budget increased funding to EERE by 22.5% to \$1.3 billion, including a 50% increase in the SEP budget.⁴

Table 1. ARRA Energy Efficiency Funding to State and Local Governments

Program	FY 2009 Approp.	Stimulus Funding
Weatherization Assistance Program	\$450 million	\$5 billion
State Energy Program	\$50 million	\$3.1 billion
Energy Efficiency and Conservation Block Grant Program	N/A	\$3.2 billion
Appliance Rebate Program	N/A	\$300 million
Total	\$500 million	\$11.6 billion

State Funding

State governments regularly fund energy efficiency activities. Some states fund energy efficiency programs through the general appropriations process. Environmental, administrative, transportation or economic development agencies all receive funding from general state funds from revenue sources such as taxes and bonds. Alaska also uses proceeds from fossil fuel production for energy efficiency. The state allocated \$160 million of general funds mostly gained due to a steep rise in oil prices to the Home Energy Rebate Program. The Pennsylvania legislature established a broad \$650 million Alternative Energy Investment Fund in 2008 for clean energy and energy efficiency loans, grants, low-income programs, tax credits, and R&D. The legislation provides authority to the Commonwealth Finance Agency to issue a \$500 million bond and provides \$150 million in general fund tax revenue to be allocated over eight years (White 2008⁵). Several state agencies administer or oversee the various programs, including the Department of Community and Economic Development, the Department of Environmental Protection (DEP), and the Commonwealth Finance Agency. The Pennsylvania case is fairly

³ Louisiana HERO: <http://dnr.louisiana.gov/sec/execdiv/techasmt/programs/residential/hero/>; Texas LoanSTAR: <http://www.seco.cpa.state.tx.us/lr/>; Nebraska Dollar and Energy Savings Loans: www.neo.ne.gov/loan/index.html

⁴ U.S. DOE, Office of EERE Fiscal Year 2010 Budget in Brief. http://www1.eere.energy.gov/ba/pba/pdfs/fy10_budget_brief.pdf

⁵ <http://senatormjwhite.com/press-2008/HB1-PN86.pdf>

unique, however, as many states face serious budget constraints. States have been much more apt to utilize external funding sources or energy savings performance contracts (ESPC) to finance energy efficiency investments.

States typically finance energy efficiency improvements in public facilities by utilizing ESPCs, which can account for a significant portion of the state's energy efficiency project investments. Energy service companies (ESCOs) finance the energy efficiency projects and are paid back through utility bill savings by the state. General Service Administrations typically oversee these programs. A recent review found that the ESCO market in the U.S. was about \$28 billion between 1990 and 2006, or about \$1.7 billion per year, and that 75-80% of this activity was in the public institutions market, including schools, colleges, state/local/federal governments, and hospitals. Rate-payer funding in these states also complements ESPC project investments, but ESPC activity has accounted for the majority (60%) of energy efficiency investments in state facility projects (Bharvirkar et al. 2008). A 2007 market analysis found that the ESCO industry achieved 20% annual growth in 2004-2006 as a result of customer response to rising energy prices, renewed interest in energy efficiency and climate change, re-authorization of ESPCs in the federal market, the adoption of aggressive energy savings goals for federal agencies, and the ramping up of public benefit and ratepayer funded energy efficiency programs (Hopper et al. 2007). While the latest recession certainly has dried up capital and financing, the trends that led to the growth in the ESCO industry hold strong as states ramp up energy savings targets and spending, energy prices remain high, and public awareness of energy efficiency and climate change grows.

Regional Funding

A new major source of funding comes from carbon auction proceeds from the Regional Greenhouse Gas Initiative (RGGI), in which 10 Northeast and Mid-Atlantic states participate.⁶ A memorandum of understanding signed by these parties called for the use of proceeds from RGGI auctions for energy conservation and clean energy programs. Through six auctions beginning in September 2008, proceeds from allowances sold total nearly \$500 million (RGGI 2010). The funding streams for individual states coming from RGGI proceeds have been large enough to launch new and innovative energy efficiency programs, such as the Green Homes/Green Jobs Program in New York.⁷ In Maine, all proceeds are used for electric and fuel efficiency. New Hampshire dedicates 90% of its proceeds to energy efficiency and at least 10% to low-income energy assistance. The state established the Greenhouse Gas Emissions Reduction Fund (GHGERF) with RGGI proceeds, which will support energy efficiency and renewable energy projects and initiatives in New Hampshire. The fund has already implemented a new revolving loan fund offered to businesses and administered by the NH Business Finance Authority (NH PUC 2010).

States have begun to leverage other revenue sources as well to finance energy efficiency programs, including congestion pricing mechanisms such as the Forward Capacity Market run by the New England Independent System Operator (ISO-NE). The capacity auction for 2012/2013 held in May 2009 saw a five-fold increase in the amount of demand resources cleared for

⁶ Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

⁷ <http://www.nysenate.gov/blogs/2009/sep/11/senate-passes-green-jobs-green-ny-bill>

electricity needs and for the first time, energy efficiency resources participated as well (Bowring 2009). The entity that provides these resources, such as a utility, can re-invest the money into energy efficiency creating a new revenue stream.

Administrative Models for State Energy Efficiency Programs

Administration of Clean Energy Funds

Many states pool these various funding sources into a clean energy fund to be streamlined and administered by a single entity or set of entities. Clean energy funds typically include utility cost recovery or systems benefits charges, but may also include state, federal, and regional funds. The New York State Energy Research and Development Authority (NYSERDA), for example, is an independent governmental body that channels SBC, state, regional and federal funding into energy efficiency programs.

States use a variety of program models to administer clean energy funds for energy efficiency projects and often blend these models. These include: (1) utility; (2) government; and (3) third-party.

- The utility model provides programs run directly with the human and capital resources of utilities. For example, Iowa’s utilities administer energy efficiency programs under a regulated structure with oversight by the Iowa Utilities Board (IUB).
- The state model offers efficiency programs administered by the State Energy Office, or another state government entity that typically relies on private contractors to perform some functions. Run by the Board of Public Utilities, the New Jersey Clean Energy Program acts as the statewide administrator of energy efficiency programs using federal, SBC and RGGI funding.
- The third-party model utilizes a third-party that administers energy efficiency programs independently. The Energy Trust of Oregon (ETO), for example, is a nonprofit organization established by the Oregon Public Utilities Commission to administer most of the statewide energy efficiency programs.

Several states, if not most, blend these models. In New York, for example, both utilities and a state entity (NYSERDA) offer energy efficiency programs. In Wisconsin, both the statewide efficiency program, Focus on Energy, and utilities offer programs.

Table 2. State Approaches to Clean Energy Fund Administration and Funding

		Administrative Options		
		Utility	State	Third Party
Funding	UCR	Kansas, Texas, California, New York, Iowa, Minnesota	Illinois	
	SBC	Massachusetts, Connecticut, California	New York, New Jersey, Maine	Vermont, Oregon, Wisconsin, Delaware
	Taxes		New York	Vermont

Source: EPA 2008, 3.

State Energy Offices as Program Administrators

State Energy Offices typically serve a discrete role from clean energy fund program administrators. Established after the energy crisis in the 1970s, these offices spur energy-related economic development and advise governors and legislators on energy issues. The work of State Energy Offices is supported primarily by state funding under the direction of the governors or legislatures and by federal appropriations for the State Energy Program, which focuses on promoting cost-effective energy solutions. State Energy Offices also develop, manage, and implement SBCs-funded programs in states such as California, Minnesota, New York, and New Jersey.

State energy offices reside in various places within state government bureaucracies, including economic development and commerce departments, environmental departments, and offices of policy. As is the case with NYSERDA, some energy offices reside separately from a larger department, and some within the office of the Governor as in Florida and Iowa. Many programs run by state energy offices involve financial incentives for business and consumers such as loans, grants, rebates, and bonds. The role of the state energy office is to administer these financial incentive programs and in many cases, hire contractors to carry them out.

State energy offices also fund and support programs run in other agencies within the state government. A program created by the energy office, the Keystone HELP in Pennsylvania provides rebates and low-interest loans for energy improvements and is principally supported by state Department of Environmental Protection, Treasury Department and the Housing Finance Agency. The program is administered by AFC First Financial Corporation.⁸

State Energy Offices often work to leverage substantial private-sector funds for energy projects, aggregating existing private sector energy service companies to create a connected network of consumers and businesses. The model allows for businesses and consumers to understand the array of incentives available for energy efficiency upgrades. Examples of this model include the Home Performance with Energy Star, which is run out of a handful of state energy offices and twelve state clean energy funds.⁹ New York's FlexTech program provides a model for an industrial retrofit program, which matches industrial energy professionals to plant and facility managers to improve energy performance.¹⁰

⁸ <http://www.keystonehelp.com/>

⁹ http://www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_hpwes_partners

¹⁰ <http://www.nyserda.org/programs/flextech.asp>

Table 3. Summary of Funding Sources for State Energy Efficiency Programs

State Energy Efficiency Program Provider	Funding Sources		
	UCR / PBF	State	Federal
Utilities	•		
Statewide Administrator (State and Third-Party Models)	•	•	DOE
State Energy Offices	•	•	DOE
Transportation and Planning Departments		•	DOT
Economic Development, Housing, Health, and Community Action Agencies		•	DOE, DHHS, HUD
Environmental Agencies		•	EPA
Universities		•	
General Service Departments		•	
Departments of Labor		•	DOL

Beyond Clean Energy Funds and State Energy Offices

State governments can promote and implement energy efficiency through a number of different avenues aside from a dedicated energy efficiency body. While they may not state it explicitly, many entities share the objective of saving energy and fuel, including departments of environment, economic development, transportation, planning, and numerous other state-level public institutions. The ramped-up or new role for energy efficiency in many of these programs, increasing funding levels and political salience of energy and climate change demands a clear and complete taxonomy of state activities.

Table 4. Energy Efficiency Beyond State Energy Offices and Clean Energy Funds

Sector	State Providers
Residential Buildings	Housing Development Authorities for low-income and multifamily housing retrofits. Also, Economic Development Agencies and Departments of Human Services and Community Action implement residential and low-income programs, including loan programs to finance energy efficiency improvements.
Public facilities	General Service Departments typically oversee performance contracting for government buildings. State education departments may oversee green schools initiatives and state energy offices may also play a role in this effort.
Transportation	Environmental Agencies focus on climate change and regulate air emissions from energy users. Transportation Departments oversee mass transit; Planning Agencies and Smart growth offices promote efficient land-use and urban design. General Service Departments maintain efficient fleet programs.
Research, Development, and Deployment	Universities and affiliated research institutions conduct RD&D on energy technologies. State energy offices may offer financial incentives for private RD&D efforts.
Workforce Development	Universities commit resources to training students at Industrial Assessment Centers. State Departments of Labor and Economic Development Agencies also partner with various private, public, and non-profit parties to advance training initiatives.

Housing, Economic Development, Labor, Human Services, and Community Action Agencies

States coordinate the Weatherization Assistance Program in numerous ways, delegating it to agencies such as Economic Development Departments, Housing Authorities, Departments of Human Services and Departments of Community Action. These agencies act as intermediaries and administer these funds, passing them through to local community groups that hire contractors to implement the home retrofits to low-income households. While WAP is the major energy efficiency initiative of these agencies, many states run financial incentive programs out of these diverse institutions to promote energy efficiency in housing stocks. The most typical programs provide low-interest loans for home energy improvements. In Alaska, for example, the state legislature allocated \$160 million to the state housing agency (also the designated state energy office) to help finance energy efficiency improvements up to \$10,000. Since 2008, the Home Energy Rebate program has issued 3,100 rebates to participants, who spend an average of \$10,500 on improvements resulting in projected annual savings of \$1400. On top of its existing weatherization program, Alaska's rebate program offers an example of how states are supplementing traditional low-income weatherization programs with new financing programs to reach new customers and derive additional savings. The Minnesota Housing Finance Authority also administers a financing program for general home improvements known as the Fix-up Fund. The program is now paired with an Energy Saver Rebate equal to 35% of the cost of the eligible improvements financed with a Fix-up Fund loan, up to a maximum of \$10,000.¹¹

Moving forward, the existing infrastructure in place for state economic development will help push efficiency ahead through assisted financing as well as workforce training and education programs. In Iowa, for instance, new sources of funding will advance clean energy workforce training at community colleges. The 2007 bill allocated \$2.5 million to the Workforce Training and Economic Development Fund for four years. The Michigan Strategic Fund, which was initially created in 1984 to promote economic development and create jobs, received approval to spend up to \$45 million on the Centers of Energy Excellence Program, which will support clean energy research, workforce development, and commercialization.¹² These traditional financing and training programs should no longer be cast simply as promoting economic development, but promoting the benefits of clean energy as well.

General Service Agencies

The role of general or administrative service agencies within state governments is critical to improve the energy performance of public buildings. In particular, these agencies often take the lead on energy performance contracting programs, which aid in developing a robust network of private energy service contractors. These agencies also take the lead on product procurement, which has a direct and indirect effect on energy usage. Over half the states adopted legislation, policies, or plans that require the procurement of energy efficient appliances and equipment over the past decade (EPA 2009). Almost every state has committed resources to "lead by example", and while these agencies typically oversee the effort, the programs span across departments, and departments of environment sometimes act as the lead agency. Some states put in place government-wide emission reduction goals or mandatory energy savings target for new and

¹¹ <http://www.mnhousing.gov/>

¹² S.B. 1380: <http://www.legislature.mi.gov/documents/2007-2008/publicact/pdf/2008-PA-0175.pdf>

existing state government facilities. Only eight states have yet to implement some energy efficiency requirement for public facilities or fleets (Eldridge et al. 2009).

While energy performance contracting programs are nothing new, state governments are now pursuing energy efficiency activities on a statewide scale providing far more savings than programs targeting single buildings. Hawaii's Lead by Example program applies to all 26 agencies and resulted in a 5.8% drop in electricity consumption in 2009 and a 2.5% drop from baseline year 2006. Prior to 2006, Hawaii's energy office provided limited assistance to the Department of Accounting and General Services, which subsequently retrocommissioned 5 or 6 buildings. The new LBE program strengthens the focus of Hawaii's executive agencies on energy efficiency and more states are likely to follow as ARRA funds for the SEP and EECBG finance energy improvements at government facilities.

Environmental Agencies

State environmental agencies oversee state efforts at regulating and mitigating pollution, which places them in a unique position to conduct programs to save energy. Most agencies cover programs for air, water, land, and recycling or waste management. Many states use these agencies as the primary tool to educate citizens about climate change and run programs to mitigate greenhouse gases. State air quality offices ensure compliance of the federal Clean Air Act and the Emergency Planning and Community Right-to-Know Act, but can assume broader responsibilities as well. Efforts to curb greenhouse gas emissions from polluting sources, particularly in the transportation sector are quickly ramping up and should be recognized for their multiple benefits.

The California Air and Resources Board (ARB) is the lead agency for implementing Assembly Bill 32, the Global Warming Solutions Act of 2006 (Chapter 488, Statutes of 2006). The ARB executes numerous programs to contribute to the Act's aim of reducing greenhouse gas emissions to 1990 levels by 2020. The ARB Climate Change Program envelops a number of important energy and fuel saving programs including the low-carbon fuel standard program, the goods-movement emissions reduction program, and the enforcement of Clean Car Standards.¹³ Some states have more than one governmental authority dedicated to air quality. In Ohio, the Air Quality Development Authority rests outside the Ohio Environmental Protection Agency, which houses the Division of Air Pollution Control. The AQDA is a non-regulatory body that can issue air-quality bonds and finance public and private projects that improve air quality and energy performance with loans or grants.¹⁴ Both operating for decades, these two bodies have evolved from focusing mostly on air quality to an expanded portfolio of energy and climate change programs. State air quality agencies across the country are following this trend, particularly in the adoption of clean car programs based on California's emission standards, a step taken by 15 states.

While less common, environmental divisions tasked to oversee waste reduction and pollution control also run programs with convergent goals related to energy efficiency and environmental protection. Some states recognize the commonalities between energy efficiency and waste reduction and offer innovative voluntary program models to achieve these aims. North Carolina Waste Reduction Partners provides a variety of energy users the services of highly experienced and retired engineers, architects, and scientists to reduce waste and energy through

¹³ <http://www.arb.ca.gov>

¹⁴ <http://www.ohioairquality.org/>

assessments and technical assistance. The program is a partnership of the Land-of-Sky Regional Council and Triangle J Council of Governments, and the North Carolina Division of Pollution Prevention and Environmental Assistance. It receives funding from a variety of state, utility, and federal funding. A similar program in Minnesota, run out of the Pollution Control Agency, utilizes retired engineers to conduct energy audits for facilities of all types. In 2009, the program conducted more assessments than ever before.

Transportation and Smart Growth

State governments also address transportation efficiency through transportation departments, which receive federal and state funding to pursue projects that reduce fuel consumption and promote alternatives to automobiles like public transit. While the main concentration of state departments of transportation focuses on road and highway construction and repair, many supplement federal financing for municipal mass transit programs. Some states, such as Massachusetts include mass transit in its main programs. The Massachusetts DOT directly administers the Massachusetts Bay Transportation Authority, which serves the Boston metro area, as well as the surrounding transit and rail network.¹⁵ Transit and energy-efficient transportation options are becoming central to state transportation legislation and planning. In Illinois, the Jump Start Capital Plan authorized more than \$8.3 billion in bonds for the Department of Transportation, \$1 billion of which will target rail and mass transit. In Colorado, the newest transportation bill dedicates \$15 million annually to fund transit and bike/pedestrian safety programs, the first time the state has created a dedicated funding source for statewide transit programs.

States also focus on the smart growth concept, which blends disciplines to promote healthy communities and resource conservation. States address smart growth in a number of ways, setting up agencies, programs, and policies to develop communities in sustainable ways. While local governments act as the main policy driver for planning and land-use issues, state governments can fill an important role to ensure responsible measures are taken across the state. Many state planning agencies assist local governments in land-use planning, revitalization, and growth management with the smart growth concept guiding their work even if not explicitly stated in its mission. The North Carolina Community Planning Program, which is run out of the Department of Commerce, consists of regional offices with professional planners who support local governments implement smart zoning and land-use policies through training and technical assistance.¹⁶ Colorado's Office of Smart Growth, housed within the Department of Local Affairs, collaborates with several agencies to offer workshops across the state.¹⁷ Arizona's Office of Smart Growth is part of the Department of Commerce and offers statewide technical assistance to municipalities, counties, and tribal communities. The Office also administers a grant program for rural communities, but most of its work involves engagement at the local level.¹⁸

In Massachusetts, the Department of Housing and Community Development oversees the implementation of Chapter 40R, otherwise known as the Smart Growth Zoning and Housing Production Act. The program encourages higher-density mixed-income housing production in smart growth locations by providing financial incentives to municipalities that establish zoning

¹⁵ <http://www.massdot.state.ma.us/Transit/>

¹⁶ <http://www.nccommerce.com/en/CommunityServices/CommunityPlanningAssistance/>

¹⁷ <http://www.dola.state.co.us/osg/>

¹⁸ <http://www.azcommerce.com/SmartGrowth/>

overlay districts satisfying certain minimum thresholds pertaining to location, allowable residential density and affordability. Since its inception in 2004, the program has awarded over \$12 million to 36 communities. While a similar program has taken hold in Connecticut, this model has yet to be adopted elsewhere.

Research, Development, and Deployment

States primarily leverage existing resources to conduct research, development, and deployment (RD&D) in the energy technology field (NGA 2008). States typically can utilize existing industrial resources and intellectual resources present at public universities and research institutions. Utilizing existing laboratory and research facilities, energy efficiency RD&D programs focus on building science, transportation, distributed generation, and end-use behavior. A defining feature of energy efficiency RD&D at the state-level is the collaborative nature of these ventures, a trait exemplified by North Carolina's Advanced Transportation Energy Center, which receives funding from the state government and utilities, while being housed on the Centennial Campus of North Carolina State University (NGA 2008, 31). Federal and state funding for energy efficiency can leverage significant private sources of funds from venture capital and private industry. In the field of clean energy research, development, and deployment (RD&D) for instance, venture capital investment grew 15-fold from 2003 to 2007 to reach an estimated \$3.4 billion (NGA 2008, 19).

Many universities also run Industrial Assessment Centers, well-established programs which train students in energy audits and provide businesses with energy services. Funded by the federal government, this program provides real-world experience and training for students and important services to industrial facility managers. State energy offices also offer tax credits, financial incentives for the private sector to conduct RD&D on energy technologies, an approach taken in Connecticut with its New Energy Technology Program, which awards grants to firms attempting to commercialize new energy related technologies.¹⁹

Universities and colleges will continue to fill a major need in the expanding state energy efficiency program portfolios. Some will receive ARRA funding through the newly created Advanced Research Projects Agency-Energy (ARPA-E), which seeks to replicate the success of a defense-oriented program that funded innovative technologies ready for market breakthroughs. ARRA allocated a total of \$400 million to this program and the first round of funding awarded \$151 million to 37 research projects in 17 states. A majority of the applications awarded include college and university team members and 35 percent have educational institutions as the lead organization. Forty-one percent of the projects will focus on energy efficiency or vehicle technologies (ARPA-E 2010).

It also should be noted that while they are non-profits affiliated in some instances with Universities, state Manufacturing Extension Partnerships (MEP) are beginning to embrace energy efficiency and sustainability as a core component of its technical assistance offerings. The MEPs function autonomously from state governments, but receive support from the National Institute of Standards and Technology (NIST) and function similarly to a voluntary state program, as professional engineers consult manufacturers on how to make their processes more efficient.

¹⁹ http://www.ct.gov/opm/cwp/view.asp?a=2994&q=389832&opmNav_GID=1808

Conclusion

States continue to rely heavily on traditional ratepayer, state, and federal funding for energy efficiency programs. Clean energy funds and state energy offices will remain critical to administer programs as well. These funding and administrative models underpin the energy efficiency program landscape and gain increasing importance as policymakers, regulators, and private stakeholders seek solutions to integrated economic, environmental, and energy challenges. The full spectrum of energy efficiency program options should be recognized, however, to ensure they receive the funding and administrative support needed to evaluate and replicate their success. The latest wave of funding from ARRA and other new sources demand a re-evaluation of how states can address energy efficiency, and identifying the broad group of energy efficiency program delivery mechanisms, whether old or new, can help clarify paths for states seeking to build energy efficiency program portfolios. Critically, states moving forward must recognize that success depends greatly on collaboration, not competition, between the program providers old and new, to share best practices and innovative methods of funding and administration.

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