United States
Environmental Protection
Agency

Advancing State Clean Energy Funds

Options for Administration and Funding

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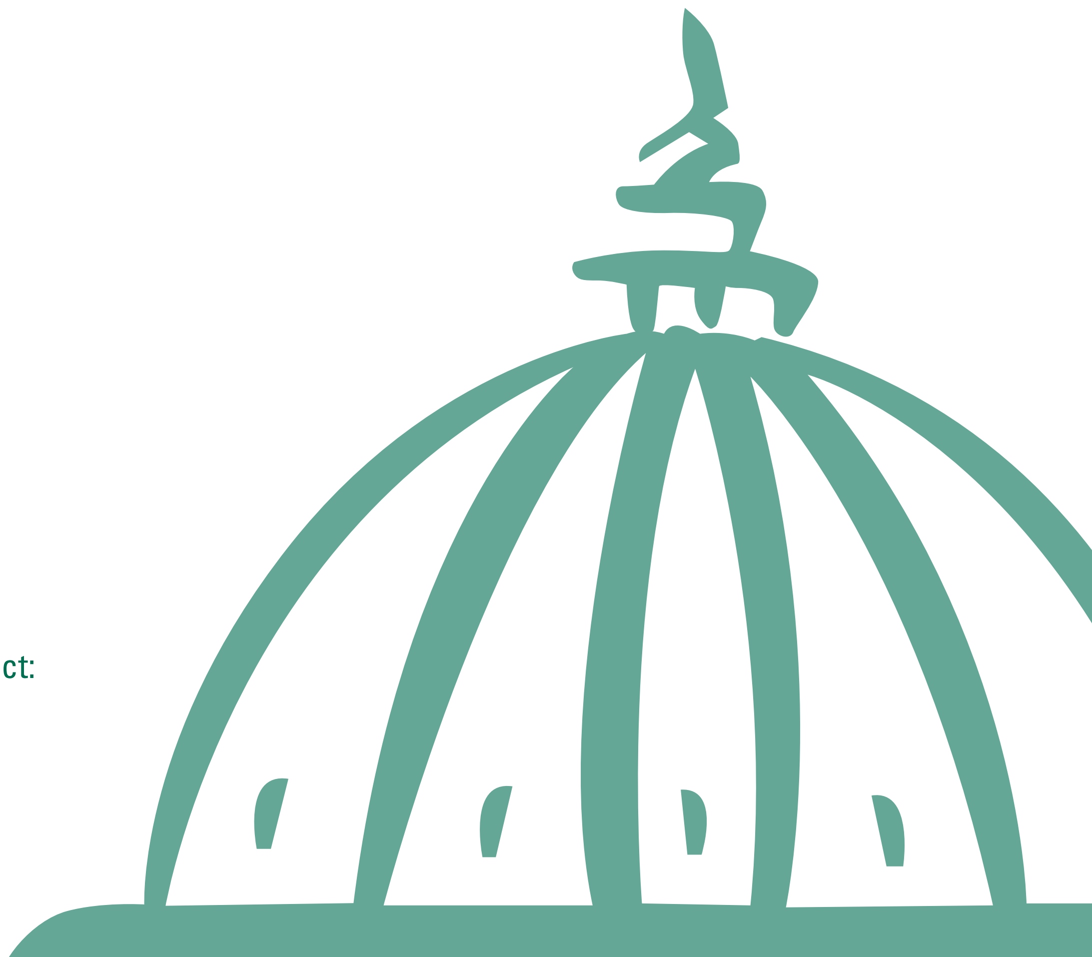
Prepared for the U.S. Environmental Protection Agency's
Climate Protection Partnerships Division
by Optimal Energy, Inc.

May 2008



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Executive Summary

Importance of Clean Energy Funds

Improving the energy efficiency of homes, businesses, schools, governments, and industries—which consume more than 70 percent of the natural gas and electricity used in the United States—is often the most cost-effective option for addressing the challenges of high energy prices, energy security and independence, environmental concerns, and global climate change in the near term. Other technologies that address these challenges include renewable energy (e.g., solar thermal, solar photovoltaic, wind, hydro, biomass), clean distributed generation, and combined heat and power (CHP). Despite a range of well-documented benefits, several persistent barriers limit greater investment in clean energy. Focused policies are necessary to overcome barriers and enable these resources to play an increasing role in meeting our nation's energy needs.

States are increasingly using Clean Energy Funds (CEF) as a means to establish effective funding sources and clean energy delivery mechanisms that can overcome the barriers to these investments faced by individuals, facility owners and operators, and public sector entities. The objectives of these CEF policies include:

- Saving energy and avoiding new generation through long-lasting improvements in energy efficiency,
- Accelerating the development of renewable energy and CHP within a state,
- Lowering energy demand and reducing air pollution and greenhouse gas emissions, and
- Reducing customer energy costs.

CEFs can provide a source for stable, long-term funding that helps place clean energy resources on a level playing field with traditional options for meeting energy needs. CEFs can advance these objectives through a variety of strategies, including lowering equipment costs, addressing market barriers, and providing customer education and outreach (EPA 2006a).

The important role of CEFs is recognized in the National Action Plan for Energy Efficiency (Action Plan) *Vision for 2025*, which provides a framework for policies and approaches aimed at achieving all cost-effective energy efficiency by the year 2025. Goal Five of the *Vision's* Ten Implementation Goals encourages states to clearly establish an entity to administer energy efficiency programs and establish energy saving targets and the necessary funding on a multi-year basis (NAPEE 2007a, p. 2-3). While the Action Plan focuses on efficiency, the goals discussed here are relevant to the advancement of other clean energy technologies.

Status of Clean Energy Funds

There is substantial experience with CEFs across the United States. Most states have implemented some form of CEF for either efficiency or renewables, even if it is the straightforward use of general state funds for low-income efficiency programs or home energy audits. According to the American Council for an Energy Efficiency Economy (ACEEE), at least 46 states and the District of Columbia made some investment in efficiency in 2004 (Eldridge et. al 2007). Nevertheless, most of these states are well-positioned to capture substantially more cost-effective energy savings and reap related societal benefits, including greenhouse gas (GHG) and air pollution reductions, water savings, and economic development opportunities. Significant opportunities exist for advancing CEFs at lower cost compared to traditional generation resources.

States are structuring their CEFs using a variety of funding and administration approaches, based on what makes sense in a particular area. These approaches are discussed at length in this manual and are summarized below in Table ES-1.

Table ES-2 provides a snapshot of various state-level approaches to administration and funding. Where a state appears more than once, this indicates that multiple CEFs exist or that aspects of CEFs are handled in different ways. For example, a recent settlement in Illinois resulted in joint CEF administration by the utilities and the state. In the case of California, the CEF is funded by both utility cost recovery and a public benefits fund. Of the top-ten spending states, 8 use a system benefits charge (SBC) as their primary funding mechanism and 2 rely on utility cost recovery (UCR). Nationwide, approximately 20 states have SBCs for clean energy (DSIRE 2007).

As far as total spending, several states in New England and the Pacific Northwest now allocate approximately 2 percent of annual utility revenues to electric efficiency. These states include Vermont, Massachusetts, Oregon, Washington, and Connecticut. Other top states – those spending between approximately 1.2 and 1.6 percent of revenues – are widely distributed around the country, including New Jersey, Minnesota, and California.

Table ES-1. Summary of CEF Administrative and Funding Mechanisms

Administrative Approaches	
Utility	Delivered by utilities, usually distribution-only utilities in restructured markets or traditional utilities in regulated markets
State	Delivered by existing or newly-created state entity, typically relying on contractors to perform many functions
Third Party	Delivered by independent entity whose sole purpose is to administer energy efficiency programs
Funding Mechanisms	
Utility Cost Recovery	Recovered by utilities directly from ratepayers through a separate surcharge (similar to fuel adjustment surcharges) or through base rates at the time of a new rate case
System Benefits Charges (SBCs)	Recovered from ratepayers through a surcharge levied on consumption, usually at distribution level rather than generation level
Taxes	Funded through tax collections, usually from general funds
Leveraging	Funded by revenue collected as a result of clean energy investments, typically from, emissions or energy markets

[1] Although some of this spending may have been in the form of tax credits or incentives, which do not fall under the definition of CEF used in this Manual, CEF spending as defined here is certainly widespread.

Table ES-2. State Approaches to CEF Administration and Funding

		Administrative Options		
		Utility	State	Third Party
Funding	Utility Cost Recovery	Kansas, Texas, California, New York, Illinois, Iowa, Minnesota (efficiency)	Illinois	N/A
Funding	SBC	Massachusetts (efficiency), Connecticut, California	Massachusetts (renewables), New York, New Jersey, Maine	Vermont, Oregon
Funding	Taxes	N/A	Minnesota (renewables)	N/A
Funding	Leveraging	Connecticut		Vermont

Structure and Use of this Manual

This manual is intended to help policy and program decision-makers identify the clean energy funding and administration approaches that make sense for their jurisdiction. For each approach, it provides an overview of advantages and disadvantages, implementation options, and state examples. The manual also references other policies for promoting clean energy and briefly describes interactions and considerations related to establishing a Clean Energy Fund. After reviewing the manual, readers will be able to answer the following questions:

- What is a Clean Energy Fund, and how can it benefit my state economy, my constituents, other stakeholders, and the environment?
- What are the options for administering a CEF and what factors should I consider in selecting an entity to administer a CEF?
- What are the potential funding sources for a CEF and what factors should I consider in choosing one?
- How do CEFs interact with other policies that promote clean energy and energy efficiency investments?
- What do I need to know about program design, evaluation, and other topics in relation to CEFs?

Table ES-3. Summary Evaluation of Administrative Model Characteristics

	State Model	Utility Model	Third Party Model
Resistance to fund raids	L	H	M
Administrative efficiency	M	L	H
Reduces Transition Costs	M	H	L
Avoids conflicts of interest	M	L	H
Facilitates Market Transformation	H	L	M
Flexibility of Programs	L	H	H
H=high, M=medium, L=low			

Table ES-4. Summary Evaluation of Funding Model Characteristics

	Utility Cost Recovery	Public Benefits Funds	Taxes	Leveraging
Legislative or Regulatory Approval?	Regulatory	Legislative	Legislative	Regulatory
Sustainability and Flexibility	M	M	L	L
Supports Integrated Resource Planning	H	M	L	H
Limits Short-Term Rate Impacts	M	M	H	H
H=high, M=medium, L=low				

Summary of Findings

Clean Energy Funds can be administered by utilities, states, third-party entities, or a combination of these. Each of these comes with strengths and weaknesses, but in any given situation one or two may be better choices. Table ES-3 summarizes some of the important characteristics of the administrative models and their relative strengths in each area.

Clean Energy Funds can be capitalized by ratepayers through System Benefits Charges/Public Benefits Funds (SBCs/PBFs) or as part of electric rates, by the public through taxes, or through other sources such as monies leveraged from energy and emissions markets. As with administrative models, these approaches have strengths and weaknesses (highlighted in Table ES-4).

Consideration of the above factors leads to the conclusion that successful CEFs facilitate a long-term commitment to implementing cost-effective clean energy resources. This requires a structure that can be responsive to changing economic, technological, and political conditions while maintaining a long-term focus and supporting consistent and sustained clean energy investments. Administrative mechanisms must also be supported by timely, consistent, and stable program funding that is sufficient to achieve all cost-effective clean energy resources.

Chapter 1
Background and Purpose

1.1 Clean Energy Funds as a Policy Option

Improving the energy efficiency of our homes, businesses, schools, governments, and industries is often the most cost-effective option for meeting the combined challenges of growing energy demand, energy security, and climate change. Other technologies that address these challenges include renewable energy (e.g., solar thermal, solar photovoltaic, wind, hydro, biomass), clean distributed generation, and combined heat and power (CHP). Policy-makers in many states and regions are working to advance these "clean energy" resources and increase their role in meeting future energy needs.

A Clean Energy Fund (CEF) is a policy that secures: (1) a source of funding and (2) an administrative delivery mechanism for clean energy resources.[2] A well-designed and administered CEF can increase public and private sector investment in clean energy, resulting in reduced energy costs for energy customers, lower emissions, and increased energy reliability. CEFs can advance these objectives through a variety of strategies, including lowering equipment costs, addressing market barriers, and providing customer education and outreach (EPA 2006a). This manual is intended to help policy and program decision-makers develop

National Action Plan for Energy Efficiency Recommendations

The Leadership Group of the National Action Plan for Energy Efficiency developed the Action Plan Report to present policy recommendations for creating a sustainable, aggressive national commitment to energy efficiency. Listed below, the recommendations are likewise applicable to efforts aimed at expanding commitments to other clean energy resources.

Clean Energy Funds are a key policy option for addressing the two recommendations highlighted below.

- Recognize energy efficiency as a high-priority energy resource.
- ***Make a strong, long-term commitment to implement cost-effective energy efficiency as a resource.***
- Broadly communicate the benefits of and opportunities for energy efficiency.
- ***Provide sufficient, timely, and stable program funding to deliver energy efficiency where cost-effective.***
- Modify policies to align utility incentives with the delivery of cost-effective energy efficiency and modify ratemaking practices to promote energy efficiency investments.

Source: NAPEE 2006.

[2] Not included in the definition of Clean Energy Funds are efficiency savings requirements, renewable portfolio standards, or research programs.

CEFs by identifying the clean energy funding and administration approaches that make sense for their jurisdiction.

Many states have initiated CEFs as a key strategy for increasing the use of clean energy to meet resource needs and for moving towards longer term objectives such as acquiring "achievable" clean energy potential and lowering greenhouse gas emissions. This is consistent with the National Action Plan for Energy Efficiency *Vision for 2025* report, which sets a primary objective of achieving all cost-effective energy efficiency by 2025 (NAPEE 2007a). This document builds from the initial Nation Action Plan Report (see sidebar on page 5), and includes ten goals that provide a framework for implementing the recommendations of the Action Plan and achieving the 2025 goal. Of particular relevance to this manual is Goal Five: "Establishing Effective Energy Efficiency Delivery Mechanisms," which recommends that states (e.g., energy offices, public utility commissions, legislatures) clearly establish an entity to administer energy efficiency programs and establish goals and funding on a multi-year basis (NAPEE 2007a, p. 2-3).

This manual also builds from the EPA Clean Energy-Environment Guide to Action (EPA 2006a, www.epa.gov/cleanenergy), which identifies and describes sixteen clean energy policies and strategies – including Clean Energy Funds – for delivering environmental, economic, and energy benefits for states. The information presented here expands upon the Guide to Action chapters on Funding and Incentives (section 3.4) and System Benefits Charge (section 4.2) for energy efficiency and renewable energy.

1.2 Structure of this Manual

This manual is intended to help policy and program decision-makers identify the clean energy funding and administration approaches that make sense for their jurisdiction. For each approach, it provides an overview of advantages and disadvantages, implementation options, and state examples. The manual also references other policies for promoting clean energy and briefly describes interactions and considerations related to establishing a CEF.

For purposes of this manual, we define clean energy to encompass energy efficiency and conservation programs, renewable energy (e.g., solar thermal, solar photovoltaic, wind, hydro, biomass), and clean distributed generation including combined heat and power (CHP). Most state experience to-date is with energy efficiency, so the analysis, discussion, and examples are focused accordingly. Relevant similarities and differences to other clean energy resources are noted, as applicable.

This manual is structured as follows:

- Section 2 provides an overview of experience to date with CEFs, describes their current status (including states' spending/savings levels), and addresses typical objectives and benefits.
- Section 3 addresses options for clearly establishing an entity to administer programs. The administrative options considered are utility, state, and third party models.

- Section 4 outlines options for establishing goals and funding on a multi-year basis.[3] Funding sources here include system benefits charge (also referred to as public benefits funds, system benefits charges or "wires charges"); utility-collected funds; taxes or other governmental funds; and funds leveraged from other markets or regulatory mechanisms.
- Sections 5 and 6 deal with the interactions between CEFs and related policies and describe related program design concepts and evaluation practices.

1.3 Key Questions Answered by This Manual

The sections of this manual each provide the answer to a question or set of questions about CEFs. These are:

- What is a Clean Energy Fund, and how can it benefit my state economy, my constituents, other stakeholders, and the environment? (Section 2)
- What are the options for administering a CEF and what factors should I consider in selecting an entity to administer a CEF? (Section 3)
- What are the potential funding sources for a CEF and what factors should I consider in choosing one? (Section 4)
- How do CEFs interact with other policies that promote clean energy and energy efficiency investments? (Section 5)
- What do I need to know about program design, evaluation, and other topics in relation to CEFs? (Section 6)

The manual provides references to other resources throughout the text. A full reference list is provided in Appendix A.

[3] The information presented in these sections supports Goal Five of the *Vision for 2025* report: "Establishing Effective Energy Efficiency Delivery Mechanisms."

Chapter 2
Introduction to Clean Energy Funds

This section provides an overview of experience to date with CEFs, describes their current status (including states' spending/savings levels), and addresses typical objectives and benefits.

2.1 Experience with Clean Energy Funds

The first Clean Energy Funds were utility-run efficiency programs developed in the late 1970s and 1980s. The impetus for increased efficiency came from the oil supply shocks in 1973 and 1979, as the greatly increased price of oil resulted in substantial fuel switching in electricity generation and attention to conservation and efficiency in energy-consuming sectors. The second impetus came from changes in the regulatory climate which saw utility regulators begin to question the high construction costs of new generation facilities, particularly nuclear power plants, which electric utilities were seeking to recover through their rates.

In the 1980s, regulatory commissions disallowed billions of dollars in utility costs and began to require least cost planning (LCP), also referred to as "integrated resource planning" (IRP). This approach required utilities to evaluate both supply and demand-side resource options for meeting their load. Least-cost planning provided an opportunity to demonstrate that energy efficiency and demand side management (DSM) options could be lower cost alternatives to constructing or purchasing new generation. Utilities recovered the costs for energy efficiency programs approved under least-cost planning through rate cases in the same way they recovered costs for new generation facilities. By the mid-1980s, several states had adopted least-cost planning regulations. Utility spending on DSM grew rapidly, as did the number and scope of utility energy efficiency programs. These investments continued to grow, peaking in 1993 when an estimated $2.7 billion was spent on utility DSM programs (DOE 2007).

The next major influence on clean energy funding was the restructuring and deregulation of wholesale electricity markets during the mid 1990s. In brief, deregulation and restructuring raised the concern that including efficiency program costs in rates might place the incumbent utilities at a competitive disadvantage—customers might avoid the charge by switching to a new, competing supplier. This problem was addressed by creating "non bypassable" charges. In states that restructured, most energy-efficiency programs are now funded by ratepayers through a separate public benefit fund (PBF) or system benefits charge (SBC) included in their electric bill (Blumstein 2003).

2.2 Current Status of Clean Energy Funds

With the exception of electricity efficiency programs, good data are difficult to find for most clean energy fund programs. Electric sector efficiency programs are the most widely implemented and have the longest history. Several states in New England the Pacific Northwest spend in the neighborhood of 2 percent of annual utility revenues on electric efficiency, including Vermont, Massachusetts, Oregon, Washington, and Connecticut. Other top states spend between 1.2 and 1.6 percent and are more widely distributed around the country, including states such as New Jersey, Minnesota, and California. Many of the top-spending states use system benefits charges (SBCs) as their funding mechanism, with only 2 of the top 10 relying on utility cost recovery (UCR).

Nationwide, approximately 20 states have SBCs for clean energy (DSIRE 2007). Table 1 summarizes recent spending levels in the ten states with highest spending as a percentage of total annual electric utility revenues. Note that the median value is well below the average, indicating that many states spend very little on efficiency: 13 states spent 0.01 percent or less. The table also shows spending on renewable energy programs in these states, where data are available. With the exception of New Jersey, spending on renewables lags spending on efficiency among the top 10 efficiency states.

Differences in spending on efficiency programs translates directly into differences in the results of these programs. Although there is some variability across programs, greater spending generates greater savings. The specifics of program design do influence the cost of saved energy, but Figure 1 shows that there is a relatively consistent

Table 1. Electricity Efficiency and Renewables Program Spending as Percent of Utility Revenue

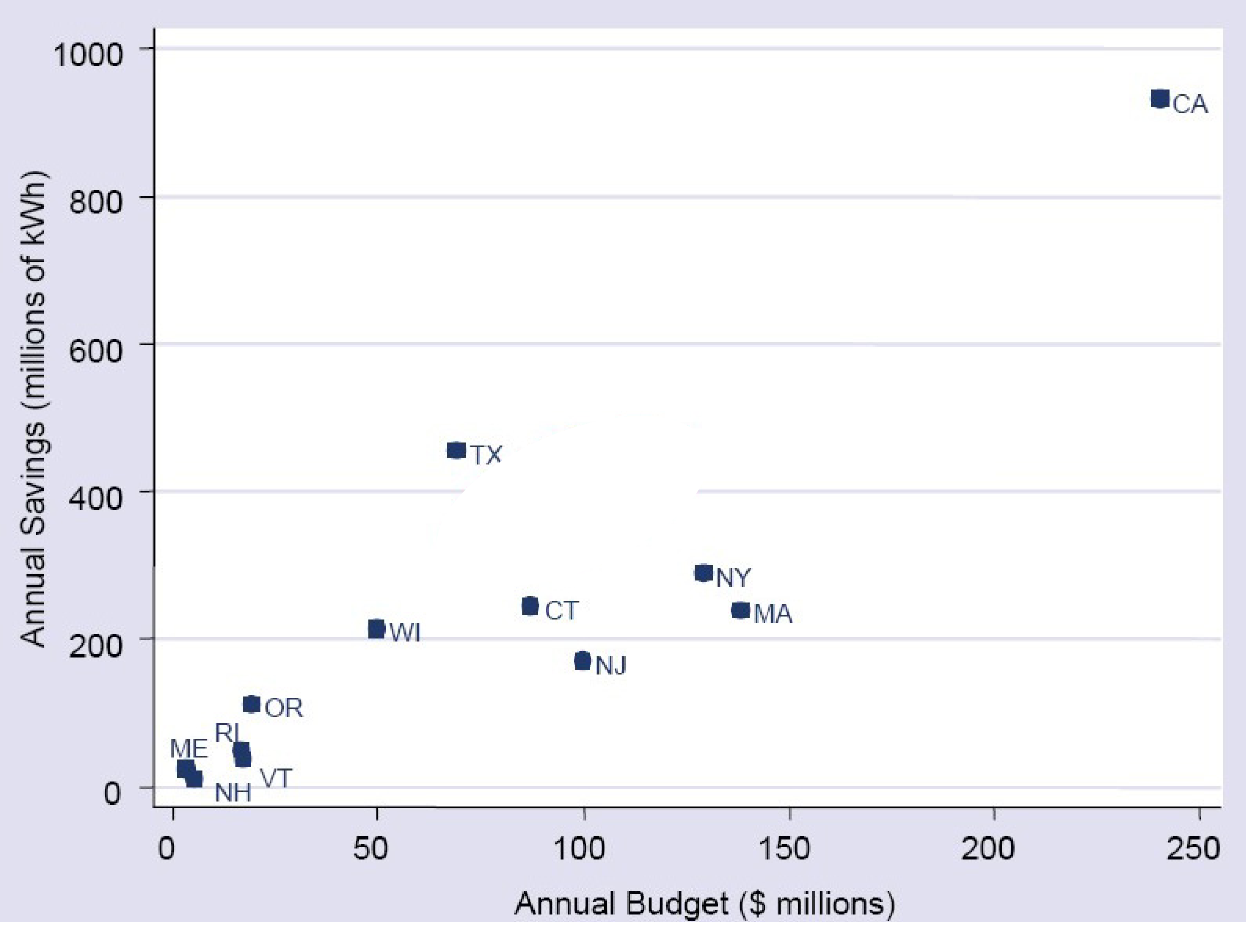
	Efficiency Spending as % of annual total revenue (2006)	Renewables Spending as % of annual total revenue (2006)	Funding Mechanism–Efficiency	Funding Mechanism–Renewables
Vermont	2.4%	1.0%	SBC	SBC
Washington	2.2%	N/A	UCR	N/A
Oregon	2.0%	0.4%	SBC	SBC
Idaho	1.8%	N/A	SBC	N/A
Iowa	1.7%	N/A	SBC	UCR
Rhode Island	1.6%	0.2%	SBC	SBC
Connecticut	1.5%	0.4%	SBC	SBC
Massachusetts	1.5%	0.3%	SBC	SBC
Wisconsin	1.3%	0.1%	SBC	SBC/Taxes
New Hampshire	1.1%	N/A	SBC	N/A
2006 US Average	0.5%	N/A	N/A	N/A
2006 US Median	0.12%	N/A	N/A	N/A

Source: Eldridge et. al 2007; York and Kushler 2005; unpublished ACEEE data; DSIRE database; Optimal Energy research.

relationship between program spending and realized savings. Note that some of the variability in the ratio of spending to savings is due to differences in the way savings are calculated across jurisdictions. Also note that energy savings as measured in kWh is not the only metric of interest to CEF administrators: peak kW reduction, greenhouse gas reductions, fossil fuel savings, and difficult-to-measure effects such as market transformation, education, and public outreach are all valuable results generated by program spending. To the extent that programs are designed to emphasize these benefits over energy savings, the resulting cost of saved energy may not convey a complete picture of program benefits.

On the renewables side, good data on total spending by state are sparse. One reason is that, compared to energy efficiency, tax incentives are more frequently used to advance renewables programs. Estimates of total program costs (in the form of lost tax revenues) are available, but there

Figure 1. State Energy Efficiency Savings as a Function of Annual Budget, ca. 2003.



Source: Graphic by S. Stratton; data from Kushler et al (2004).

is typically no separate fund or account that tracks total spending. Furthermore, the technologies supported by the state programs vary widely. Some states have only solar photovoltaic (PV) programs, while others cover a wide range of clean energy technologies (e.g. hydroelectric, biomass, fuel cells). Geothermal heat pumps, which can be considered an energy efficiency measure, are also frequently included in renewable energy programs.

2.3 Benefits of Clean Energy Funds

States implement clean energy funds for a variety of reasons, but they are generally designed to increase the implementation of efficiency measures or renewable energy technologies and therefore capture the benefits that these clean energy resources can provide.

Environmental Benefits

- Reduces pollution since most, if not all, clean energy technologies generate less pollution per kWh than traditional fossil-fuel fired generation. Efficiency generates no emissions for each kWh saved, and most renewable technologies have zero or low net emissions.
- Reduces the need for new power plants or transmission lines, thereby reducing all of the environmental impacts associated with power plant or transmission line siting and construction.

Energy Benefits

- Reduces the risks associated with price and supply of fossil fuels and avoids the costs of unanticipated increases in future fuel prices.
- Reduces peak demand, thus reducing stress on generation and local transmission and distribution systems, potentially deferring expensive new power plants and T&D upgrades or mitigating local transmission congestion problems.
- Improves the overall reliability of the electricity system, also derived from peak demand reductions.
- Improves the overall efficiency of fuel usage.

Economic Benefits

- Lowers cost of electricity (generally from efficiency, although biomass and CHP may also be less expensive than traditional generation), which lowers overall system costs and therefore reduces customers' electricity bills.
- Promotes local economic development by increasing the disposable income of citizens and making businesses and industries more competitive. They also create local jobs in the energy efficiency and renewable manufacturing and service sectors. In contrast, traditional power production often entails large export of local capital for the importation of power plant equipment, fuel, or power purchased from outside the utility service territory.

Chapter 3. Administrative Models

This section discusses three administrative models for clean energy funds which differ primarily based on the identity of the program administrator: utilities, state governmental entities, and third parties.[4] Each model has distinct pros and cons, and certain models may be more or less effective in specific circumstances and depending on the policy environment and infrastructure of the state.

The National Action Plan for Energy Efficiency highlights the designation of the entity responsible for administering energy efficiency programs as a key option to consider. This step is critical to pursuing the second of the Action Plan's initial five recommendations, which is to make a strong, long-term commitment to implement cost-effective energy efficiency as a resource. The *Vision for 2025* report, which establishes an implementation framework for the Action Plan, also highlights the importance of this step (see Goal Five of the Ten Implementation Goals).

The administrative model chosen for a CEF, relative to the policy environment and energy marketplace, plays a large role in the effectiveness with which the program is delivered. Questions that decision-makers should ask when considering which model to implement include:

- Will the Program Administrator be able to operate efficiently and without concern over appropriation of clean energy funds by other organizations?
- What are the costs, if any, to transition from the current administrative model to the new one?
- How will the Program Administrator avoid conflicts of interest?
- Does the administrative structure facilitate market transformation activities?
- Will the Program Administrator have the flexibility to respond to changing market conditions, policy interests, and funding levels?
- Are there additional policies or actions that can limit the potential disadvantages of a particular administrative model?

3.1 The Utility Model

In the utility model, efficiency programs are funded by the ratepayers or a SBC and run by the electric and/or gas utilities. The utility model can be further divided into two subcategories: those administered by distribution-only utilities in states that have undergone restructuring and those administered by traditional vertically-integrated utilities in states that have not.[5] Before the restructuring of the 1990's, many vertically integrated utilities ran

[4] While these categories are useful for illustration, state implementation often occurs on a continuum across these models, and some overlap between them exists.

[5] Note that some states that have restructured still allow vertically integrated utilities to serve as both distributor and retail service providers (notably Texas), but this is not the norm.

large and effective efficiency programs, spending an average of 1.4 percent of revenues on efficiency. This represents twice the amount utilities spent in 2002 (Lin 2005).

The utility model, while quite common for efficiency programs, is rarely used for renewables programs.

Examples of the Utility Model

In Massachusetts, efficiency programs are administered by the state's investor-owned distribution utilities.[6] Program plans and designs are created only after extensive input from a collaborative consisting of the Department of Energy Resources (DOER), low-income representatives, and various business, environmental and consumer advocate groups. This collaborative helps ensure that the utilities' programs are aligned with public interest, and that efficiency efforts enjoy continued support from the stakeholders. Other states that use the utility model include: California, Colorado, Connecticut, Florida, Kansas, Minnesota, New Hampshire, Rhode Island, Texas and Washington.

Advantages of the Utility Model

- Efficiency can easily be included in utilities' Integrated Resource Plans (IRPs). Other issues of coordination and integration are minimized with utility administration.
- Efficiency programs of both vertically integrated and distribution only utilities benefit from pre-existing relationships with the customers and distributors. This allows customers to engage with a familiar entity and may reduce the level of marketing needed to inform customers of clean energy policies and programs. Utilities also benefit from added contact with their customers.
- Many utilities have long-running efficiency programs, and there can be significant transition costs and time associated with dismantling the existing infrastructure and re-establishing it elsewhere. For this reason, moving CEF administration away from utilities should be done cautiously and with good reason.
- Utilities have access to valuable customer data on energy usage patterns which can be leveraged to increase understanding of the market for energy efficiency and clean energy resources.

Disadvantages of the Utility Model

- There is significant potential for conflicts of interest: utilities may have financial disincentives for efficiency and alternative generation, since their profits and recovery of their operating costs often depend on how much electricity they sell once rates are set. Even in states where the legislature or regulators have separated profits from sales and created financial incentives for efficiency, the internal culture at the utility may require some time to adjust to this change.
- When more than one utility in a state offers the same standard efficiency programs, there will be some administrative redundancy. Utilities may also have differences in their program designs and implementation procedures. This can cause confusion in the market, since most market actors (e.g., architects, engineers, lighting designers, vendors and contractors) work across utility boundaries and large customers may have buildings in multiple service territories. This was an important factor in Vermont's decision to shift to a third-party model: Vermont has over 20 individual utilities serving a total population of approximately 600,000 people.
- In many states that use the utility model, the small municipal utilities do not offer programs.

[6] Renewable energy programs in Massachusetts are separately administered by a state entity, as described under that heading.

Compelling them to offer efficiency requires an act of legislation (they are not often regulated by the state utility commission). Further, small municipal and cooperative utilities may not have the human capital to deliver substantial program portfolios, and when they do the administrative redundancies become much more significant. This means that residents and firms in their service areas may not have access to programs.

- Market transformation[7] activities typically need to address geographic areas that are larger than any single utility's service area. This is less true in places such as California, where the utilities serve enormous territories, and have aligned their programs well.
- Larger utilities are developing efficiency programs that are consistent throughout their multi-state service areas. While this can provide economies of scale, it also requires that all states in which the utility operates have implemented the utility model. Where part of the service territory is in states with other administrative models, these economies of scale cannot be realized.

3.2 The State Model

In the state model, the efficiency program is administered by an existing or newly created state entity. In this model, the state typically relies on contractors to perform some functions but retains overall program administration and financial responsibilities. Under this model, state agencies are intimately involved in program designs and details.

Examples of the State model

States that administer CEFs include New Jersey, Maine, Ohio, and to a certain extent Illinois, New York and Massachusetts. Illinois retains 25 percent of their CEF for state-implemented programs, with the remaining 75 percent administered by the utilities. New York has a hybrid of all three administrative models, including the New York State Energy Research and Development Authority (NYSERDA), a state public benefit corporation funded by a SBC. NYSERDA is responsible for energy efficiency programming for much of the state, as well as clean energy research and development For more about New York state, see the sidebar on page 20 titled, "Hybrid Administrative Models." In Massachusetts, renewable energy programs are administered by the Massachusetts Technology Collaborative, another public benefit corporation funded by a SBC.

Advantages of the State Model

- A single statewide entity avoids redundant administrative costs that can occur when multiple utilities run their own programs. Examples of efficiencies include, but are not limited to: development and maintenance of data tracking systems; administrative staff and overhead; marketing, education and training materials and resources; monitoring and evaluation functions; and planning and program development resources.
- State administration removes the potential or real conflicts of interest inherent in utility program administration. Because the state's overriding purpose is the public interest rather than shareholder profits, it can focus on capturing societal benefits without countervailing influences. However, the state model is not immune to the effects of utility rate increases and other stakeholder concerns faced by utilities and third party administrators.
- States are generally significantly larger than utility service areas, resulting in more consistent messaging and program offerings across large geographic areas. This can have significant

[7] Market transformation refers to a reduction in market barriers resulting from an intervention, as evidenced by a set of market effects, that lasts after the intervention has been withdrawn, reduced, or changed.

benefits for market transformation programs, where consistency across numerous market actors and channels is essential and may improve the ability to influence upstream market actors such as equipment manufacturers.

- State models ensure that all residents and businesses within a state are eligible for services. Under the utility model, customers of small municipal utilities may not be well-served by clean energy programs.
- Under the state model, program implementation is typically accomplished through private contractors, which can help create competitive and experienced energy service companies. This same effect can be achieved through utility or third-party models, but in practice states are more likely to rely on outside contractors than are utilities or third-party program administrators.

Disadvantages of the State Model

- States are often challenged in their ability to hire and contract rapidly, which has direct effects on the period required for program ramp-up.
- State administered energy efficiency programs can put the state in the electricity market as a competitor to supply-side providers and energy service companies. This can create conflicts, and raise broader political issues.
- State agency funds are vulnerable to being re-appropriated to other programs, departments or staff that have little to do with clean energy.
- It may be hard to attract the most qualified people to work for the public sector, which typically pays less than private employment.
- State agencies may not have the speed and flexibility to change program goals with changing market climates, especially for market transformation programs. Depending on the structure, state models may suffer from higher levels of bureaucracy and operating restrictions than other models.
- If there is no separation between the program administrator and the oversight agency (as in Maine) the program may lack effective measurement and evaluation and the ability to timely and effectively correct deficiencies in program design or scale.
- In general, state agencies may be more susceptible to influences by external politics that have little to do with clean energy or efficiency, or that are in contradiction with CEF objectives.

3.3 The Third Party Model

The third party model creates an independent efficiency entity whose sole purpose is to administer energy efficiency programs. They are typically selected by a proposal and bidding process and enter into contracts with the state that specify spending and performance targets and associated compensation schedules. Because state programs typically rely on contractors to achieve their savings, and because the state often regulates programs administered by a third party, there is often a fine line between the state model and the third party model. However, in third party models there is more separation between the administrator and the government: contracts with the program administrator typically specify only a budget, performance goals, targeted customer segments, and a time frame. This allows the third-party administrator great latitude in reaching its goals. The state may be involved in evaluation, measurement, and verification (EM&V), but day to day operation is left in the hands of the third party.

Another distinction between state and third party models is that in some cases states have created a new non-governmental entity with its own charter and purpose that transcends beyond the contractor(s) chosen for implementation. Examples include Oregon and Vermont.

Examples of the Third Party Model

In 1999, the Vermont legislature decided that the structure of the electric industry in Vermont (consisting of many very small utilities) and other factors rendered utility-administered efficiency programs an undesirable option. As an alternative, the Vermont Public Service Board (PSB) issued an RFP for a contractor to fulfill the role of an energy efficiency utility (EEU).

Under the Vermont structure, the PSB has the power to issue RFPs, hire the EEU contractor, and approve EEU plans, programs and major budget changes. Details of program administration, design, marketing, delivery and implementation are left to the EEU. The PSB also mandates the avoided cost calculations used in cost-effectiveness screenings. A separate governmental entity, the Vermont Department of Public Service (DPS), advises the PSB on these avoided costs and on EEU program or budget changes. It also evaluates the PSB-approved and EEU-designed programs, and verifies the EEU's savings claims.

An important innovation of the Vermont system is the establishment of an independent fiscal agent (FA) to collect funds from the distribution utilities and disburse them to the EEU. The FA is hired by the PSB through a competitive bidding process, reports directly to the PSB, and provides monthly, quarterly, and annual financial statements. Despite the close connection between the FA and the PSB, the EEU funds are never owned by the State and are therefore well-protected from raids by the Executive or Legislative bodies.

Hybrid Administrative Models

It is possible to construct a hybrid administrative model that combines aspects of the models described in this section. In 1998, for example, New York tasked NYSERDA, an existing quasi-governmental agency, with administering clean energy programs. NYSERDA was created by the state legislature and its Board of Directors is appointed by the governor, yet it has considerable freedom to develop specific program designs. In this way, it is like a third-party administrator.

NYSERDA is dedicated exclusively to clean energy programs and clean energy-related research. It has successfully implemented both market transformation and resource acquisition programs and is widely viewed as more agile and efficient than traditional state agencies. As a matter of practice, NYSERDA relies heavily on independet contractors to deliver and design programs. In this regard, it operates somewhat more like a state-administered entity.

New York's approach also includes significant reliance on utility-administered programs. The two state power authorities—Long Island Power Authority (LIPA) and New York Power Authority (NYPA)—deliver their own programs to their customers.

As of this writing, New York is seeing renewed interest in investor-owned utilities delivering their own programs in tandem with those provided by NYSERDA. This was spurred by a mandate from the Public Service Commission to decouple utility sales from shareholder profits, thereby eliminating a major disincentive for utilities to pursue efficiency (NY PSC Case 03-E-0640, 20 April 2007). A recent PSC order mandating an Energy Efficiency Portfolio Standard has also had a major impact on utility efficiency plans (NY PSC Case 07-M-0548, 15 June 2007).

Other states that have implemented versions of the third party model are Oregon and New Jersey. New Jersey's approach is very similar to Wisconsin's state model, but is included here to illustrate the continuum from one administrative model to another. New Jersey follows a more arms length approach (similar to Oregon and Vermont) by allowing contractors wide latitude over program decisions while focusing primarily on overall performance criteria. Until recently, clean energy programs in New Jersey were managed and implemented by the utilities.

Advantages of the Third Party Model

- A clear and specific mission without conflicting business objectives
- The ability to react swiftly to changes in the marketplace and maintain flexibility while avoiding bureaucracy.
- Elimination of redundant administrative mechanisms, as discussed under the State Model.
- Serves entire states, or even multi-state regions, therefore maintaining broad eligibility and consistency across large areas, as discussed under the State Model.
- Funds collected and distributed under contract to a third party are typically harder to raid for extraneous purposes than with a state model, although they may be more susceptible than those in the utility model.
- States may competitively bid for services and change providers if performance is not acceptable. Nevertheless, changing the delivery entity could entail significant transaction costs and should be considered with caution.

Disadvantages of the Third Party Model

- There may be a large initial cost to creating an independent agency, which effectively involves dismantling existing utility infrastructure and developing it elsewhere. In addition, transitioning existing programs from utilities to the third party may be difficult and cause confusion on the part of customers, particularly if the transition does not simultaneously occur across the entire state.
- Effort is frequently required to engage utilities in active cooperation with the new entity, both in terms of sharing data and marketing to their customers.
- Third party entities do not initially have the contacts and relationships with customers that utilities maintain. Where data is freely shared between the utilities and program administrators, and where utilities cooperate in marketing the program to their customers, this can be overcome relatively quickly.

3.4 Evaluating Administrative Models

The three administrative models described in this section each have strengths and weaknesses. Any one of them may be appropriate in a given state, depending on the specific circumstances and priorities of the stakeholders, regulators, and legislators who determine how best to administer a CEF.

In real world implementation, the specific workings of all these models vary depending on the political and regulatory environment. Furthermore, there are a wide variety of program strategies employed under all models, and program administrators do not calculate program costs and savings in a consistent way. This makes it very difficult to compare the efficacy of the three models on an even playing field.

Studies conducted by the American Council for an Energy Efficient Economy (ACEEE) have found that there is no single best approach to administration of public benefits funds despite an apparent shift towards non-utility administration (either state or third-party) between 2000 and 2004 (Kushler et al 2004). This finding is likewise supported by other independent studies of administrative options (e.g., Harrington 2003, Biewald, et. al. 2003). In short, any of the models can be successful, and ultimate determination of the best approach for a specific state will depend on its unique situation and the details of how the particular model is administered.

The table below provides a summary of the relative advantages of each of the administrative models with respect to a set of Clean Energy Fund objectives and issues. These qualitative judgments are not intended to be definitive evaluations of any one model.

Table 2. Summary of Key Characteristics of Administrative Models

	State Model	Utility Model	Third Party Model
Resistance to fund raids	L	H	M
Administrative efficiency	M	L	H
Reduces Transition Costs	M	H	L
Avoids conflicts of interest	M	L	H
Facilitates Market Transformation	H	L	M
Flexibility of Programs	L	H	H
H=high, M=medium, L=low			

Table 3. Administrative Approaches

Administrative Approaches	
Utility	Delivered by utilities, usually distribution-only utilities in restructured markets or traditional utilities in regulated markets
State	Delivered by existing or newly-created state entity, typically relying on contractors to perform many functions
Third Party	Delivered by independent entity whose sole purpose is to administer energy efficiency programs

3.5 Overcoming Administrative Disadvantages

Most of the disadvantages noted in this chapter are not insurmountable and can be overcome by careful administrative and program design. Depending on circumstances, any of the three approaches can result in exemplary programs or a failure to penetrate the market. For example, despite observed disadvantages of state administration, two nationally regarded programs – in New York and Wisconsin – follow this model.

As previously noted, the three models are not discreet options but exist along a continuum. For this reason, elements of each can be adopted and combined to best suit local circumstances. For example, states could allow utilities to competitively bid to serve as the contractor under a state or third party model.

One disadvantage inherent in the utility model is the potential for disincentives to energy efficiency investment; a utility's main source of income is from sales of electricity, so selling less electricity means less revenue. States have tried to eliminate this disincentive through "decoupling" and shareholder performance incentives:

- *Decoupling* breaks the link between utility revenue and electricity sales volume. There are variations among decoupling schemes, but the general concept is that rates are automatically adjusted downwards if the sales volume turns out to be higher than the forecast and upwards if the volume is lower than the forecast. The total revenue earned stays constant, or nearly so, to allow for recovery of fixed costs.
- *Shareholder performance incentives* involve mechanisms that reward the utility with a financial incentive tied to performance, in addition to direct recovery of expenditures. Incentives can be related to the level of investment or set as a share of the estimated societal benefits from the efficiency program. For a thorough discussion of this topic, readers can see the Action Plan report on aligning utility incentives with energy efficiency investments (NAPEE 2007d).

These strategies for overcoming administrative disadvantages can be effective even in states that do not use the utility model to administer clean energy funds. Oregon, for example, is one of the leading states in rate decoupling even though its clean energy programs are run by an independent non-profit organization. Similarly, New York has recently mandated decoupling for regulated gas and electric utilities even though it uses a state-like hybrid model. Decoupling is still useful in this context because it minimizes utility disincentives for both delivering clean energy programs and actively cooperating with and promoting these programs to utility customers. It can also modify their position on policy initiatives such as higher efficiency buildings codes, equipment standards, and increased SBC funding. Implementing decoupling or performance incentives may also avoid conflicts between utilities and regulators on clean energy issues.

Regardless of structure, clean energy programs can overcome administrative disadvantages by achieving the following three characteristics (Harrington 2003):

- *Clarity*. Well-outlined policy rationale and clear, objective goals are critical, as are a clear administrative and decision-making framework. Performance metrics should be explicitly stated to facilitate evaluation and to provide oversight and guidance to inform interventions or redesigns.
- *Consistency*. It takes time to build an effective program infrastructure and even more time to realize the full savings of a program. Frequent changes to program infrastructure, goals, and design can significantly weaken results. A program administrator who is assured of a certain period of stability during which programs can mature and begin to demonstrate success will typically perform better than one who is concerned that funding will be removed or program goals modified if results do not materialize in an unrealistically short timeframe.
- *Consensus*. Key stakeholders should be in agreement about important issues. At the very least, utilities, regulators, various customer classes (e.g., industrial, low-income, businesses), and environmental stakeholders should be engaged in discussion about important structural questions. This is likely to generate a more robust and sustainable outcome.

Chapter 4. Funding Models

The *Vision for 2025* report establishes a goal of "Establishing Effective Energy Efficiency Delivery Mechanisms." Among the actions recommended to meet this objective are to establish goals and funding on a multi-year basis, a topic addressed in this Section. The Action Plan also suggests that establishing funding mechanisms for energy efficiency is an option to consider in providing sufficient, timely, and stable program funding for delivering cost-effective energy efficiency.

There are a number of funding mechanisms for capitalizing CEFs. Broadly, these fall into four major categories or combinations thereof:

- *Utility Cost Recovery*: utilities collect funds through rates or surcharges
- *System Benefits Charges* (SBCs): funds collected from energy users, usually as part of their bill (also known as Public Benefits Funds, Public Good Funds, or Wires Charges)
- *Taxes* or other general government funds
- *Leveraging* funds from local, state or regional market or regulatory mechanisms

Questions that decision-makers should ask when considering which model to implement include:

- Under whose authority will funds be collected, and which governing bodies, if any, must grant that authority?
- Does the funding mechanism provide a balance between sustainability (i.e., consistency over time) and flexibility (i.e., the ability to respond to changing conditions)?
- How will funding levels be determined? Will funding levels be determined in whole or in part by Integrated Resource Planning or other energy system planning processes?
- How will fund collection affect utility rates and/or energy prices?

4.1 Utility Cost Recovery

Prior to restructuring in the mid 1990s, most utility-delivered energy efficiency programs were funded by utility cost recovery (UCR). It is still widely used, typically in states with lower efficiency spending as a percentage of revenue.[8] Under this approach, utilities recover monies directly from their ratepayers through a separate surcharge (similar to fuel adjustment surcharges) or through base rates at the time of a new rate case.

[8] According to ACEEE's 2006 State Energy Efficiency Scorecard and data from the Database of State Incentives for Renewable Energy (DSIRE), only 3 of the top 15 states in spending as a percentage of revenue used this funding model: Washington, Iowa, and Minnesota (Eldridge et al 2007; DSIRE 2007)

Impact of Clean Energy Funds on Consumers

When CEFs are proposed as a mechanism to increase investment in energy efficiency and clean energy technologies, some stakeholders express concern about the cost of the program to consumers. In particular, they often note that additional utility spending, particularly on clean energy investments, will result in higher rates. They argue that because rates are expressed in dollars per unit energy (e.g., 8.5 cents per kilowatt-hour) and efficiency programs both increase costs (in the short term) and decrease the amount of energy sold, rate increases will necessarily follow. While it is true that—all else equal—utilities will need to raise rates to recover their largely-fixed costs if the amount of kilowatt-hours they sell goes down, it is also true that total bills (i.e., total customer spending on energy) will decrease for all customers on an aggregate basis, assuming the investments are cost-effective. Customers that take advantage of efficiency programs will consume less energy and therefore have lower bills than in the absence of the program, even accounting for higher rates. Other customers may in fact be faced with higher bills, in the near term, but if the investments made by efficiency programs are cost-effective (i.e., generate savings in excess of their costs), total customer spending will decrease and all customer bills will be reduced in the long term. Ultimately, energy efficiency has been found to be the cheapest way to lower total spending on energy.

With UCR, utilities typically collect funds as they spend them, usually accounted for on an annual basis. This generates a discrepancy between the costs and benefits of clean energy investments because the measures are paid for up-front (through incentives, payments to contractors, or in-house administrative costs) while the resulting savings accrue over a longer time period. Another option is to amortize the cost recovery with interest over some longer period, potentially up to the duration of the savings that will accrue. This serves to minimize short-term rate impacts and distribute the costs in line with the benefits. This approach treats clean energy resources more like traditional power plant capital costs, which are amortized over their expected life.

Rate-Basing

For an investor-owned utility, the rate-base is the total value of all the utility's assets, on which they receive an authorized rate of return. Efficiency and other clean energy investments are usually not included in the rate-base; rather, utilities typically recover these costs as they are incurred through separate surcharges. Treating these resources as investment assets, similar to traditional power plants, would allow utilities to recover their investment over time. This approach may also mean an investor-owned utility's shareholders are automatically earning a rate of return on its clean energy investments, including efficiency. Although earning a return on investment can provide a strong inducement to pursue efficiency, rate-basing ties the return to spending, as opposed to performance. Under this scenario, even spending that does not translate into cost-effective savings might be rewarded, potentially creating perverse incentives. This can be avoided through various regulatory mechanisms that tie a utility's rate of return to measurable performance outcomes.

The Procurement Approach

California has recently adopted a procurement approach, or "loading order," for electricity resources that provides an example of how applicable agencies can pursue cost-effective energy efficiency. While not a funding mechanism, per se, this procurement policy directs administrators to prioritize clean energy resources over traditional supply using existing funding channels. In California, utility cost recovery methods and public benefits funds are both in place, but instead of a full integrated resource plan, funding levels for efficiency programs are based on a hierarchy of descending priorities. Energy efficiency is considered the highest priority resource, and utilities are not permitted to procure any other electricity resource until all cost effective efficiency is implemented. In descending order, the resource priorities in California are efficiency, demand response, renewables and distributed generation, and clean fossil-fuel generation.

4.2 System Benefits Charge

System benefits charges (SBCs) emerged in the mid-1990s as utility deregulation gained traction. Many traditional utility cost recovery methods were dropped due to concerns about rate impacts and competition for market share on very slim price margins. Because utilities in deregulated markets were no longer vertically integrated, the benefits of clean energy investments would accrue to different parties (i.e., customers, generators, distribution firms, and transmission owners), making it less attractive for any one entity to bear the upfront investment costs. In addition, generators were no longer in a position to deliver efficiency programs while marketing power to customers in non-contiguous areas, sometimes from large distances.

SBCs were developed to replace traditional utility cost recovery in a way that would "level the playing field" for all generators selling into a deregulated electric market. Like the UCR model, SBCs recover funds from ratepayers through a surcharge levied on consumption, but at the distribution level rather than the generation level. These "non-bypassable" charges essentially ensure that the same charge is paid for every unit of energy delivered—termed a "volumetric" charge—regardless of the retail or generation utility. One advantage is that SBCs can apply to all distribution utilities, including small municipal and cooperative utilities that often are not regulated by state commissions or that are small enough to avoid participation in other utility-administered CEFs.

While SBCs work similarly to UCR, they are generally set by legislators rather than regulators.[9] This means they may be harder to adjust over time as clean energy investment opportunities change. In addition, SBC levels may be based more on political realities and negotiation than on careful planning and analysis of the available resource and the relative costs and benefits of different amounts of clean energy spending. As a result, SBCs are typically divorced from the process of utility integrated resource planning, and often preclude higher levels of investment without passage of additional legislation.

For example, Massachusetts legislators established a SBC and mandated that it be the only mechanism for collecting ratepayer expenditures on efficiency. Although there has recently been widespread agreement among numerous stakeholders within the Massachusetts Efficiency Collaborative (including by the utilities) that increasing expenditures would be beneficial, the Department of Public Utilities is prevented from approving any increased expenditures until new legislation is passed.

Another potential drawback to funding with SBCs is that distribution of funds typically occurs in the same period in which they are collected. In contrast, traditional generation resources are amortized over time, minimizing short-term rate impacts. This makes clean energy resources appear more expensive compared to supply options.

[9] In most cases (e.g., Vermont), legislators have passed enabling legislation allowing regulators to establish and implement a SBC. In the case of New York, a SBC was established directly by the Public Service Commission without the need for new legislation.

Leveraging ISO-NE's Forward Capacity Market

The Independent System Operator (ISO) in New England has begun implementation of a market for electric system capacity. This market provides payments for either supply- or demand-side resources that are available to meet system peak loads. The market includes an auction for future capacity to encourage commitments to acquire new resources in advance of when it is needed. Because demand-side resources are eligible to participate, the market provides an additional revenue stream to entities that bid in energy efficiency, renewable energy, and distributed generation investments. For example, a utility that pays incentives for solar PV installations may receive payments for delivering that capacity to the market, thus reducing the total cost of supporting clean energy investments from more traditional sources and providing additional funding for future CEF activities.

According to the Database of State Incentives for Renewables and Efficiency (www.dsireusa.org), 19 states have SBCs for energy efficiency and 17 states have SBCs for renewable energy. In many cases states have both, as does the District of Columbia.[10]

4.3 Using Taxes for Clean Energy Funds

Some CEFs have been funded through taxes or other general public funds rather than strictly from ratepayers. This approach is rare in the U.S. for efficiency programs but somewhat more common for renewable energy programs. It has also been used to a varying degree in Canada, where provincial utilities are public corporations.

Because virtually everyone uses electricity, the entities contributing to a tax-funded CEF are generally the same as those contributing through UCR or a SBC. Unlike those two approaches, general government funds may be collected in very different proportion to energy use, redistributing costs (and benefits) compared to a volumetric charge to ratepayers. Funds collected from taxes are also likely to be even more susceptible to political influence and raiding than ratepayer funded SBCs.

It is important to note the difference between using tax revenue to fund a clean energy program and using the tax system itself to influence behavior. Clean Energy programs might pay incentives to consumers that cover investment in efficient equipment or clean energy generation. These program incentives can be funded by SBCs, tax revenue, or utility cost recovery. Programs usually have a limited budget such that once it is expended, no additional incentives can be paid. Tax credits or deductions, by contrast, encourage clean energy investment by offering reductions in an individual's or corporation's tax liability. They typically have no set budget; the state incurs costs in the form of lower tax revenue in proportion to the number of credits or deductions claimed. Tax deductions or credits for clean energy exist in a number of states and also at the federal level. Because there is no set budget or cap for these tax revenue losses, it is very difficult to collect data on total spending using this mechanism.

In Minnesota, funds for renewable energy programs are collected from a utility operating nuclear power plants in the state in exchange for permission to store spent nuclear fuel at the sites. In effect, the state is taxing this activity and using the funds for clean energy. The Renewables Development Fund (RDF) supports both research and development of new renewable-energy sources and projects that produce renewable energy.

[10] For more detailed examples, see Section 4.2 of the Clean Energy-Environment Guide to Action: www.epa.gov/cleanenergy

4.4 Leveraging other Revenue Sources

In addition to collecting dedicated funds for CEFs, there may be regulatory or market mechanisms that can provide an income stream to help capture clean energy resources. These include emissions trading schemes and congestion pricing mechanisms. Examples of these in the U.S. are the Forward Capacity Market run by the New England Independent System Operator (ISO-NE) (see box on page 24) and the Northeast's Regional Greenhouse Gas Initiative. Many of these mechanisms are just emerging and in most cases leveraging these funds is an opportunity to supplement already-established funding mechanisms. However, over time, particularly if carbon trading schemes develop with a high clearing price, it may be possible that these revenue streams will be sufficient to capitalize CEFs on their own.

4.5 Selecting a Funding Mechanism

This section presents several factors to consider when developing a funding mechanism for clean energy. Table 3, below, summarizes this information and approximates how well – on a scale of High, Medium or Low – each funding mechanism addresses these factors.

Political and Regulatory Environment

A key question to consider is whether an approach will require legislative approval, action by regulatory bodies, or some combination of both. In the cases of SBCs and taxes, legislative enactment is generally required. This may or may not be a barrier depending on the current political climate. UCR and leveraging are generally decided in the regulatory arena, although the latter may occur on the basis of external markets with no local political involvement. Depending on the current make up of utility commissions, the positions of stakeholders, and other factors, one can weigh the likelihood of a positive outcome under different approaches.

Sustainability and Flexibility

For a CEF to be sustainable and flexible, it should be relatively immune to extraneous influences that might result in uncertainty about the consistency of funding. It should also be flexible, so that modifications can be made in response to changing opportunities and conditions.

UCR is generally considered flexible, and can be modified on the basis of integrated resource planning (IRP) and analyses of the cost-effective clean energy resource potential. In contrast, modifying SBCs and taxes typically requires legislative action and may therefore be politically difficult. In addition, there have been instances (e.g., Connecticut and Wisconsin) where the state "raided" these funds when faced with budget deficits. Even with funds coming directly from ratepayers, SBCs and taxes tend to be viewed as general funds that can be redirected by the executive or legislative branches. While UCR can be viewed as more sustainable and flexible than SBCs or taxes, states have taken steps in recent years to insulate the latter forms of funding from redirection.

The issues of sustainability and flexibility are typically not applicable to funds leveraged from external markets because they are not under the control of the program administrator or regulator.

Integrated Resource Planning

Integrated Resource Planning (IRP) seeks to place all potential energy resources, including clean energy and demand-side assets, on an equal footing with supply-side options. The goal is to develop the least cost solution to a region's energy needs, subject to safety and reliability requirements and other relevant criteria.

The funding mechanism that best facilitates a comparative analysis of supply side resources and cost-effective clean energy is UCR. This is because funding can vary by service territory and be tailored to the resources available and reliability needs of each utility. UCR also spreads cost recovery over a longer time frame than other funding options (as discussed above under "Rate-basing"), further supporting an integrated approach to energy supply planning.

SBCs may be integrated with IRP, but this requires a high level of coordination and interaction among multiple utilities and regulatory bodies, in addition to the flexibility to modify the funding level over time. Integrating funds acquired by leveraging into IRP likewise faces barriers but can be accomplished in a similar manner. CEFs funded by taxes or that use the tax code to provide incentives are not easily integrated into IRP because the effects of tax code changes and the quantity of actual tax collections is difficult to know a priori.

Rate and Bill Impacts

Clean energy resources that cost less than traditional supply serve to lower overall energy costs to society, translating to lower overall energy bills. However, impacts on near-term rates are a contentious issue, and concerns about them can limit willingness to pursue all cost-effective clean energy resources. Energy efficiency investments, in particular, can raise energy rates for the following two reasons: (1) greater efficiency means that total usage decreases and utilities are required to recover their fixed costs over a smaller volume of energy sales, resulting in higher per-kilowatt-hour energy rates, and (2) the utility incurs the cost of running efficiency programs (assuming a ratepayer funded CEF), which requires additional cost recovery from customers.

While the overall customer base benefits because total costs go down, those customers that do not participate in programs and improve their efficiency will be exposed to higher costs from rate increases in the near term. However, customers who do participate in cost-effective programs will save more in aggregate than the additional spending by those who do not. In the long term all customers will benefit through lower bills, because efficiency is typically less expensive than new generating capacity. This reduces the cost of meeting energy loads for all customers. In considering a funding mechanism, policy-makers should evaluate not only the impact on short-term rates, but the overall energy costs to society and the effect on energy bills paid by customers.

Funding Mechanisms

Utility Cost Recovery - Recovered by utilities directly from ratepayers through a separate surcharge (similar to fuel adjustment surcharges) or through base rates at the time of a new rate case.

System Benefits Charge (SBC) - Recovered from ratepayers through a surcharge levied on consumption, usually at distribution level rather than generation level.

Taxes - Funded through tax collections, usually from general funds.

Leveraging - Funded by revenue collected as a result of clean energy investments, typically from, emissions or energy markets.

Table 4. Summary of Key Characteristics of Funding Models

	Utility Cost Recovery	Public Benefits Funds	Taxes	Leveraging
Political or Regulatory Approval?	Regulatory	Legislative	Legislative	Regulatory
Sustainability and Flexibility	M	M	L	L
Supports Integrated Resource Planning	H	M	L	H
Limits Short-Term Rate Impacts	M	M	H	H
H=high, M=medium, L=low				

One option for addressing rate increases is amortizing costs over a time frame consistent with the stream of clean energy benefits. This approach is particularly important for aggressive CEFs striving to capture the "maximum achievable" clean energy potential. To date, however, SBCs and most UCR approaches spend funds in the same period in which they are collected resulting in higher short-term rate increases compared to a case where costs are amortized. While amortization is relatively straightforward with UCR, amortizing SBC funding has not been attempted to date. Using taxes as a funding source is another way to eliminate the need to recover CEF costs through rates.

Solutions to the distributional effects include allocating program funding in a way that ensures an equitable distribution of incentives across customer classes and geographic areas. Particular care with distribution issues must be taken in cases where retail electricity supply is deregulated to ensure that all customers participate, regardless of their electricity supply arrangements. SBCs are a good solution in this regard, as they are typically levied at the distribution level and are non-bypassable for most customers.

4.6 Determining a CEF Funding Level

The long-term goal for the National Action Plan for Energy Efficiency *Vision for 2025* (NAPEE 2007a) is to achieve all cost-effective energy efficiency by the year 2025. Identifying the spending necessary to accomplish this goal – and broadened to include all cost-effective clean energy resources – typically requires a potential study that estimates both the size of the clean energy resource and the potential costs and benefits of acquiring it.[11]

Even when supported by rigorous analysis, the funding level for a CEF is typically the result of a political negotiation between the public, stakeholders, interest groups, and the state itself. These discussions consider the economic costs and benefits of alternative funding decisions, and may involve non-energy considerations. Because stakeholders have a variety of interests other than acquiring all cost-effective clean energy resources, actual funding levels in most jurisdictions fall short of achieving this goal (Biewald et al, 2003). Nevertheless, several states have recently set clean energy funding at levels tied to the achievement

[11] More information on potential studies is available in two reports conducted for the National Action Plan for Energy Efficiency (Action Plan): the Guidebook for Conducting Energy Efficiency Potential Studies and the Guide to Resource Planning with Energy Efficiency. These guides describe several approaches to estimating energy efficiency potential, although many of the analytic approaches can be applied to analyses of renewable energy and other clean energy resources. For the purpose of determining an overall funding level, an estimate that addresses real-world market barriers to achieving clean energy investments is most appropriate.

of all cost effective energy efficiency. California, Vermont, Massachusetts, and New York are examples.

It should be noted that, as with many public policies, the benefits of expenditures do not accrue exclusively to those who bear the costs. In the case of clean energy programs, spending may come from utility ratepayers or the public sector while the benefits accrue primarily to direct program participants. Therefore, decision-makers working to identify spending levels should present economic information related to investments in clean energy in ways that clearly define and distinguish between spending and savings and identify to whom these obligations and benefits accrue.

Chapter 5. Policy Interactions

5.1 Other Policies for Promoting Clean Energy

A Clean Energy Fund is any fund established by the government – through the methods described in Chapter 3 – to advance renewable energy, clean distributed generation including CHP, and/or energy efficiency. Other governmental policies that can be used to promote clean energy are tax deductions and credits, renewable or efficiency portfolio standards (RPS or EPS), energy or emissions markets, and building codes and equipment standards. These and other state policies are also an important objective of the *Vision for 2025* framework, as described in Goal Six: Developing State Policies to Ensure Robust Energy Efficiency Practices.

Tax Deductions and Credits

Clean Energy Funds are differentiated from tax deductions or credits in that the CEF is (typically) a finite amount of money; once these funds are spent no more incentives can be paid. Tax deductions and credits usually have no limit on the amount of incentives they can pay out. It can be difficult to determine exactly how many incentives were claimed because they manifest in the form of reduced tax revenue. Tax incentives generally also do not provide other services that may be necessary to overcome barriers to investment in clean energy. Unlike a CEF, tax incentives cannot be used to provide marketing, program administration, and other supporting activities that may be necessary to overcome non-economic barriers to clean energy investment.

Several states provide tax credits for investment in energy efficiency. For example, Montana provides a personal tax credit of up to $500 for investment in several categories of conservation measures in the residential sector, including shell upgrades and HVAC equipment. Oregon also provides personal tax credits for similar residential measures, while Maryland's tax credits apply only to commercial buildings or multi-family residences. Oklahoma provides the builders of high-efficiency residences with tax credits for new homes that meet "green building" guidelines.

Portfolio Standards

A portfolio standard is a policy approach that differs from both CEFs and tax credits in that it specifies a target for energy savings or clean energy generation, rather than stipulating a mandatory spending level. Essentially, portfolio standards direct utilities or load-serving entities to acquire a certain portion of their energy supply from a defined set of renewable and/or efficiency resources. To date, 27 states plus the District of Columbia have a mandatory renewable portfolio standard (RPS) and 16 states have an energy efficiency portfolio standard (EEPS) (EPA 2006b). States have been adopting both policies with increasing frequency in recent years, in recognition of the advantages of specifying a performance target rather than a spending level. CEFs, regardless of administrative or funding approach, may be used to help achieve the savings goals specified under a portfolio standard.

Market Approaches

Market-based policies or mechanisms may be instituted or encouraged by government or quasi-governmental bodies. Examples include energy, emissions, and efficiency trading markets. While still relatively uncommon, they are likely to become more prevalent. Current examples include: ISO New England's Forward Capacity Market (see text box on page 24), the Northeast Regional Greenhouse Gas Initiative, the federal sulfur dioxide emissions trading program, the regional NOx Budget Trading Program, and Pennsylvania's Alternative Energy Portfolio Standard.[12] These mechanisms may create additional revenue streams for CEFs, as described in Section 3.4. Program designers in regions where these opportunities exist should work to coordinate with and leverage these funding streams to the extent feasible.

Building Codes and Equipment Standards

Building codes and energy efficiency standards can also affect the operation and success of CEFs. Building codes are generally established at the state level (although sometimes by municipalities) and set minimum efficiency requirements for new construction and major renovation projects. In some cases, CEF programs are specifically designed to effect long term market transformation by supporting code upgrades over time. CEF programs can also fund code training for architects, engineers, code professionals, and contractors to encourage higher levels of compliance and enforcement. In other instances, CEF funds are used to support programs that go beyond baseline efficiency levels specified in the energy code.

Standards refer to the manufacture or sale of equipment rather than overall building performance. Currently, most standards are set at the federal level, forbidding the manufacture of equipment below certain performance levels (e.g., minimum efficiencies for residential refrigerators). Some states, most notably on the West Coast and in the Northeast, have enacted standards for appliances not regulated at the federal level that apply to the sale of equipment within their borders. As with codes, CEFs may use strategies to encourage standards upgrades over time and must make sure programs are designed to promote efficiency beyond the standards.

5.2 Interactions between Clean Energy Funds and Related Policies

There are many states or regions in which both a CEF and one or more other clean energy policies are in place. For example, at least 15 states have both a specific CEF and a portfolio standard for renewable energy (EPA 2006b).

In such cases, it is important that implementers are aware of each other's efforts and that each program supports the other without duplication of effort. In addition, the potential savings from all policies

[12] As with some other standards, PA's policy has facilitated a secondary market whereby utilities can provide funds to purchase credits necessary to meet their targets.

should be considered when setting rebate levels for qualifying measures. For example, if there is a federal tax credit for a clean energy measure, the program administrator for the CEF may want to leverage these funds by ensuring common efficiency criteria and promoting the credits to customers while providing a lower incentive payment than might otherwise be necessary. They may even offer services to help customers obtain the tax credits by providing information or consultation services. For example, the Oregon Energy Trust coordinates closely with the implementation of state efficiency tax incentives and even helps non-profit customers enter into agreements that take advantage of federal and state tax incentives for renewable energy projects.[13]

While CEFs and other policy mechanisms can enhance each other's effectiveness, care must be taken to avoid negative interactions. Consider a state where a portfolio standard exists to ensure a certain level of clean energy activity. If a CEF also exists and provides financial incentives for the same investments, the result is a form of freeridership, where incentives are paid for investments that would have occurred anyway. This results in greater ratepayer expenditures than necessary.

[13] Tax incentives cannot lower the cost of clean energy investments for non-profit organizations or governmental entities that pay no federal or state taxes. By providing guidance or information on how to structure ownership arrangements with for-profit entities, states can remove both the high first-cost barrier and informational and transactional barriers for non-profit firms that want to invest in clean energy.

Chapter 6.
Other Considerations for Clean Energy Funds

6.1 Program Design Concepts

There is a wide body of literature available on best practices for designing programs funded by CEFs, and this manual is not intended to replicate or synthesize that literature. The purpose of this Section is to summarize best practices in program development, with particular attention to coordination among the various aspects of resource planning. Appendix A provides additional references for more detailed information. For an in-depth review of program design concepts, see the *National Action Plan for Energy Efficiency Report* (NAPEE 2006) and the *Guide to Resource Planning with Energy Efficiency* (NAPEE 2007b).

Major Markets Addressed by CEF Programs

CEF programs, as defined here, can focus on energy efficiency, renewable energy, or other customer-sited distributed generation such as combined heat and power (CHP). Energy efficiency programming is often segmented into several "markets." This may be done to focus efforts on the particular barriers to efficiency faced by different customer classes or in relation to particular market channels for energy-consuming equipment. At the broadest level, portfolios of efficiency programs may be segmented along one or more of the following schemes:

- Residential versus commercial and industrial customers (although commercial and industrial may be further segregated);
- Low income versus non-low income residential customers;
- Multifamily versus single-family residential structures;
- New construction versus planned equipment replacement versus discretionary "early retirement" measures[14]; and
- Retail or "plug load" products versus contractor installed products.

Within these categories, there can be numerous other distinctions. Some programs target very specific customer groups such as public sector institutions or particular industrial sectors. Other programs may target specific technologies. Many program administrators have implemented separate programs promoting efficient lighting, motors, and air conditioners.

Differentiating Between New Construction, Planned Replacement, and Early Retirement

When allocating CEF resources there are a number of reasons to differentiate programs or strategies for new construction, planned replacement, and

[14] Early retirement — also termed "retrofit" — refers to replacing functioning but inefficient equipment or systems with new, high efficiency equipment or systems.

early retirement. One is that the costs and savings associated with them are quite different. For example, for planned investments (new construction and planned replacement), consumers are already in the market to make an investment and the cost of the efficiency gain is limited to the incremental cost of the more efficient product. Similarly, the savings are calculated as the difference between typical standard efficiency equipment for new installations and the high efficiency alternative. For early retirement (i.e., retrofit) opportunities, consumers bear the full cost of labor and equipment to make improvements. The savings may also be larger (at least in the short term) because older existing equipment typically is less efficient than new standard efficiency models. These economic differences often require very different strategies to overcome financial, informational, and transactional barriers.

For the replacement market, intervention is highly time-dependent, which presents an important barrier. It requires strategies to ensure that a program can effectively identify, get the attention of, and influence decision makers at the time a decision is being made. These programs often work closely with other market actors such as architects, engineers, lighting designers, contractors and distributors to ensure that opportunities are captured when they occur. In contrast, retrofit efficiency improvements are generally discretionary decisions that can happen at any time. As a result, the focus may be more closely tied to specific consumers and strategies to encourage a discretionary decision to change out still functioning equipment.

Many programs targeted at time-dependent opportunities address all new construction, renovation, remodeling and planned equipment replacement within the same framework.

An Upstream Approach to Expanding the Market for Efficient Lighting

Several jurisdictions are exploring the use of "upstream" incentives for energy efficient products. In this approach, utilities encourage manufacturers, distributors, and wholesalers to preferentially stock, promote, and sell efficient products. The province of New Brunswick, Canada, is implementing such a program focused on high-performance T8 linear fluorescent lighting fixtures and components. Distributors and wholesalers are paid a per-unit incentive sufficient to eliminate their cost-differential between traditional T8 and high-performance T8 lighting components; the customer pays the same price for either. While this simplifies the administration of the program by dramatically reducing the number of rebate transactions and participation parties, it also provides the supply chain with experience dealing in higher-efficiency products, increases the demand for the product, and begins to transform the market for commercial lighting. When the program started most NB distributors were not even aware of HPT8s and none were stocking them. After only 6 months, HPT8s have reached a significant market penetration and some distributors have even stopped stocking standard T8 equipment.

Others will separate out new construction and major renovation from remodeling and planned equipment replacement for existing facilities. While the economics and savings are typically similar, separation allows programs to focus on the unique barriers and opportunities associated with the different markets. For example, for new construction and renovation, it is critical to get involved as early as possible, ideally at the very start of conceptual design, to effectively influence decisions. The opportunities in these markets also afford the best opportunities for comprehensive strategies that address all energy use in a building, an approach that is less appropriate to limited equipment replacement events. Programs for the latter tend to focus more on the contractor and vendor market channel, rather than architects and engineers.

Differentiating Between Market Transformation and Resource Acquisition Programs

Clean energy programs funded by CEFs can span a continuum of objectives. However, the terms market transformation and resource acquisition are often used to delineate where in the continuum from one to the other they fall in terms of primary objectives. Resource acquisition (RA) refers to a primary focus on direct capture of energy and/or demand savings, usually in the near term, without much attention on efforts specifically intended to modify long term market practices and behavior. An example of this might be a low-income retrofit program where an administrator offers a turnkey service to replace existing home equipment and systems with high-efficiency models.

Market transformation (MT) refers to programs that are designed with the primarily objective of modifying the long-term behavior and practices of a market such that efficiency gains will continue without the need for permanent direct program intervention. These programs typically focus resources on building awareness, education and training, and working "upstream" with manufacturers, distributors and contractors to ensure efficient equipment is made, stocked and promoted.

Programs are rarely pure RA or MT. The goals of market transformation – to expand the penetration of efficient products being sold in the market to the point where awareness and availability is widespread, cost differentials drop, and practices are transformed over time – are often pursued by programs that take a mixed approach. For example, a program might offer consumer rebates for the purchase of efficient products while working with retailers to train salespeople on the energy saving features of that product. Refer to the adjacent text box for an additional example of a mixed approach to expanding the market for energy efficient products.

6.2 Best Practices in Program Design

Key Components of Best Practices Programs

It is important to remember that there is no single solution that works well for all markets or even for a single market under all conditions. Successful programs generally employ a suite of services and strategies that together can overcome barriers and influence decisions. Programs should be flexible and responsive to unique customer or market barriers. In general, most successful programs employ some or all of the following strategies:

- Effective marketing and outreach strategies to all relevant market actors;
- Training and education of contractors and other market professionals;
- Financial strategies to overcome economic barriers, ranging from cash rebates, to financing and shared savings arrangements;
- Technical and design assistance services that provide engineering assistance to identify and analyze clean energy opportunities;
- Construction management or facilitation services that overcome transaction barriers to procuring and completing construction;

- Coordination, cooperative promotions, training and outreach with upstream market actors (retailers, distributors, contractors, etc.) to ensure products and services are available and well promoted; and
- Turn-key direct installation services to address segments with many significant barriers (e.g., low income households and small commercial establishments), which provide all analysis and installation services directly, often at no cost to the customer.

For a more detailed discussion of best practices in program design, please refer to Chapter 6 of the National Action Plan Report (NAPEE 2006).

Recent Innovations in Best Practices Programs

Program designers and administrators promote numerous strategies and service combinations using CEF resources, with some more successful than others. The following strategies are showing promise.

Comprehensive, customer-oriented organization. In the past, many program portfolios offered separate programs for each technology or category of technologies. In some cases, services for specific customers were segmented as well. For example, NYSERDA, the program administrator for New York State, offers technical assistance to commercial and industrial customers through one program and financial incentives for implementing the recommendations through a separate program and subcontractor. Similarly, some administrators have separate programs for lighting, motors, and air conditioners, even when they are all targeted to the same customer base. More recently, a trend has been to break down internal barriers within administrating organizations to focus a single project team or individual on all opportunities within a given customer. This one-stop shopping approach provides more comprehensive service to the customer and eliminates transactional barriers in having to work with multiple entities within an organization. In addition, it allows for more comprehensively addressing all opportunities in a facility and helps establish the program administrator as a resource for all clean energy needs. The text box on this page provides an example of this practice in the form of Efficiency Vermont's Account Management protocol.

Financing. Program administrators have long experimented with financing strategies in an effort to minimize non-participant ratepayer costs for efficiency programs and collect funds primarily from those making improvements. As noted in the Action Plan, financing also removes the barrier

A Market-Based Approach to Capturing Energy Efficiency Opportunities in the C&I Sectors

Efficiency Vermont (EVT) is a state-wide efficiency utility with the responsibility of delivering energy efficiency programs to all Vermont residents and businesses. As part of continuing efforts to increase the depth of efficiency savings, EVT recently implemented an Account Management protocol for large commercial and industrial (C&I) customers. EVT assigns each large C&I customer an account manager (AM), much the same as many businesses do. The AM is responsible for developing and maintaining relationships with key personnel within the company to ensure that energy efficiency is considered as part of all facility renovations and expansions, remodeling efforts, process modifications, and capital replacement cycles. The AM attempts to encourage the selection of high-efficiency equipment and operating procedures by providing technical assistance, cash flow comparisons, and financial incentives, if necessary.

faced by participants in the form of high first-time costs of many efficiency measures (NAPEE 2006). The theory is that because efficiency is generally very cost-effective, providing financing allows customers to make economically attractive investments while lowering or eliminating the need for a cash incentive to do so. The following features are critical to successful financing efforts:

- Make sure participation is as easy as possible: avoid onerous credit checks and requirements for detailed financial information.[15]
- Ensure immediate and significant positive cash flow: make sure monthly energy bill savings exceed the monthly loan payment.
- Structure loans so they may be treated as operating expenses rather than long term capital debt. This is particularly important for government and institutional entities and for some industries.
- Allow repayment of loans on the energy bill (i.e., "on-bill financing").

On-bill financing has emerged as an important strategy for advancing clean energy. First, it can facilitate accomplishing other objectives, such as having the loan payment treated as an operating expense, rather than as capital debt. This can avoid lengthy and uncertain approvals from school boards, voters, or executive committees. Second, on-bill financing makes it very clear that positive cash flow is achieved. The customer still gets only one bill for energy, and the bills go down immediately. It also simplifies paperwork for customers, while utilities find that it lowers default rates for these loans.

Things to Avoid in CEF Program Design

A few things that are important to consider when developing programs include:

- *Do not create silos.* As mentioned above, single-point-of-contact, full-service approaches are more effective than many individual programs that do not comprehensively address customer needs and that create numerous barriers that detract from good customer service.
- *Do not rely on only one strategy.* There are numerous barriers to clean energy adoption. They may be financial, informational, or transactional. Successful programs address all important barriers through a range of approaches to customer intervention. Following a multifaceted strategy also serves to attract new customers and minimize freeridership (the situation where those already predisposed to adopt clean energy strategies participate).
- *Do not offer insufficient services.* In efforts to minimize costs, some program administrators may adopt a reasonable suite of services but at levels that are not sufficient to adequately influence the market (e.g., paying very low financial incentives for efficiency measures). In these cases, freeridership may again be high because the strategies are not aggressive enough to influence customers beyond those already planning to implement efficiency measures. The results are wasted resources and lost opportunities.
- *Do not ignore important market actors.* Some programs have focused on only one or a very limited group or market actors rather than recognizing the dynamic and complicated nature of the markets they are trying to transform. It is important to fully understand the market, where the points of influence are, and how to influence each entity's role and opportunities in this process.
- *Do not be inflexible and ignore new information.* Programs should remain flexible, be able to adjust to changing markets, and make mid-course

[15] While some program administrators are concerned about loaning funds without traditional credit requirements, the alternative is often to simply provide cash rebates. In general however, even with no credit requirements, the cost from loan defaults is far less than the cost of rebates without financing.

corrections. Evaluation (described below) efforts should be undertaken to provide regular and timely feedback to program administrators to support these improvements over time.

6.3 Evaluation, Measurement, and Verification

The terms evaluation, measurement, and verification (EM&V) refer to processes and techniques used to measure and document the effects of clean energy projects and programs supported by CEFs. The following discussion highlights approaches to EM&V for energy efficiency, although the concepts and methods can be extended to clean energy programs more broadly. Readers seeking an in-depth treatment of evaluation issues should refer to the National Action Plan's *Model Energy Efficiency Program Impact Evaluation Guide*, which outlines best practices for calculating energy, demand, and emissions savings from efficiency programs (NAPEE 2007c). Evaluation approaches for renewable energy are discussed in Volume Three of EPA's guidance on establishing clean energy "set-asides" in the NO_X Budget Trading Program (EPA 2007).

Evaluation

Evaluation involves retrospectively assessing the performance and implementation of a clean energy program. Program evaluations may include one or more of the following evaluation types:

- *Impact Evaluations* determine the impacts (usually energy and demand savings) and co-benefits (such as avoided emissions health benefits, job creation, and water savings) that directly result from a program. All categories of energy efficiency programs can be assessed using impact evaluations, but they are most closely associated with resource acquisition programs.

  In determining energy savings from a program, impact evaluations may consider both savings from particular efficiency measures or projects (e.g., high-efficiency HVAC equipment), as well as factors like freeridership and spillover that influence savings across a program or portfolio.

- *Process Evaluations* assess how efficiently a program was or is being implemented with respect its stated objectives, with implications for improving future programs. All energy efficiency program categories can be assessed using process evaluations.

- *Market Evaluations* estimate changes in the marketplace and thus a program's influence on encouraging future energy efficiency activities. While all program categories can be assessed using market effects evaluations, they are primarily associated with market transformation programs that indirectly achieve impacts and resource acquisition programs intended to have long-term effects on the marketplace.

For more information on these evaluation types, please refer to the National Action Plan's *Model Energy Efficiency Program Impact Evaluation Guide* (NAPEE 2007c).

EM&V for CEF Programs

EM&V establishes the credibility and transparency of CEF programs by demonstrating that investments in renewable energy generation and energy efficiency do indeed provide energy and economic benefits. This is particularly critical because, regardless of a CEF's funding strategy, program funding ultimately comes from the public. EM&V provides citizens and decision-makers with assurance that funds are being spent appropriately and prudently. From a purely practical perspective, EM&V can help administrators understand the effectiveness of program strategies and provide a perspective on what works and what does not. This allows for on-going improvements in programs with the goal of maximizing net benefits. Data derived from EM&V are also important for demonstrating program cost-effectiveness.

While a detailed discussion of EM&V methods is beyond the scope of this manual, the objective here is to provide key definitions and reference information. For greater detail on planning and conducting impact evaluations, please refer to the Model Energy Efficiency Program Impact Evaluation Guide (NAPEE 2007c). The *Guide to Resource Planning with Energy Efficiency* (NAPEE 2007b) also contains information and additional references to assist policy-makers and program administrators with EM&V.

Clarification of Terms

The objective of this section is to offer clarification on EM&V-related definitions to policy-makers and program administrators. For example, measurement and verification (M&V, and sometimes "monitoring and verification") refers to data collection, measurement, and analysis associated with the calculation of gross energy and demand savings from individual sites or projects. M&V can be considered a subset of program impact evaluation. Generally speaking, the differentiation between evaluation and M&V is that evaluation is associated with programs and M&V with projects. The term "evaluation, measurement, and verification" (EM&V) is used broadly to refer to the estimation of program and project impacts due to CEF activities.

The term "measurement" typically refers to on-going quality assurance activities that specify what is being counted, with the aim of ensuring that it really happens and is accurately documented. For example, an efficiency program might randomly inspect a sample of projects to ensure that the efficiency measures receiving a financial incentive were actually installed and that the proper models and efficiency levels were recorded. Similarly, ensuring accurate data tracking, achieving consistency with declared calculation methods, and conducting on-going reviews of tracked savings are often included as measurement functions. In some cases the terms measurement and verification are used interchangeably to refer to these activities.

The following methods are typically used to conduct measurement:

- *On-site project inspections* verify that equipment installations occur as projected. Inspections may be performed on a random sample of projects, all projects of greater than a certain cost or size, or some combination of these.
- *Review of program records* to ensure accuracy with tracking systems and ensure proper levels of compliance and quality assurance. For example, invoices, sales data, etc. may be reviewed.
- *Formal assessments* to track the accuracy of all program data, through review of databases and comparison with hard copy documents.
- *Short term metering* is sometimes used on specific projects to measure savings and adjust a priori estimates.

"Verification" typically refers to engineering-based assessments conducted to ensure that efficiency savings or clean energy generation is being calculated correctly. It is similar to an accounting audit and is typically performed by an unbiased and certified party. For example, a third party might verify, operating hours, etc. and make adjustments for any errors or perceived inadequacies. Verification can also refer to direct metering of specific projects to verify and adjust initial savings estimates (the *Model Energy Efficiency Program Impact Evaluation Guide* prefers the term "Project Evaluation" for this purpose).

Administering and Funding EM&V

Planning for EM&V activities should occur concurrently with overall program planning. According to the National Action Plan for Energy Efficiency, "engaging in evaluation during the early stages of program development can save time and money by identifying program inefficiencies, and suggesting how program funding can be optimized. It also helps ensure that critical data are not lost" (EPA 2006b). Developing detailed EM&V plans simultaneously with program design ensures that appropriate data will be collected and that program activities are conducted in a way that facilitates effective evaluation.

In addition to starting early in the process, managers should strive to conduct EM&V activities throughout program implementation to inform and support needed mid-course corrections. Some formal evaluations may be delayed until sufficient data are available, but EM&V should generally be an on-going process.

While policy makers and others involved in CEFs may wish to participate in EM&V activities, it is recommended that professionals trained and practiced in the type of evaluation for which they are responsible should lead and conduct these efforts (CPUC 2004). There is also general agreement that program evaluations be conducted by firms or organizations that are independent of the administrator or implementation contractor and that the evaluation teams maintain an arm's-length relationship in order to help assure objective and reliable evaluation efforts (CPUC 2004). One exception is on-going measurement, which is generally performed by program administrators.

Program administrators and policy-makers are often concerned with identifying the "right" program budget for EM&V activities. While there is no such formula, it is recommended that decision-makers set evaluation budgets at levels appropriate to the use of the information. For some programs, EM&V expenses may be relatively large to support better understanding the markets and opportunities, fine tuning, and new and innovative strategies such as pilot programs and those still in their early. For larger scale programs and mature efforts with fairly traditional methods, EM&V may be a much lower percentage of overall budgets. This is because the uncertainty surrounding the program design and effectiveness is comparatively small, and because economies of scale are available.

As a rule of thumb, spending on EM&V generally accounts for between one and ten percent of total program budgets. In general, on a unit-of-saved-energy basis, costs are inversely proportional to the magnitude of the savings (i.e., larger projects have lower per-unit evaluation costs) and directly proportional to uncertainty of predicted savings (i.e., projects with greater uncertainty in the predicted savings warrant higher EM&V costs). In Vermont, spending is currently about 3.5 percent on EM&V (Wasserman 2008), while Massachusetts has spent between 3 and 3.5 percent in recent years (Schlegel 2008). In contrast, the California Energy Commission requested EM&V funding of 8 percent for the years 2006-2008 (CPUC 2008).

Chapter 7. Summary of Findings

Clean Energy Funds can be administered by utilities, states, third-party entities, or a combination of these. Each comes with strengths and weaknesses, but in any given situation one or two may be better choices. The adjacent table summarizes some of the important characteristics of the administrative models and their relative strengths in each area.

Clean Energy Funds can be funded by ratepayers through system benefits charges (SBCs) or as part of electric rates, by the public through taxes, or through other sources such as monies leveraged from energy and emissions markets. As with administrative models, these approaches also have strengths and weaknesses and are appropriate in different circumstances (see table).

Summary Evaluation of Administrative Model Characteristics

	State Model	Utility Model	Third Party Model
Resistance to fund raids	L	H	M
Administrative efficiency	M	L	H
Reduces Transition Costs	M	H	L
Avoids conflicts of interest	M	L	H
Facilitates Market Transformation	H	L	M
Flexibility of Programs	L	H	H
H=high, M=medium, L=low			

Summary Evaluation of Funding Model Characteristics

	Utility Cost Recovery	Public Benefits Funds	Taxes	Leveraging
Legislative or Regulatory Approval?	Regulatory	Legislative	Legislative	Regulatory
Sustainability and Flexibility	M	M	L	L
Supports Integrated Resource Planning	H	M	L	H
Limits Short-Term Rate Impacts	M	M	H	H
H=high, M=medium, L=low				

Consideration of the above factors leads to the conclusion that successful CEFs are those that allow for a long-term commitment to implementing cost-effective clean energy resources, as outlined as a key recommendation of the National Action Plan. This requires a structure that can be responsive to changing economic, technological, and political conditions while maintaining a long-term focus and supporting consistent and sustained clean energy investments. Administrative mechanisms must also be supported by timely, consistent, and stable program funding that is sufficient to achieve all cost-effective clean energy resources.

State Approaches to CEF Administration and Funding

	Utility	State	Third Party
Utility Cost Recovery	Kansas, Texas, California, New York, Illinois, Iowa, Minnesota (efficiency)	Illinois	N/A
SBC	Massachusetts (efficiency), Connecticut, California	Massachusetts (renewables), New York, New Jersey, Maine	Vermont, Oregon
Taxes	N/A	Minnesota (renewables)	N/A
Leveraging	Connecticut		Vermont

Appendix A. References

This reference list includes both documents referenced in the text of this report and other documents that may provide additional information on CEFs.

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Appendix B: Decision-Making

This manual is intended to help policy and program decision-makers identify the clean energy funding and administration approaches that make sense for their jurisdiction. For each approach, it provides an overview of advantages and disadvantages, implementation options, and state examples. As an additional resource, this Appendix provides three detailed examples of the how different states have arrived at decisions on these topics.

Example: Vermont Energy Efficiency Utility

As mentioned above, Vermont has pursued a model that relies on a single independent third party to administer and deliver efficiency services throughout the state.[16] Starting in the early 1990's the Vermont PSB established an integrated resource planning approach that called on the electric utilities to pursue all cost-effective efficiency.[17] In response to this order, the three investor-owned utilities (also the three largest utilities in the state) and three municipal and cooperative utilities began offering efficiency programs. This model resulted in some significant successes but a number of issues continued to limit its effectiveness.

First, Vermont has the second smallest population of any U.S. state, yet has 22 electric utilities. As a result, while the six utilities with programs covered the majority of the population, most utilities did not offer any efficiency services. Many of these utilities are so small that effectively delivering efficiency programs created a major challenge. Further, each of the utilities offering services did so independently. As a result, customers, vendors, contractors, distributors, architects and engineers had to deal with a wide array of different and sometimes inconsistent program services and procedures. This created significant barriers to effective DSM implementation.

In addition to the above challenges, Vermont found itself expending inordinate resources and time regulating, monitoring, and planning for efficiency. Each utility DSM plan was extensively litigated through a regulatory process, both during the planning stages and later to address cost recovery and lost revenue issues. Given the requirement to acquire all cost-effective efficiency, numerous investigations into what was cost-effective and whether utilities where in fact developing and implementing plans to successfully capture all cost-effective efficiency were extensive and often contentious. With separate avoided costs estimated for each utility, this also meant the standards to which this criterion was applied were different for every utility territory.

[16] Efficiency Vermont serves as the "energy efficiency utility" for about 93% of the state load, while the states largest municipal utility (Burlington Electric Department) retained responsibility for these services within the City of Burlington. BED strives to deliver consistent services with the same "look and feel" as those in the rest of the state provided by Efficiency Vermont.

[17] VT PSB, Order in Docket 5270, April 16, 1990.

Finally, during the mid-1990s, stakeholders and regulators expected that Vermont would follow neighboring states such as Massachusetts and New York in restructuring the utility industry. This posed the likelihood of divestiture of vertically integrated utilities and possibly dramatic reductions in the existing efficiency services.

For all of the above reasons, the Vermont Department of Public Service (DPS) determined that an independent third-party administrator might be preferable to utility administration. As envisioned, this would ensure:

- All Vermont electric ratepayers would have equal and consistent access to the same services;
- Consistent, statewide services, including the obvious advantages in terms of marketing services, simplifying processes, and encouraging market transformation;
- Elimination of the inherent disincentives utilities faced with promoting efficiency and the perceived need to compensate utilities for lost revenues;
- A stable and consistent funding stream and mechanism for efficiency under an anticipated restructured utility sector; and
- Economies of scale by simplifying administrative and regulatory oversight of efficiency efforts.

Pursuing an independent third-party strategy required a legislative change to enable the Public Service Board (PSB) to establish an efficiency utility. Under its existing mandate, the PSB had no authority to create or fund such a structure. The DPS therefore worked with the legislature to enact new legislation. Act 60 was passed in June of 1999, authorizing the PSB to develop a funding mechanism based on a non-bypassable wires charge and to create an entity to deliver efficiency services statewide, as the PSB deemed appropriate and in the public interest. The Act established an initial spending cap of $17.5 million per year, but otherwise left much discretion to the PSB to determine the appropriate structure, methods and guiding principles for an energy efficiency utility (EEU).

Simultaneous with the legislative process, the DPS developed a detailed plan for the efficiency utility under a separate docket.[18] This plan laid out a proposed administrative structure, including contractual arrangements and functions. It also analyzed the potential for efficiency savings and provided program designs, budgets and savings goals for a set of core programs that would serve as the initial three year plan to be implemented by the EEU. The DPS submitted this proposal to the PSB for approval of creation of the EEU.

The other parties to the agreement included all the VT electric utilities, environmental and public interest groups, and business interests. Through a contested case, the proposal was thoroughly litigated. In general, the main issues by party or group were:

- *Utilities:* Virtually all the utilities were opposed to the creation of an EEU. The most vocally opposed were the investor-owned utilities that were currently offering their own DSM programs, although a consortium of municipal utilities was also strongly opposed. Utility opposition was primarily based on the following issues:
  - A belief they were doing a good job delivering programs and that they were the most appropriate entity to continue because of their existing customer relationships;
  - A strong desire to maintain their customer relationships, rather than ceding a portion to another independent entity;
  - Concern over having to lay off staff;

[18] VT DPS., The Power to Save: A Plan to Transform Vermonts Energy Efficiency Markets, Docket No. 5854: Investigation into the Restructuring of the Electric Utility Industry in Vermont, May 23, 1997.

- Concern over rate impacts, because the programs envisioned would represent a substantial increase in efficiency efforts;
- Concern over lost revenue, based on the assumption that lost revenue collection would not continue under an EEU; and
- In the case of one utility, concern the statewide efforts would not be as aggressive as the theirs and that their customers would not receive as much benefit from the new programs. This utility was also concerned that their customers would effectively be subsidizing others because they had already paid for and captured a high portion of the achievable retrofit potential in their territory.

- *Environmental/Public Interest:* The environmental and public interest groups were strongly supportive of the concept of an EEU, and in fact pushed for more aggressive funding and goals than those proposed in the DPS plan.
- *Business Interests:* The business sector intervenors were opposed to the EEU. While the Chamber of Commerce was an active intervenor, the most vocal business interest was Vermont's single largest electric customer, who accounts for over five percent of the statewide load and has historically opposed all DSM spending in Vermont and other states where it operates. Their primary position is based on the belief that the market should be allowed to allocate efficiency and supply resources and a concern over rate impacts and the possibility of cross-subsidizing their competitor's efficiency efforts.

Ultimately, a settlement was reached with all parties to establish the EEU and adopt the plans laid out in the *Power to Save.* Various compromises were reached to satisfy the parties that were opposed. For example, it was agreed that utilities would receive lost revenue for 2 years to compensate them for lost sales from EEU savings. The most vocal business interest was able to negotiate a separate "program" that allowed it to use 70% of the funds it contributed for its own self-directed efficiency projects. The City of Burlington was granted the right to continue to offer its own programs separate from, but consistent with, the EEU. In addition, and critical to the overall settlement, were negotiated ratepayer funding levels by utility territory. Rather than a single SBC for all Vermonters, levels were adjusted somewhat to reflect past investments in efficiency and recognizing the remaining opportunities and likely benefit from the EEU programs. This minimized rate impacts for some sectors, and resulted in what was perceived to be a more equitable overall solution.

Example: New York State "15 x 15" Initiative

In April 2007, the Governor of New York announced a goal to decrease electricity use 15 percent by 2015 through increased energy efficiency as part of a comprehensive plan for reducing energy costs and curbing pollution in New York State. This goal has come to be known as "15 x 15." In response to the 15 x 15 Goal, the New York Public Service Commission (PSC) has initiated a proceeding with the objectives to: "balance cost impacts, resource diversity, and environmental effects by decreasing the State's energy use through increased conservation and efficiency."[19] The purpose of the proceeding is to design an Energy Efficiency Portfolio Standard (EEPS) to meet the targets for energy efficiency.

New York created the New York State Energy Research and Development Authority (NYSERDA) in the 1970s in response to that decade's oil crises, with a goal of research and development focused on reducing the State's petroleum consumption. As

[19] See Order Instituting Proceeding issued May 16, 2007 in Case 07-M-0548—Proceeding on Motion of the Commission regarding an Energy Efficiency Portfolio Standard, p.6.

electric energy efficiency became more important and energy prices rose, regulators put pressure on utilities to deliver efficiency services. NYSERDA was formed in response to a real or perceived lack of progress on the part of the utilities in addressing the need for efficiency.

In 1998, in conjunction with electric industry utility restructuring, the state established the System Benefit Fund (SBF), financed through assessment of a charge on customer bills. The SBF funds energy efficiency programs administered by the New York State Energy Research and Development Authority (NYSERDA). The PSC is revisiting the issue of how best to administer and fund efficiency in light of the new 15 x 15 goal.

While the current model in New York includes a mixture of program administrators, future structures may include even more hybrid elements. One of the current proposals for New York would have NYSERDA implement programs for residential and commercial new construction and for efficient products. They would also be responsible for general marketing of the Energy Star brand. Utilities would work directly with their customers to effect efficiency improvements in existing C&I facilities and to provide efficiency services for existing homes. This distribution of responsibility is driven by the following factors:

- As a regional program administrator, NYSERDA can better manage market transformation activities that require the participation of multi-facility retailers and distributors. They can provide large home improvement stores and electrical distributors with a common brand and outreach effort to implement state-wide with a consistent message and incentive. Without this level of coordination, individual utilities offer different programs and customers are confused, resulting in lower participation.
- The utilities prefer not to have another entity provide services directly to their customers. Customers trust their utility and expect them to be able to help them with all of their energy needs. Energy efficiency is becoming an important component of this service as a way of managing individual customer's energy costs and the overall cost for the utility to meet its load obligations. Having another entity involved in providing services to existing customers may result in confusion.
- Under the existing structure, utilities have been concerned that their priorities are different from NYSERDA's. For example, a customer that is high priority for the utility may not be as high a priority for NYSERDA. NYSERDA may not have a current program that fits the customer's needs or be able to provide custom support when needed. The utility also desires more certainty in load forecasting. Having a separate entity be responsible for load reductions adds uncertainty to the process of resource planning.
- Achieving the 15 x 15 goal will require dramatic expansion in efficiency services over the next several years. Although NYSERDA is already delivering limited efficiency programs and is therefore in a position to quickly deliver additional savings, utilities will also need to play an important role in reaching their small to medium-sized customers. Over time, the utilities may become responsible for a greater share of the programming and savings, depending on their early success. Regardless, the assumption is that the efforts of both NYSERDA and the utilities are required to meet the aggressive savings target.

The funding mechanism for these programs is also on the table for discussion. It is likely that the current SBC will be increased to support to additional efficiency programs. Along with the inclusion of the utilities in program administration has developed discussions about handling lost revenues and the potential for decoupling. The parties are also trying to determine how to leverage funds from the Regional Greenhouse Gas Initiative (RGGI) and potential funding streams from carbon or forward capacity markets. At this point in the discussion, very little has been decided and there is no clear picture how the funding will eventually be structured.

Example: Illinois Program Administration

The Commonwealth of Illinois provides an example of a hybrid CEF model that relies primarily on utility program implementation but with some state government components. In August 2007 Illinois passed the Public Utilities Act ("Act"), 220 ILCS 5/12-103, which set energy efficiency resource targets to be captured by a combination of utility and state efforts. The Act calls for programs to acquire annual efficiency savings equal to 0.2 percent of total electric load in 2008, increasing by 0.2 percent each year to an ultimate level of 2.0 percent annual savings by 2017.

Illinois traditionally has not been a leader in DSM efforts. Although IRPs were required in the 1980s, this did little to generate interest in efficiency, partly as a result of large excess supply-side capacity at the time. In the early 1990s the IRP rules were eliminated, followed by restructuring of the industry, which resulted in elimination of the minimal programs existing at the time.

The primary responsibility for program implementation and performance goals under the new authorization resides with the two investor-owned utilities (IOUs) — Commonwealth Edison and Ameren. However, 25 percent of the funding was set aside for program delivery by the State Department of Commerce and Economic Opportunity (DCEO). DCEO is responsible for delivering program services to low-income consumers and to municipalities and schools. In addition, DCEO will provide technical services, coordinated with the utility programs, to large commercial and industrial customers.

Funding for energy efficiency programs occurs through a surcharge on all electricity sold by the IOUs. Surcharges are designed to recover all program costs in the year they are expended, with true-ups as necessary to adjust for under or over spending, or variations in expected electric usage. DCEO funds are collected by the IOUs and transferred to DCEO. The funding mechanism, rather than being specified in the legislation, was left open for the utilities and the regulatory commission to work out. However, the mechanism that was proposed by the utilities and approved by the Illinois State Corporation Commission (SCC) is substantially similar to that suggested as a possible example in the legislation. The Act also imposes strict rate impact caps on spending. First year spending is limited to 0.5 percent of electric revenue, increasing each year until a maximum of 2.0 percent. In the event that savings goals can not be met within the funding caps, goals can be lowered based on a showing by the utilities that they are not feasible.

While the utilities do not earn any shareholder performance incentives, they are exposed to penalties. If the utilities fail to meet their goals in the second year (goal of 0.4 percent of system load saved) they are subject to financial penalties in the form of a shareholder contribution to the Illinois Low Income Home Energy Assistance Program (LIHEAP). If a utility fails to meet the goal in year three, the penalty can be to transfer responsibility for program implementation away from the utilities to a newly created state entity, the Illinois Power Agency. This has the effect of highly motivating the utilities to meet performance targets, as they have a strong vested interest in continuing to provide these services to their customers.