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4.2 Energy Efficiency Programs

Policy Description and Objective

Summary

States have found that well-designed and administered energy efficiency programs increase public and private sector investments in cost-effective energy efficiency, resulting in reduced energy costs for electricity customers, emission reductions, and enhanced reliability. Programs can be used in conjunction with other strategies to achieve market transformation, causing lasting change in the availability and demand for energy-efficient goods and services.

Energy efficiency programs provide a range of financial and other incentives to encourage investments in energy-efficient technologies, related services, and/or behavior change. These incentives range from simple cash rebates for the purchase of efficient products to bundled customized financial incentives and technical assistance.

State executive and legislative branches rely on a combination of authorities and funding sources to administer and oversee successful energy efficiency programs. State policy makers may allow state energy offices, utility companies and/or third-party administrators to deliver energy efficiency programs. In recent years, state funding for electricity energy efficiency programs has increased significantly from $1.6 billion in 2006 to $6.3 billion in 2013, with program administrators in all 50 states reporting savings. As a result, individual states have saved up to 2.1 percent of total electricity demand due to energy efficiency programs (ACEEE 2014b).

The majority of funding for energy efficiency programs comes directly from utility customers, also referred to as ratepayers.[28] State legislators and state utility commissions play a lead role in establishing public benefits funds (PBFs), also known as system benefits charges, to fund energy efficiency programs. PBFs are typically created by levying a small charge on every customer's electricity bill. Alternatively, some state utility commissions allow the utility to provide an annual revenue stream to fund energy efficiency programs by expensing or capitalizing the funds from the utility company's total revenue without itemizing a charge on the customer bills. According to a study by Lawrence Berkeley National Laboratory, ratepayer-funded electricity efficiency program spending is projected to continue growing at a substantial rate, reaching between $6.5 billion and $15.6 billion in 2025 (LBNL 2013).[29] Where there are comprehensive statewide programs in place, funding levels range from 2.83 to 8.55 percent of total utility revenues (ACEEE 2014b).

Objective

The objectives of energy efficiency programs include:

- Reducing customers' energy costs.
- Meeting customers' demand for electricity services without generating electricity at power plants.
- Meeting energy savings goals (see Section 4.1, "Energy Efficiency Resource Standards").
- Stimulating local economic development and new jobs.
- Reducing the environmental impacts of meeting electricity service needs.
- Supporting electricity system reliability by decreasing electricity demand.

[28] As discussed later in this section, in addition to ratepayer-funded programs, energy efficiency programs may also be funded through other sources, such as state budgets and proceeds from related auctions.

[29] Values for both electricity and natural gas programs provided in nominal dollars from LBNL (2013).

Most states use energy efficiency programs to reduce total overall energy consumption in buildings and homes. Energy efficiency programs also reduce energy waste in agricultural and industrial facilities, support efficiency by taking advantage of thermal energy applications (including combined heat and power [CHP]), reduce peak demand, support consumer education, and demonstrate new energy efficiency technologies and practices. Some of these objectives are also discussed in Chapter 6, "Policy Considerations for Combined Heat and Power," and Section 7.5, "Maximizing Grid Investments to Achieve Energy Efficiency and Improve Renewable Energy Integration."

Benefits

Well-designed and administered energy efficiency programs can reduce energy demand at a lower cost than supply options (see Figure 4.2.1) and deliver a variety of benefits. They lower energy costs for utility customers by reducing average bills and limiting future energy price increases. By reducing demand, they improve the reliability of the electricity grid and avoid emissions.

Energy efficiency programs play an important role in correcting market failures and addressing barriers to investment in cost-effective, beneficial energy efficiency opportunities.

Energy efficiency programs also help create local jobs by lowering energy costs and stimulating new public and private sector investments: initial investments in energy efficiency generated about 11 jobs per million dollars of investment (PNNL 2014).

States with Energy Efficiency Programs

Forty-eight states, as well as Washington, D.C., offer energy efficiency programs. These states have one or more entities administering programs in the state, such as statewide third-party program administrators, utility companies, and state energy offices. Figure 4.2.1 illustrates which entity in each state reported energy savings from programs during 2012. Investor-owned utilities reported approximately 75 percent of electricity savings, while third-party administrators and publicly owned utilities reported the majority of additional savings. Annual electricity savings were also reported by cooperatively owned utilities, as well as state and federal power authorities who administer energy efficiency programs (EIA 2012). States have found that coordination across entities administering programs can support greater energy savings and broader market transformation.

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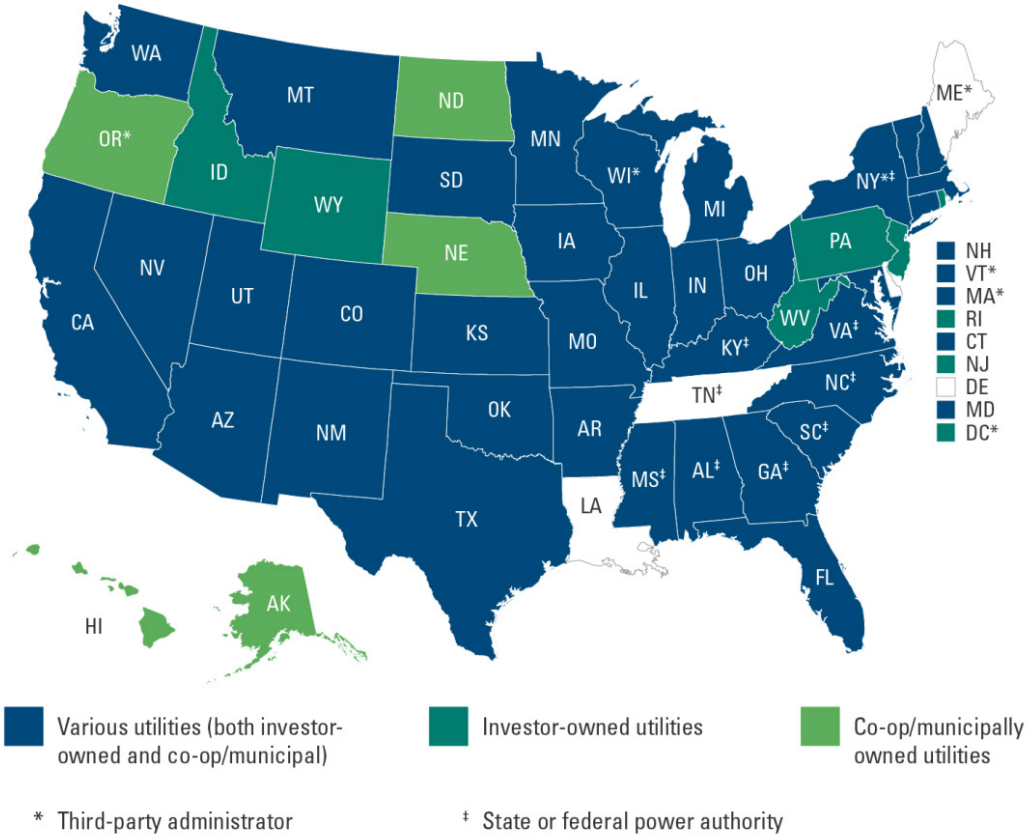
Figure 4.2.1: Entities Reporting Energy Savings from Energy Efficiency Programs by State, 2012



Source: Derived from EIA 2012 data, using annual electricity savings from energy efficiency programs for 2012.

Designing an Effective Policy for Energy Efficiency Programs

There are several key issues that states consider when establishing policies that support delivery of energy efficiency programs. These issues include identifying key participants and their roles, calculating appropriate funding levels, determining timing and duration, developing a portfolio of activities, and interacting with other state and federal policies.

Participants

- *State legislatures.* Legislation may be required to establish or expand energy efficiency programs, particularly if statewide program administrator and/or funding mechanisms, such as PBFs, are to be used. The state legislatures may also need to authorize and ensure periodic reviews of energy efficiency programs implemented by utilities and third-party administrators that are not otherwise under the jurisdiction of the state public utility commission (PUC). Legislation may also determine energy efficiency goals and objectives, establish funding, specify implementing and oversight organizations, and review program authorization at specified intervals.

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- *State energy offices.* State energy officials, often on behalf of the state governor, play an important role in developing policies to support energy efficiency programs and in reporting on results of policies and programs. State energy offices may also administer energy efficiency programs, particularly those funded through state budgets and/or federal grants.
- *PUCs.* PUCs play a key role in authorizing, reviewing, and approving ratepayer-funded energy efficiency program plans, approving utility cost recovery and related ratemaking considerations (also see Section 7.2), approving methodologies used to evaluate savings, and ensuring that programs are achieving anticipated results. PUCs advance these roles through regulatory processes that allow for stakeholder participation. In some states, PUCs also have authority over specific aspects of cooperatively and publicly owned utilities that give them jurisdiction over energy efficiency programs. State PUCs that require ratepayer-funded energy efficiency programs to be administered by third-party entities, instead of the utility companies, may enter into the contractual arrangement with the third-party program administrators.
- *Other state agencies.* State environmental offices may play a role in supporting policy, establishing funding, and implementing energy efficiency programs. This is particularly true when these programs support environmental policy, such as greenhouse gas (GHG) markets (see more information on Regional Greenhouse Gas Initiative [RGGI] energy efficiency set-asides in Chapter 3, "Funding and Financial Incentive Policies") or Climate Action Plans. State agencies that deliver assistance from the Low-Income Home Energy Assistance Program (LIHEAP) also help implement energy efficiency programs to improve energy affordability. State energy offices may also administer all or part of the energy efficiency programs, including those that weatherize low-income homes.
- *Utilities.* In most states, utilities serve as program administrators for the energy efficiency programs. For those programs in which the utility does not directly serve as program administrator, the utility may still be involved in funding, such as processing PBF charges on customer bills and providing data sources for reporting results. Utilities may also coordinate with other energy efficiency program administrators, including the state energy office, LIHEAP office, and third-party administrators, during program design and implementation.
- *Customers.* Industrial customers and consumer advocates are typically active participants in energy efficiency program proceedings at state PUCs. They help determine the distribution of charges to customers to fund programs as well as which customer classes will be offered programs, such as low-income, residential, commercial and industrial customers.
- *Public and private sector organizations*. Businesses and other non-governmental organizations, including environmental groups, will also participate in policy design, adoption, and implementation.

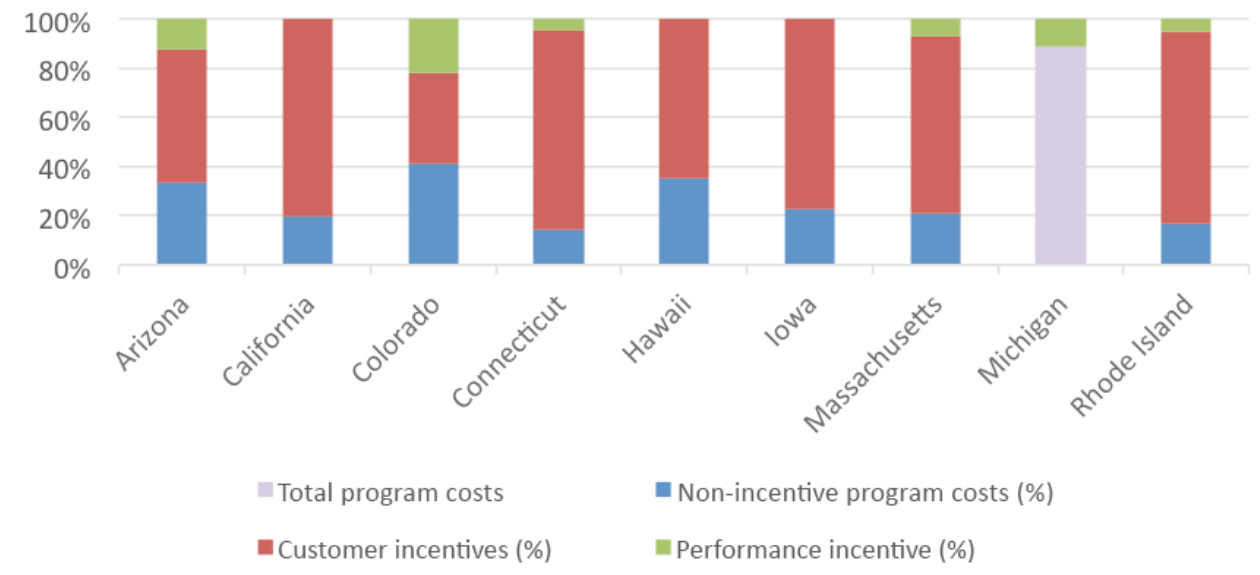
Responsibility and Coverage

States provide policy direction on which customer classes are to be offered programs (i.e., low-income, residential, commercial, and industrial). Policy direction is often provided at a portfolio level, leaving flexibility for program administrators to design and modify specific program offerings to meet policy goals. Energy efficiency program coverage may also in part be affected by the jurisdiction of the agency establishing and implementing the policy. For example, the PUCs in the majority of states do not have authority over cooperatively or municipally owned utilities, hence limiting state PUC implementation of energy efficiency program policies administered by investor-owned utilities. The board of directors or municipal agency overseeing the utility will typically determine energy efficiency program coverage for a cooperatively or municipally owned utility.

Funding

Energy efficiency program funding covers the costs incurred by the program administrators and the incentives paid to customers. Administrative costs are distributed across several activities, including marketing, design and planning, and measurement and verification. Cost distribution across activities varies, with some states setting policy direction on the level of funding directed to administration versus direct incentives. Figure 4.2.2 provides an illustrative overview of how the distribution of program costs varies across key activities.

Figure 4.2.2: Electricity Energy Efficiency Program Costs by Type



Note: "Customer incentives" refers to rebates, discounts, and other forms of financial incentives received by customers that participate in the energy efficiency program. "Performance incentives" refer to financial rewards that may be provided to the program administrator for reaching or exceeding pre-established performance targets, as further discussed in Section 7.2, "Policies That Sustain Utility Financial Health."

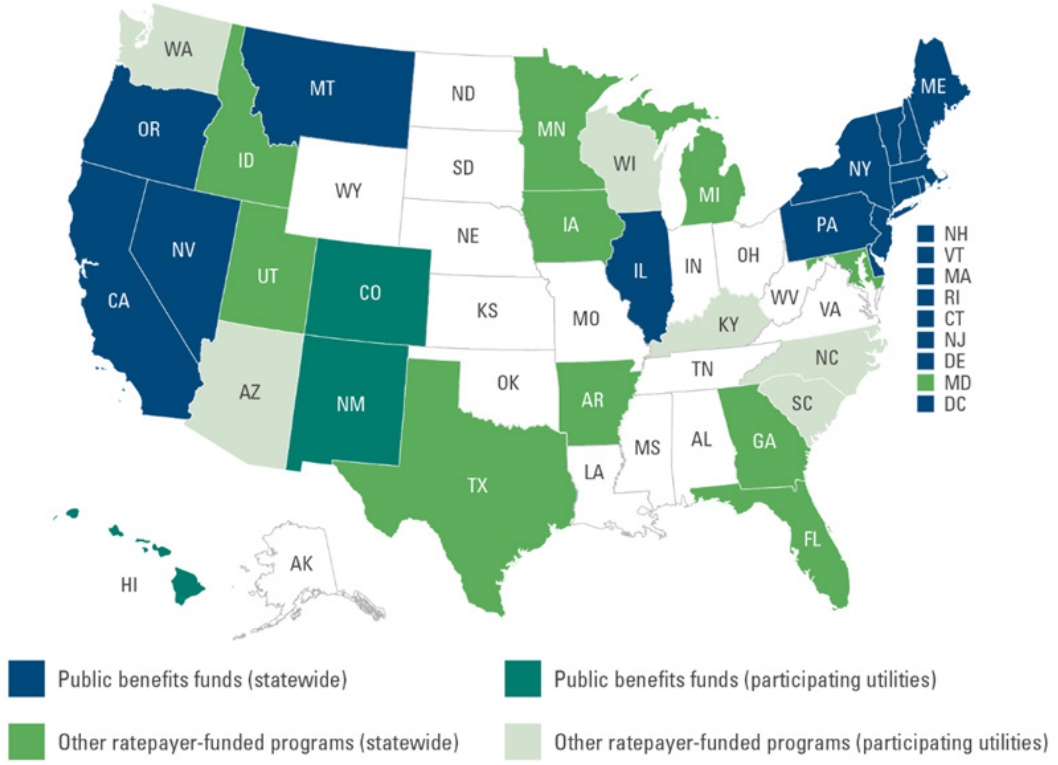
Source: ACEEE 2014c

There are two basic approaches for administering the energy efficiency program funds, both of which can affect how costs are recovered. Under the first and most common approach, money is collected and spent during the current year in an expenses-based mode. If there is an under- or over-collection, it floats in an account and is adjusted in the following year. This account may be controlled by a utility or a third-party administrator, depending upon the type of administering body. (See also "Administering Body" later in this section.) The second approach, which is less common, is to use the energy efficiency program funds to capitalize a revolving fund for grants and loans, which is replenished or expanded when new funds are available.

Funding sources for energy efficiency programs vary, but most states use money collected through customer utility bills. PBFs are a common funding approach; they apply surcharges on customer bills that typically range from $1 to $4 per megawatt-hour (MWh), which translates to well under a half-cent increase on each kilowatt-hour (kWh) of electricity usage (ACEEE 2013). As of March 2015, PBFs are used to fund energy efficiency programs in Washington D.C. and 18 states. In 15 of these states (plus D.C.), energy efficiency PBFs are required statewide, while in the other three, only certain participating utilities use PBFs. An additional 16

states offer energy efficiency programs through other ratepayer-funded mechanisms, but not through a PBF policy. Figure 4.2.3 summarizes these program funding approaches by state.

Figure 4.2.3: Energy Efficiency Incentive Mechanisms by State



Note: States with energy efficiency load funds supported by surcharges, tariffs, or riders were not included. Other ratepayer-funded programs include surcharges, tariffs, riders, and modified base rates that contribute to energy efficiency funds that are not considered PBFs.

Sources: ACEEE 2014a; DSIRE 2015

Utilities that run energy efficiency programs may also recover program costs from their operating budgets, with funding levels and cost distribution across customers determined as part of the broader ratemaking process. Other energy efficiency program funding sources include proceeds from emissions allowance auctions, such as in RGGI states;[30] from energy efficiency programs bidding into electricity capacity markets operated by the New England Independent System Operator and the PJM Interconnection; and from U.S. Department of Agriculture (USDA) grants and loans for energy efficiency programs in rural communities. State budgets and grants from foundations and the federal government (including formula grants and competitive awards from the U.S. Department of Energy [DOE]) fund programs administered by state energy offices. State energy efficiency programs can also coordinate with weatherization assistance programs to leverage an additional funding source while also ensuring complementary energy efficiency program design and implementation for low-income residential customers.

[30] Three states—Connecticut, Massachusetts, and New Hampshire—provide some funding for energy efficiency programs through proceeds from the RGGI auction (ACEEE 2014b).

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Providing adequate, consistent, and stable funding is critical for the program's success and for ensuring the private sector's continued participation. There have been market interruptions in cases where some states facing budget shortfalls deferred resources from ratepayer energy efficiency funding sources for other purposes. Some states have developed legislative language to guard against this. For example, Vermont legislation states, "Funds collected through an energy efficiency charge shall not be funds of the state, shall not be available to meet the general obligations of the government, and shall not be included in the financial reports of the state" (State of Vermont 1999).

Best Practices: Developing and Adopting State Energy Efficiency Programs

The best practices identified below will help states develop effective energy efficiency programs. These best practices are based on the experiences of states that have longstanding, highly effective energy efficiency portfolios.

- Determine the cost-effective, achievable potential for energy efficiency in the state. A growing number of states consider non-energy benefits of energy efficiency programs when reviewing cost-effectiveness.
- Start with low-cost, well-established programs and efficiency investments, and build the program over time.
- Assess the level and diversity of support for energy efficiency programs. Engage key stakeholders (i.e., utilities; residential, commercial, and industrial customers; municipalities; trade allies; and environmental groups) and experts collaboratively to help design the program—including its administering organization, funding, duration, and evaluation methods.
- Establish long-term policy direction and funding approach. Consider specific provisions to prevent the energy efficiency program funds from being used for other purposes or to be comingled with general state budget funds. Make funding a minimum level, not a cap, on investment in energy efficiency.
- Ensure that the energy efficiency programs serve the needs of diverse customer classes and stakeholder groups. Managing efficiency programs through portfolios allows program administrators to match incentive types and program features to different customer types and market needs. Portfolios can evolve over time, from simpler and fewer incentive types early on to more feature-rich and diverse incentives and services later on.
- Determine the administering organization(s). The options include utilities, state agencies, or independent organizations. If utilities are selected to administer programs, it is advisable to develop policies that align the utility business model with the goal of achieving energy efficiency. (For more information and examples of these policies, see Section 7.2, "Policies That Sustain Utility Financial Health.")
- Establish effective evaluation methods that build on proven approaches and are appropriate given the chosen program design. Evaluation methods should be rigorous enough to estimate program impacts and other benefits and simple enough to minimize administrative costs.

Timing and Duration

Depending on the resources available to them, such as their ability to consult with outside experts, program administrators that do not already have programs can engage external stakeholders, design energy efficiency programs, and compile necessary documentation for state approval (e.g., through a PUC docket) within a 1 to 2 year timeframe. In reality, most states have some sort of ratepayer-funded energy efficiency programming, and those that have been offering programs for several years continuously evaluate their program offerings and performance as they plan for the next program cycle. Designing new programs may require 90 to 120 days, with a filing made to their PUC within 6 months for approval.

Because ratepayer-funded programs, including those funded by PBFs, require state PUC approval, many states approve multi-year program plans to reduce administrative costs and allow programs to operate more effectively in the market. Typically, states approve programs for 1 to 3 years, with most states conducting reviews at least annually to ensure costs and savings are on track.

To maintain funding and support for energy efficiency programs, it is also valuable for states to collect and share information on program performance and to educate stakeholders about the energy, economic, and environmental benefits of energy efficiency programs.

Developing a Portfolio of Activities

Targeting Efficiency Investments

Most program portfolios are informed by energy efficiency potential studies that identify cost-effective energy efficiency program opportunities. Usually some expert judgment is required to determine how much of that potential is achievable and at what cost. Depending on the program type, once program administrators have received regulatory approval, turnkey programs such as lighting and appliance programs can launch and begin to achieve results within a 6 to 12 month timeframe. Programs that require infrastructure development such as whole-home or whole-building programs will be slower to ramp up. Depending on market conditions, they may be best introduced as pilot programs that are scaled up once the program administrator has gained operational experience and developed relationships with critical trade allies.

State agencies, particularly PUCs, often provide policy direction on energy efficiency programming to meet short and longer term resource needs, maintain cost-effectiveness, and ensure equitable ratepayer treatment. Where state PUCs lack jurisdiction over energy efficiency programs administered by municipally and cooperatively owned utilities, the utility's board of directors or local government may provide similar direction. Key considerations for energy efficiency include the following:

- Customer classes that need to be served, including hard-to-reach customer classes. States may also distinguish between new and existing equipment and buildings within customer classes.
- Distribution of benefits across customer classes and service territories.
- Whether cost-effectiveness should be assessed at the portfolio level, program customer sector, or measure level, and what cost-effectiveness tests should be used to screen programs (see additional information on cost-effectiveness below).
- Other social and environmental benefits (e.g., serving low-income customers, reducing air pollutants, reducing water consumption, and improving reliability of the electricity grid).
- Supporting technology research, development, and demonstration by identifying and verifying the performance of emerging technologies, practices, or innovative program models.

States may also use energy efficiency programs to reduce electricity consumption during peak demand periods, thereby supporting greater system reliability. Since utilities incur higher costs to provide electricity during periods of high usage, peak hour reductions can also improve the program's cost-effectiveness. Programs that target energy use during peak periods may include rebates for high-efficiency air conditioners.

In addition, program administrators also invest in demand response programs that involve users curtailing or shifting consumption during specific times of the day (also see Section 7.5, "Maximizing Grid Investments to Achieve Energy Efficiency and Improve Renewable Energy Integration"). Though demand response programs may result in net reductions in total energy use, the magnitude is typically less than energy efficiency programs because load changes occur in more limited hours throughout the year.

Furthermore, some states target a portion of their efficiency investments to heavily populated areas or business districts; this helps alleviate transmission congestion and offsets or postpones transmission

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infrastructure investments. By linking program savings to constrained areas, the cost-effectiveness of the energy efficiency program may improve, while all electricity customers benefit when reliable energy supply is provided without incurring costly capital investments in the system.

Cost-Effectiveness

Many states incorporate cost-effectiveness analysis into the design and evaluation of their programs to determine whether the benefits exceed the costs. This helps ensure the effective use of program funds and can be used to compare program and technology performance in developing effective future programs. Table 4.2.1 shows cost-effectiveness tests commonly used by states. These are often applied at the portfolio level, though individual measures and programs can be further screened based on both the extent to which benefits exceed costs and on other aforementioned portfolio considerations.

Table 4.2.1: Primary Cost-Effectiveness Test by State

All tests	TRC/SCT Primary Threshold	UCT Primary Threshold	Combined TRC/UCT threshold
IA, IN, NC	CO, DE, FL, IL, MA, ME, MN, MO, NH, NV, OH, OR, PA, RI, VT, WA, WI	CT, MI, NM, TX, UT	CA, OR

Sources: Cadmus and Hedman 2012; SWEEP 2014

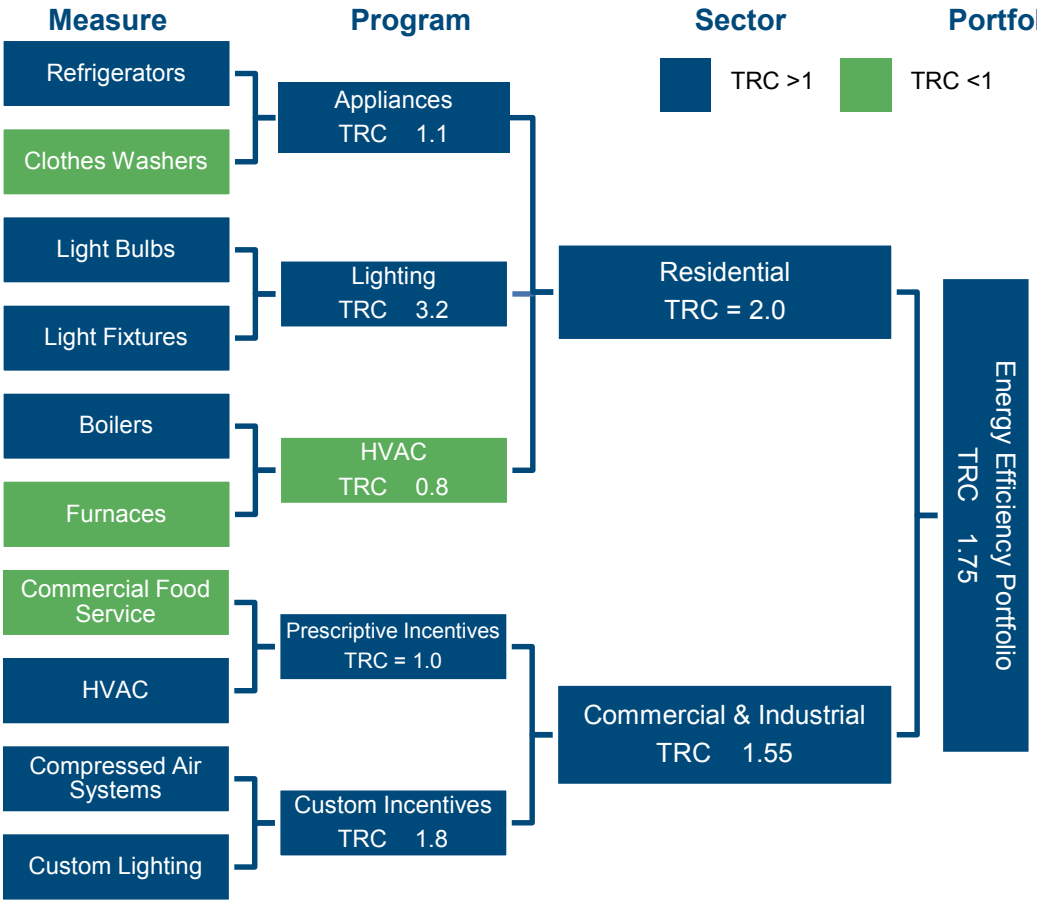
According to the American Council for an Energy-Efficient Economy (ACEEE), most states use multiple tests, although 29 states primarily use the Total Resource Cost (TRC) Test (ACEEE 2012). The TRC, as well as the Societal Cost Test (SCT), assess the net lifetime benefits and costs of a measure or program, accounting for both the utility and program participant perspectives. The SCT differs from the TRC in that it includes some non-energy benefits. As with other cost-effectiveness tests, if the benefit-cost ratio is greater than one, it is deemed to be cost-effective. In many cases, states require programs to assess cost-effectiveness from multiple perspectives, mainly because they provide useful insights into the range of issues a program might raise (ACEEE 2010). For example, the Participant Cost Test and the Program Administrator Cost Test, also known as the Utility Cost Test (UCT), are sometimes used to help design programs and incentive levels.

A longer term trend has been the movement away from the Ratepayer Impact Measure (RIM) test because it does not account for the interactive effect of reduced energy demand from efficiency investments on longer term rates and customer bills. Under the RIM test, any program that increases rates would not pass, even if total bills to customers are reduced.

Cost-effectiveness test results are typically reported in terms of the benefit-cost ratio. A larger benefit-cost ratio means that the program is more cost-effective. States may also express program costs and benefits in terms of $/kWh since such a metric may be effective when communicating to consumers and legislators. This metric also allows utilities and their regulators can compare energy efficiency to other resources, such as new generation.

As illustrated in Figure 4.2.4, cost-effectiveness is generally evaluated at the following four levels: measure, program, sector, and portfolio. Evaluation at the portfolio level is the most flexible; programs can be viewed together for cost-effectiveness purposes, allowing program planners to consider all customer classes, even though some measures and programs may not pass cost-effectiveness tests when looking at them discretely.

Figure 4.2.4: Illustrative Example of Cost-Effectiveness at Measure, Program, Sector, and Portfolio Levels



Source: NAPEE 2008

Interaction with Federal Programs

State energy efficiency programs interact with several federal programs, such as federal energy efficiency standards for equipment, appliances, and lighting. State programs complement federal standards by supporting broader adoption of newer, more efficient products and help bring down the costs for more efficient technologies. However, program administrators can only take credit for the energy savings above the minimum federal standards. Therefore, once a new federal standard advances, program administrators modify their programs to continue achieving cost-effective energy savings. For example, due to recent changes to lighting efficiency standards, state energy efficiency programs were modified to promote new lighting technologies such as LEDs (EPA 2011).

State policy-makers and energy efficiency program administrators should also be aware of other federal programs to avoid duplication and to help properly design programs that complement existing federal financial incentives and assistance. For example, if a federal tax credit is available in a given year, the magnitude of the program rebate or incentives should be recalculated to reflect the additional funding stream. Also, state energy efficiency program administrators may be able to leverage federal technical assistance and tools in their own program design to help reduce costs while also supporting a robust market for energy efficiency

products and services. Federal programs providing such technical assistance, tools, and guidance include, but are not limited to:

- *ENERGY STAR®.* EPA's ENERGY STAR program is the simple choice for energy efficiency. For more than 20 years, people across America have looked to ENERGY STAR for guidance on saving energy, saving money, and protecting the environment. Behind each blue label is a product, building, home, or facility that is independently certified to use less energy and cause fewer of the emissions that contribute to climate change. EPA offers technical assistance, tools, and resources to energy efficiency program administrators who leverage ENERGY STAR in their residential, commercial, and industrial efficiency programs.[31] Numerous tools and others resources are available free of charge to ENERGY STAR partners (ENERGY STAR 2014a, 2014b). Approximately 700 energy efficiency program administrators formally partner with ENERGY STAR to reduce program costs and implementation timelines while increasing program effectiveness. Implementation costs can be reduced because the ENERGY STAR program:
  - Defines efficiency through voluntary requirements adopted by more than 1,800 manufacturing partners and more than 4,800 home builders.
  - Develops standardized metrics to measure efficiency of commercial buildings and manufacturing plants, and recognizes the top performers through the EPA ENERGY STAR Portfolio Manager® tool32 for buildings and the ENERGY STAR Energy Performance Indicators for plants. 33
  - Ensures integrity through third-party certification and verification for products, homes, and buildings.
  - Makes it easy for consumers and businesses to identify and ask for efficient products, services, homes, and buildings.
  - Spurs supply and demand through channel marketing and consumer outreach.
  - Allows state and local energy efficiency programs to focus resources on other persistent barriers.
  - Facilitates energy efficiency program best practices and partner networking.
- *State and Local Energy Efficiency Action Network (SEE Action)*. SEE Action is a state- and local-led effort facilitated by DOE and EPA to achieve all cost-effective energy efficiency by 2020. SEE Action offers resources, discussion forums, and technical assistance to state and local decision-makers. State policy-makers and program administrators use SEE Action tools and resources to learn about policies and best practices from other states when adopting and implementing energy efficiency programs.

ENERGY STAR Industrial

Industrial plants can be large consumers of electricity. Therefore, many tools and resources exist to help states develop and deliver strong programs for industrial energy improvements. For example, ENERGY STAR for Industry provides industry, states, and utilities proven energy efficiency strategies and tools that are adoptable within any manufacturing sector. These cost-effective resources (such as sector energy guides, plant energy benchmarks, and the ENERGY STAR Guidelines for Energy Management) help states and utilities 1) evaluate, identify, and understand potential energy savings at specific types of manufacturing plants, 2) build strategic energy management capability at manufacturing plants, and 3) develop cost-effective programs that promote continuous energy-efficient improvements for sustained savings at manufacturing plants.

[31] www.energystar.gov.

[32] For more information on ENERGY STAR Portfolio Manager, see http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/learn-how-portfolio-manager.

[33] For more information on ENERGY STAR Energy Performance Indicators for plants, see www.energystar.gov/epis.

- *Better Buildings and Better Plants Programs.* Through the Better Buildings and Better Plants Programs, DOE is advancing several strategies designed to make state, local, commercial, industrial, and residential buildings 20 percent more energy-efficient over the next 10 years and accelerate private sector investment in energy efficiency (DOE 2014). State policy-makers and energy efficiency program administrators can take advantage of training, tools, and technical assistance, as well as demonstrate their leadership on energy efficiency through the Better Buildings Challenge. As of February 2015, eight states have committed to the goals of the Challenge. Better Buildings has also launched Accelerators to promote increased use of energy savings performance contracts with 14 state partners, as well as high-performance outdoor lighting with two state partners.

The federal government also provides direct financial support to states, local governments, and utilities which may be used to support energy efficiency programs. Financial support is available via loan, grant, and cooperative agreement programs, each with their own unique eligibility and funding requirements. Federal funding sources include, but are not limited to:

- *State Energy Program (SEP)*. The SEP helps states establish and implement energy efficiency and renewable energy plans, policies, and programs to reduce energy costs, increase competitiveness, enhance economic development, improve emergency planning, and improve the environment. SEP provides state energy offices with formula-based grants that allow states and U.S. territories, as well as Washington, D.C., to advance their energy priorities by designing and implementing energy efficiency and renewable energy programs. SEP also provides funding on a competitive basis to states, targeting transformational projects within state energy offices that create more public-private partnerships initiated by states within and outside of their borders to address critical clean energy challenges. In addition, the American Recovery and Reinvestment Act (ARRA) of 2009 supported an increase in energy efficiency and other energy programming via state energy offices. Many of these programs still exist and leverage ratepayer-funded energy efficiency programs, such as those funded by PBFs, by coordinating activities with utilities and other energy efficiency program administrators.
- *Rural Utilities Service Loans.* In December 2013, the USDA Rural Utilities Service finalized a rulemaking that established a new Energy Efficiency and Loan Conservation Program (USDA 2013). Through this program, utilities in rural areas may apply for financing support to administer customer programs for energy efficiency and renewable energy. These include, but not limited to, community awareness and outreach programs, energy audits, energy efficiency measures on a consumer premises, and re-lamping to more efficient lighting. States may look to leverage these loans to help fund energy efficiency programs run by cooperatively and municipally owned utilities serving rural communities.
- *Rural Energy for America Program (REAP).* Through REAP, USDA provides grants and loan guarantees to agricultural producers and rural businesses for energy efficiency and renewable energy. These funds are used to make direct energy efficiency improvements, install onsite renewable generation and CHP, and conduct energy audits and feasibility studies. State energy efficiency programs offered to rural communities and the agricultural sector may look to leverage and complement REAP funding opportunities.

As part of their efforts to reduce costs and comply with Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," federal facilities across the country may consider taking advantage of energy efficiency and demand response programs offered to them by the utility or state in which

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they are located.[34] Energy efficiency program administrators offering programs to the federal sector may need to consider the unique ownership and fiscal characteristics of the sector.

Interaction with Local and State Policies

State energy efficiency programs can also support several of the local and state policies discussed in this report, including energy codes (see Section 4.3), standards (see Section 4.4), tax incentives and financing (see Chapter 3), and electric utility policy actions (see Chapter 7). Similar to the interactions with federal policies discussed above, program administrators can leverage existing state policies and programs to support broader market transformation and avoid duplicative efforts. For example, energy efficiency programs can support energy code implementation, encourage voluntary stretch codes that offer additional savings, and help document code compliance.

Even if the utility does not administer the energy efficiency program, the energy and peak demand savings from programs are typically reflected in utility integrated resource plans. Program savings and costs must be projected and measured in order to incorporate energy efficiency for least cost service (see Section 7.1). States are also adopting policies such as decoupling and performance incentives to address the utility's inherent financial disincentive to maximize energy savings. Successful energy efficiency programs will reduce sales, making it difficult for the utility to recover their fixed costs under traditional utility regulation (see Section 7.2). Some states have required that utilities offer customers programs to take advantage of data from new electricity grid technologies, such as advanced meters and distribution automation systems. Offering energy efficiency and/or demand response programs can help make the business case for infrastructure investments and support customer acceptance of modern grid investments (see Section 7.5 for more information).

Over the last several years, more than 10 local jurisdictions and the states of California and Washington have adopted policies requiring building owners to measure and share their energy use. These policies can benefit other state energy efficiency programs and may also provide direct efficiency improvements (EPA 2012). They increase customer awareness of the opportunity to make energy efficiency investments in their facilities, priming the marketplace for customers to actively participate in energy efficiency programs. In many jurisdictions, the building energy use is to be disclosed publicly, providing energy efficiency program administrators with a new dataset to inform program design and delivery.

[34] See http://sustainability.performance.gov/.

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Benchmarking/Disclosure Policies Example

In 2010, the Seattle City Council unanimously passed an ordinance requiring owners of commercial and multifamily buildings with four or more units to benchmark energy performance in the EPA ENERGY STAR Portfolio Manager tool. They were also required to disclose current benchmarking to the city, as well as prospective tenants, buyers, and financers (note that similar mandates in Washington, D.C., New York City, and other jurisdictions require annual public disclosure of benchmarking results). Compliance and reporting are being phased in over time based on building square footage.

The benchmarking policy was developed with guidance from local industry leaders and enacted as part of the 2009–2013 Climate Action Plan. By 2030, the policy aims to reduce commercial buildings energy use by 10 percent, residential building energy use (including multifamily) by 20 percent, and GHG intensity of all fuels by 25 percent (http://www.seattle.gov/Documents/Departments/OSE/EBR-2011-2012-report.pdf).

As of January 2014, the compliance rate was an astounding 93 percent of all affected buildings, and the city has found that performance data use by building owners is spurring local competition. The city estimates that if the worst performing buildings improved energy performance to median performance levels, total annual bill savings would surpass $55 million and annual energy use would decline 25 percent.

In 2014, DOE awarded an SEP competitive grant to Washington State in order to develop uniform, mandatory statewide benchmarking and disclosure policies.

Program Implementation and Evaluation

Energy efficiency program implementation and evaluation involves several key elements. Additional guidance and other resources for program implementation and evaluation are summarized at the end of this section. Given the long history of energy efficiency program offerings across the country, several program best practices have emerged, as well as existing networks and organizations for sharing model practices and lessons learned at the regional and national level, as listed in the Resources tables at the end of this chapter.

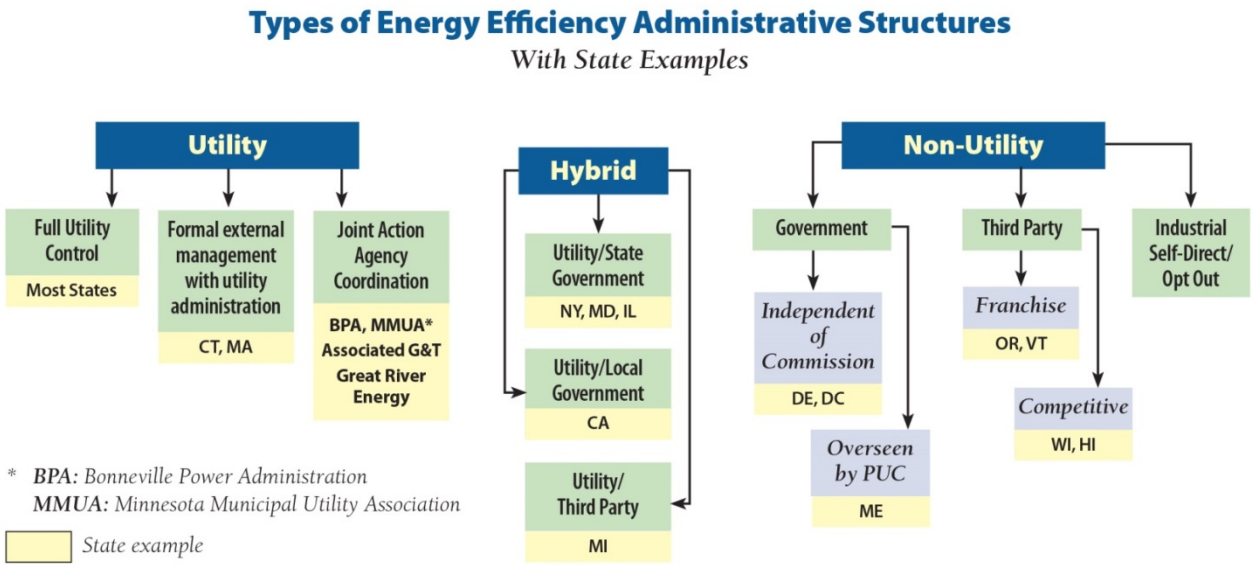
Administering Body

The administrative structure for energy efficiency programs varies by the type of funding source and state. For programs run by the state government, either a state energy office or energy efficiency program-specific state entity serves as program administrator. For programs funded by customers via their utility rates or PBFs, also referred to as ratepayer-funded programs, the utility or a state-designated third-party administrator typically administers programs under the oversight of the state utility commission or utility board of directors. Figure 4.2.5 provides an overview of different administrator options for ratepayer-funded programs.

States have developed effective programs using each administrative model; institutional history typically determines the entities best suited to administer programs. In many states, utilities have the capital, personnel, and customer relations channels that enable them to reach broad customer markets effectively. Thus, they are the most common administering entity.

However, in some states, particularly those served by numerous smaller utilities, a statewide effort may enable programs to develop a strong management capacity for designing and implementing programs and to more cost-effectively engage trade allies and educate consumers.

Figure 4.2.5: Types of Ratepayer-Funded Energy Efficiency Administrative Structures with State Examples



Note: This figure refers to types of administrative structures for consumer-funded energy efficiency programs. State examples refer to the primary administrative structure existing in each state.

Source: Adapted from RAP 2011.

Energy Efficiency Program Planning and Design

Developing Program Plans

The program oversight authority typically requires program administrators to submit detailed program plans for approval before beginning program implementation. At a minimum, good program plans include the following information for the overall program and for the individual programs that comprise the overall approach:

- Program descriptions, including target market(s), eligible participants and technologies, and financial incentives.
- Program goals and objectives.
- Budgets.
- Kilowatt and kWh goals, including anticipated annual energy savings and lifetime energy savings.
- Benefits and costs.
- Marketing and implementation strategies.
- Major milestones.
- Evaluation plans, including identification of metrics for program success (EPA 2006).

Program administrators usually have about 3 months to develop and submit their program plans. Similarly, oversight authorities typically need about 3 months to review and approve or suggest modifications to plans. In order to ensure programs are implemented as quickly as possible once approved, program administrators issue requests for proposals during this time period (if they did not do so earlier) and contract decisions are made contingent upon approval by the oversight authority.

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Designing Programs to Overcome Barriers to Energy Efficiency

The ability to help address persistent barriers to the investment and adoption of socially and cost-beneficial energy efficiency opportunities is key to successful energy efficiency program design. Programs often offer the following strategies to address market failures and other barriers that lead to inefficient energy use:

- *Provide better information*. Energy users often lack accurate information about energy savings and other characteristics of energy-efficient products or practices, which would allow them to understand the costs and benefits of energy efficiency investments. Market failure due to information imperfection leads to underinvestment in energy efficiency by consumers.
- *Address split incentives (also referred to as addressing the "principal-agent problem")*. The incentives of individuals who make energy efficiency investment decisions are not always aligned with the incentives of those who use and pay for energy. Examples include misalignment between landlords and tenants and between builders and homeowners. Split incentives also persist within organizations and institutions that lead to underinvestment in energy efficiency in both the public and private sectors.

Best Practices: Implementing Energy Efficiency Programs

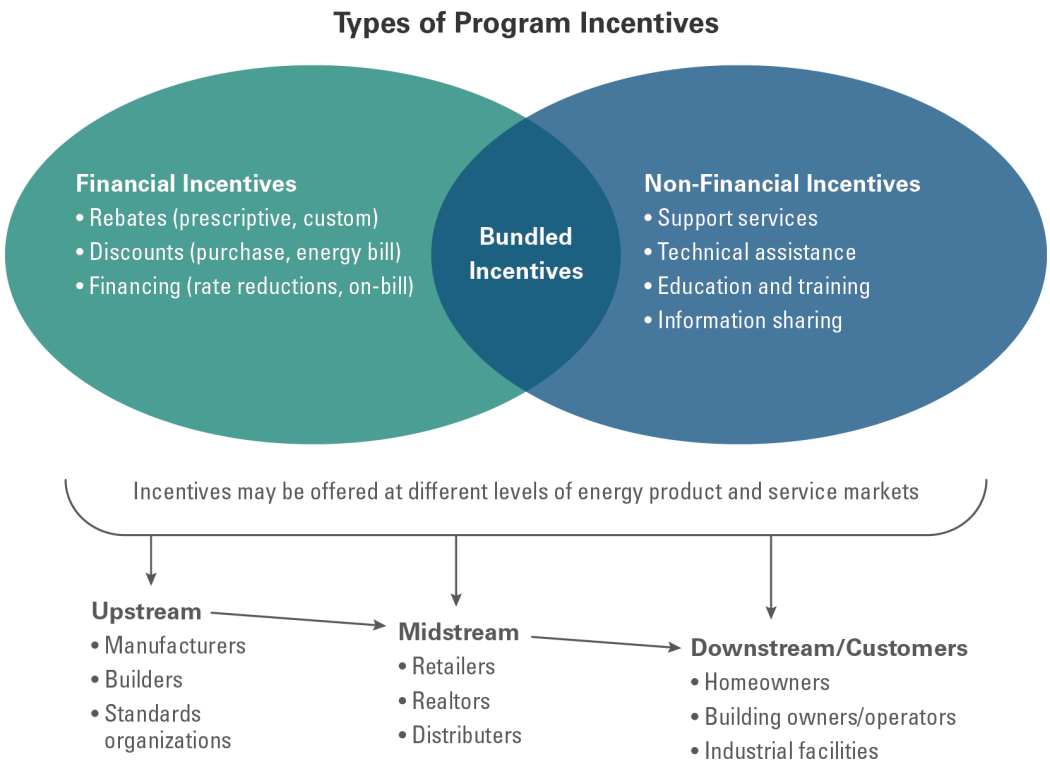
- Learn from other states' experiences to identify most cost-effective ways to achieve energy savings through programs.
- Consider a range of potential organization(s) for program delivery and select the most appropriate.
- Approve long-term funding cycles (5 to 10 years) to let programs build market experience and capture return on investment.
- Involve key stakeholders and experts in a program design.
- Base program designs on market characteristics and customer needs.
- Keep program designs simple and clear.

- *Reduce risk and uncertainty*. Adopting an unfamiliar, typically more expensive energy efficiency technology can be an uncertain undertaking. This is due to the lack of credible information on product performance and future energy prices, and the irreversibility of the investment. Imperfect or asymmetric information can exacerbate the perceived risk of energy efficiency investments and help explain why consumers and firms do not always invest in energy efficiency measures. Suppliers also face risk and uncertainty because they lack perfect information on consumer preferences for energy efficiency. In the presence of risk and uncertainties, consumers and suppliers alike will underinvest in energy efficiency.
- *Lower transaction costs*. Consumers face transaction costs in searching, assessing, and acquiring energy-efficient technologies and services. It can be time-consuming and difficult for consumers to estimate a product's lifetime operating costs. The complexity of the search process puts many efficient products at a disadvantage relative to less-efficient products with lower upfront costs.
- *Provide access to low-cost financing*. Consumers sometimes face higher interest rates to finance energy efficiency investments compared to other investments. Lenders can be reluctant to invest in energy efficiency loan portfolios in part because energy efficiency loans may lack standardization and financial markets have difficulty ascertaining the likely payoff from such investments. Limited access to credit may prevent some consumers, especially low-income consumers, from making cost-effective energy efficiency improvement decisions due to the higher upfront cost of energy-efficient products or practices.
- *Reduce environmental externalities that are not reflected in energy prices*. Bill savings that do not reflect environmental externalities lead to investments in energy efficiency below socially optimal levels.
- *Influence behavior*. Behavioral economics and psychology have identified potential behavioral impediments preventing individuals and organizations from always making cost-effective energy efficiency

investments. Behavioral economics posits possible explanations, including bounded rationality, heuristic decision-making, and non-standard preference and belief.

Program administrators may offer a range of financial and other incentives to help address information, financial, and behavioral barriers. These incentives range from simple cash rebates for the purchase of efficient products to bundled customized financial incentives and technical assistance. Incentives can be targeted to individual customers and purchase transactions, or can be directed further upstream in market supply chains to encourage manufacturers, retailers, or contractors to affect how customers choose products, building designs, or building operating methods. Figure 4.2.6 provides an overview of the types of incentives in energy efficiency programs.

Figure 4.2.6: Overview of Energy Efficiency Incentive Types



Source: EPA 2010

Evaluation, Measurement, and Verification

Energy efficiency program evaluation includes conducting a wide range of assessment studies and other activities to determine a program's effects and to understand or document program performance, program or program-related markets and market operations, program-induced changes in energy efficiency markets, levels of demand or energy savings, or program cost-effectiveness. Market assessment, monitoring and evaluation, and measurement and verification are aspects of evaluation (SEE Action 2012).

States require robust evaluation, measurement, and verification (EM&V) in order to:

- Document a program's energy savings and other benefits, and determine whether the program (or portfolio of programs) met its goals.
- Inform ongoing decision-making and improve program delivery. In particular, evaluation during the early stages of program development can save time and money by identifying program inefficiencies and suggesting how to optimize program funding.
- Support energy demand forecasting and resources planning by understanding the contributions and costs of energy efficiency programs as compared to other energy resources. (See Section 7.1 for more information on electricity resource planning.)
- Ensure policy and public support for energy efficiency programs continues.
- Enable the calculation of other benefits, such as reductions in GHGs and other air pollutants.

Best Practices: Evaluating Energy Efficiency Programs

State policy-makers are promoting evaluation requirements both during program development and after program implementation. EM&V requirements in states with the most experience implementing and overseeing energy efficiency programs are typically based upon the following industry best practices:

- Use one or more of the industry-standard EM&V protocols or guidelines, and use deemed savings values for well-understood energy efficiency programs and measures.
- Consider local factors, such as climate, building type, and occupancy.
- Involve stakeholders and solicit expert advice regarding EM&V processes and resulting energy savings impacts.
- Conduct EM&V activities (e.g., direct equipment measurements, application of deemed savings, and reporting of impacts) on a regular basis.
- Provide interim and annual reporting of achieved energy savings.
- Update protocols and deemed savings to reflect new developments and improved information.

When evaluating an energy efficiency program's impact, the key metric of interest is energy savings, which is often evaluated in terms of both total reduction and peak reduction. Savings cannot be directly measured. Instead, efficiency program impacts are estimated by calculating the difference between actual energy consumption after program implementation and energy consumption that would have occurred during the same period without the program (i.e., the baseline). Figure 4.2.7 provides an example of this comparison.

States are measuring their energy efficiency savings using strategies and protocols that are increasingly credible, transparent, and consistently applied, as further discussed in this section. Because different types of evaluation are needed at various states of program design and implementation, states may establish a process for obtaining expert advice on EM&V, such as by forming a separate evaluation advisory group or hiring a professional advisor to guide evaluation investments. These entities can help assess available resources, identify and help prioritize evaluation activities, determine areas of uncertainty in a program or portfolio, and assess a program's maturity. Such processes may also address key methodological issues related to impact evaluation as described below.

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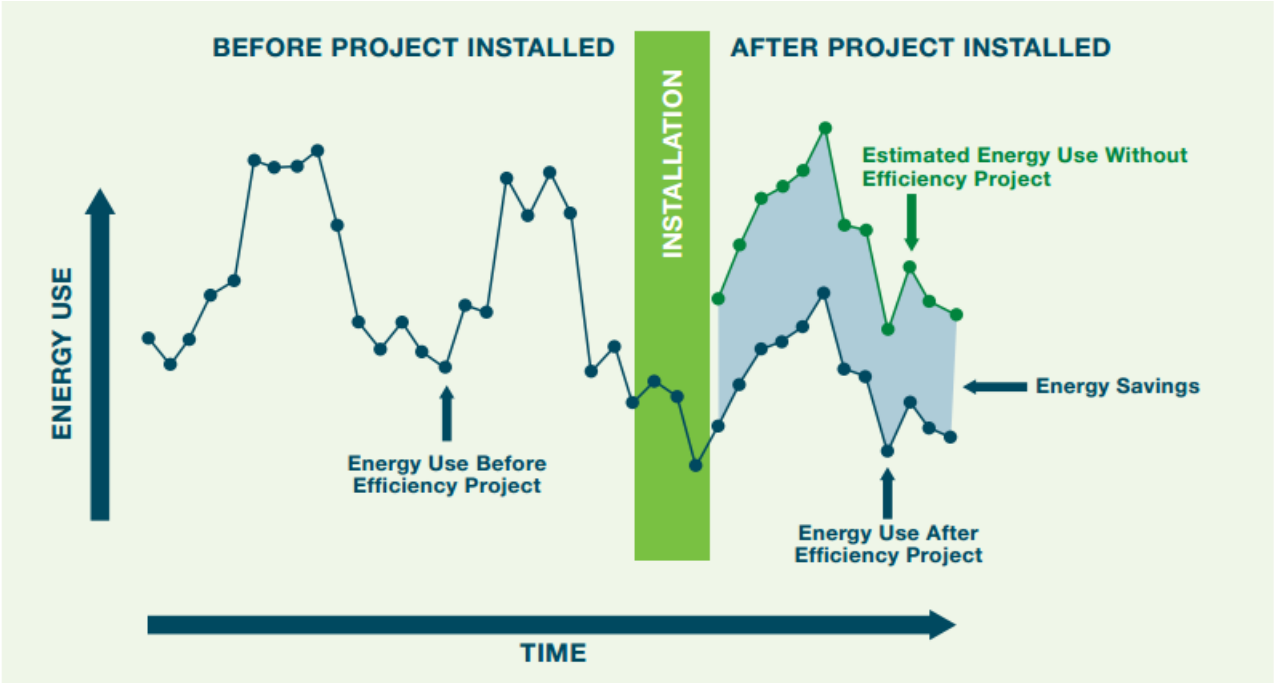
Figure 4.2.7: Energy Consumption Before, During, and After Project Implementation



Source: SEE Action 2012

Determining the Baseline

During the program planning process, program administrators should develop a baseline forecast of efficient technology or service adoption absent the program and with the program. This baseline will allow program managers to set realistic savings goals and design programs that are well-suited for the target market. Understanding market potential and the market penetration of energy-efficient equipment and practices also provides valuable insights into how the program should be delivered, and what incentive levels would be cost-effective and successful at moving the market. Depending on the technology or service, evaluating baselines by market subsector can be valuable. Some market assessments employ a survey process to develop baseline assumptions. Baselines should be revisited as needed to account for changes in program design or changes to state or federal standards.

Establishing a Program Tracking System

A program tracking system is used to collect detailed information needed for program evaluation and implementation. Data collection can vary by program type, technologies and systems addressed, and customer segment. Well-designed program tracking systems include:

- *Participating customer information.* At a minimum, create a unique customer identifier that can be linked to other customer information systems. Other customer or site specific information might be valuable.
- *Measure specific information.* Record equipment type, equipment size or quantity, efficiency level, and estimated savings. Table 4.2.2 provides an overview of information typically tracked for each measure in a commercial facility.

- *Program tracking information.* Track rebates or other program services provided (for each participant) and key program dates.
- *All program cost information.* Include internal staffing and marketing costs, subcontractor and vendor costs, and program incentives.

Table 4.2.2: Typical Energy Efficiency Program Tracking Information for a Commercial Product Program

Measure Level Information	Power Consumption Information	UCT Primary Threshold Combined TRC/UCT threshold
o Measure type – Brand – Model number – Description – Capacity o Percent of load on measure o Quantity of measure o Level of incentive o Installation date	o Power draw of installed equipment o Power draw of typical equipment Installed at time of purchase o Power draw of old equipment description	o Energy savings o Summer demand savings o Winter demand savings o Years of useful life remaining on old equipment o Years of useful life for installed equipment

Ensuring Transparency and Documentation

Many states with active energy efficiency programs rely on accepted practices and methods approved by their respective regulatory commissions as the basis for measuring and verifying energy efficiency savings. Some states have gone further and documented the key assumptions used to calculate energy and demand savings in a technical reference manual (TRM), providing transparency.

Many technical reference manuals include predetermined estimated (or deemed) savings, derived from historical evaluations, to estimate energy and demand savings. Deemed savings are appropriate for evaluating programs that focus on relatively straightforward efficiency measures with well-known and consistent performance characteristics—for example, duct sealing or replacing standard incandescent light bulbs with compact fluorescent bulbs. Though there may be consistency across state deemed savings values due to common sources, the values are typically calculated by state PUCs. For instance, the PUC of Texas' EM&V contractor develops and maintains deemed savings values in a statewide TRM.

Adopting Standard Protocols for EM&V

Several national and regional efforts have focused on developing standard EM&V definitions and protocols. By adopting these approaches, states and other stakeholders can improve the consistency and accuracy of their evaluations and make it possible to compare efficiency initiatives across states. These initiatives also promote transparency in reporting. Examples of standard protocol efforts include:

- *The International Performance Measurement and Verification Protocol (IPMVP).* The IPMVP is an accepted industry standard that provides an overview of best practice techniques for verifying energy savings from facility-level and other efficiency initiatives. The objectives of the IPMVP are to:
  - Increase certainty, reliability, and savings level (with a focus on the persistence of savings several years after installation).

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- Reduce transaction costs by providing an international, industry consensus approach and methodology.
- Reduce financing costs by providing project EM&V standardization, thereby allowing project bundling and pooled project financing.
- Provide a basis for demonstrating emissions reduction and delivering enhanced environmental quality.
- Provide a basis for negotiating contractual terms to ensure that energy efficiency projects achieve or exceed program goals of saving money and improving energy efficiency (Seattle 2006).

Northeast Energy Efficiency Partnerships (NEEP) EM&V Forum

NEEP works across the Northeast and Mid-Atlantic to accelerate energy efficiency in the building sector and improve transparency and consistency in EM&V reporting. NEEP's Regional Evaluation, Measurement, and Verification Forum develops and supports the use of consistent savings assumptions and standardized, transparent guidelines and tools to evaluate, measure, verify, and report the energy demand savings, costs, and avoided emission impacts of energy efficiency. The Forum has developed the Regional Energy Efficiency Database, which includes electric and gas energy efficiency program data for 10 jurisdictions and can be used to analyze program and policy design, air quality reporting and planning, system planning, and comparisons of state energy efficiency impacts to promote cross-state consistency.

The IPMVP provides a flexible set of EM&V approaches for evaluating energy savings in buildings. Several states—including California, Texas, and New York—have adopted the IPMVP to support system planning needs, clean energy portfolio standards, and carbon reduction programs (SEE Action 2011).

- *DOE Uniform Methods.* Technical experts developed the Uniform Methods Project to provide a straightforward method for evaluating gross energy savings for common residential and commercial measures offered in ratepayer-funded initiatives in the United States. The first set of protocols for determining energy savings from energy efficiency measures and programs was published in April 2013.

State Examples

Massachusetts

Massachusetts' long, successful track record of implementing energy efficiency programs across customer sectors has been funded by a combination of utility programs, PBFs, and the RGGI. Utility programs, dating back to the 1980s, have evolved with utility regulation and other policies. Most recently, the Green Communities Act of 2008 established a process through which all electric and gas utilities work collaboratively to design and implement statewide energy efficiency programs. The program administrators across the state develop program designs that are reviewed and approved by an oversight committee called the Massachusetts Energy Efficiency Advisory Council. Once statewide program designs are approved, the individual utility companies submit annual energy savings goals and annual budgets based on service territory size. Programs are designed for 3-year cycles and allow for annual modifications as needed. Marketing and evaluation are conducted jointly to support statewide consistency. Utility program administrators manage and implement efficiency programs, with the exception of low-income programs. The state's low-income weatherization and fuel assistance program implements low-income residential demand-side management and education programs.

In January 2013, the Department of Public Utilities approved the second 3-year (2013–2015) electric and gas energy efficiency plans under the Green Communities Act, continuing the state's progress toward ambitious energy savings targets in the country. The first electric efficiency procurement plan called for savings of 1.0 percent in 2009, 1.4 percent in 2010, 2.0 percent in 2011, and 2.4 percent in 2012. The state's second 3-year

plan calls for savings to increase to 2.6 percent in 2015. The energy efficiency investments from 2013 to 2015 are expected to save 3,703 gigawatt-hours of electricity in 2015.

The state's natural gas plan will save 24.75 million therms in 2015, equivalent to 1.14 percent of retail natural gas sales in 2015. Overall, the fully funded 2013–2015 electric and natural gas efficiency procurement plans will yield net consumer savings of more than $6.2 billion. The energy savings proposed in the current 3-year plan represent a 55 percent increase compared to the energy savings achieved in previous 3-year plans.

These efforts have placed the state among the nation's leaders in energy efficiency. The 2014 ACEEE State Energy Efficiency Scorecard placed Massachusetts first in its annual rankings. The Energy Efficiency Advisory Council won ACEEE's Champion of Energy Efficiency in Buildings Award in 2014 in public recognition of the continued accomplishments and leadership provided by the Council.

Vermont

Vermont is another example of a state that has been a pioneer of energy efficiency programs for several decades, and is also the pioneer of the energy efficiency utility concept known as Efficiency Vermont. Efficiency Vermont was created in 1999 by the Vermont Public Service Board and the Vermont Legislature in response to a request for statewide energy programs from the Vermont Department of Public Service, the state's 22 electric utilities, and a dozen consumer and environmental groups. Under the efficiency utility concept, a third-party organization is responsible for designing the efficiency program and is under contract to deliver results for the entire state. Efficiency Vermont's funding comes from a public benefit charge as a fixed amount per kWh sold on all electric utility customers' bills. Beginning in 2008, RGGI carbon allowance auction proceeds were combined with established funding sources to offer a wider range of services and incentives.

Efficiency Vermont currently operates primarily as an electricity efficiency utility to deliver energy efficiency services throughout most of the state; the City of Burlington Electric Department operates as an energy efficiency utility in its service territory. In 2014, the Board is considering whether to appoint an energy efficiency utility to deliver natural gas efficiency services, as gas efficiency programs have been operated by gas utilities since 1993.

In 2007, the Board initiated a yearlong workshop process to consider changing the energy efficiency utility. As a result, the structure of an Order of Appointment model was changed in 2009. This moved Efficiency Vermont to a 12-year rolling program model that provides additional stability. Additionally, the state conducts a demand resources plan, which is a statewide plan that identifies short- and long-term energy efficiency budgets and savings goals, as well as other compensation matters related to delivering energy efficiency services.

In 2013, Vermont's budget for electricity efficiency programs was over $35 million with projected savings of 92,520 MWh. The budget for thermal efficiency programs was nearly $5 million.

Missouri

Missouri is a good example of a state in the early processes of funding and delivering energy efficiency programs. Missouri began a major transformation in the scope and role of utility-sector energy efficiency programs in 2009 when it enacted SB 376, the Missouri Energy Efficiency Investment Act (MEEIA). Among its many provisions, MEEIA requires Missouri's investor-owned electric utilities to capture all cost-effective energy efficiency opportunities and allows them to recover costs. The Missouri Department of Economic Development's Division of Energy reviews and intervenes in dockets and utility regulatory cases for demand-side management programs, integrated resource planning, and incentive mechanisms pursuant to the MEEIA.

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The Missouri Public Service Commission's (MPSC's) implementation of MEEIA sets out voluntary goals for electric utilities to achieve. These include 0.3 percent annual savings in 2012, ramping up annually to 0.9 percent in 2015, and 1.7 percent in 2019 for cumulative annual savings of 9.9 percent by 2020. Ameren Missouri was the first large investor-owned utility to win approval from the MPSC for a comprehensive energy efficiency portfolio to recover costs and lost revenue. Its programs launched in late 2012. Kansas City Power and Light ran limited programs in its Greater Kansas City service territory and plans to expand programs to its entire service territory in 2015.

In 2012, Missouri's budget for electricity efficiency programs was more than $35 million, making up 0.38 percent of statewide utility revenues; their budget for natural gas efficiency programs was $9.2 million. The state's 2011 efforts resulted in savings of 369,000 MWh.

Utility ratepayer-funded efficiency programs are working alongside other energy efficiency policies, including state government lead-by-example, financing, and local government programs. Governor Nixon signed Executive Order 09-18 in 2009, which mandated that all state agencies adopt policies designed to reduce energy consumption by 2 percent each year for the following 10 years. The Missouri Department of Economic Development's Division of Energy has provided energy efficiency loans since 1989. In 2010, an additional $14.3 million in ARRA SEP revolving loan funds were added to the loan portfolio to specifically address energy efficiency in public and institutional facilities. Since the program's inception, loans totaling over $89 million have been made through this program, resulting in an estimated cumulative savings of $167 million.

On April 18, 2014, Governor Nixon announced that the Missouri Department of Economic Development's Division of Energy will lead a statewide initiative to develop a comprehensive energy plan for Missouri. In public meetings across the state, the initiative solicited input from energy stakeholders including consumers, businesses, publicly owned utilities, renewable energy companies, academic researchers, and environmental advocates. The comprehensive energy plan is targeted for release in summer 2015.

At the local level, Kansas City is currently crafting plans, through the City Energy Project,[35] to benchmark buildings' energy consumption, provide building operator training and certification, recognize building owners/managers who implement energy efficiency improvements, and help building owners/managers identify local, technical, and financial resources to implement energy efficiency measures. Kansas City's participation will focus on reducing energy use in large buildings, saving money on utility bills, putting local people to work making energy efficiency improvements to local buildings, and reducing GHG emissions in order to achieve the goals of the Kansas City Manager's Office climate protection plan. Kansas City Power and Light has supported the city's efforts.

Mississippi

In 2013, ACEEE recognized Mississippi as one of the country's most improved states with regard to energy efficiency. Previously falling at the bottom of the ACEEE State Energy Efficiency Scorecard rankings based on policy actions and program efforts, Mississippi has become more active in promoting energy efficiency as a state policy priority. In addition to its Scorecard, ACEEE released a report stating that Mississippi could create 32,000 jobs and free up $4.3 billion over the next decade from energy efficiency policy and program action. Such economic development arguments appear to have been persuasive. As summarized in Energy Works: Mississippi's Energy Roadmap, Governor Phil Bryant has prioritized energy efficiency in the state's energy

[35] For more information on the City Energy Project, see http://kcmo.gov/city-energy-project/; http://www.cityenergyproject.org/.

strategy, and is working with other state officials to leverage energy efficiency as an economic development opportunity.

The Mississippi Public Service Commission initiated an energy efficiency collaborative process, supported by federal stimulus funds, through which Energy Efficiency and Conservation Rule 29 was established. Rule 29 requires utilities to implement energy efficiency programs and standards. The collaboration included a range of stakeholders and interested parties, as well as jurisdictional electric and natural gas utilities and electric power associations. This resulted in comprehensive utility filings, which included such program elements as customer education, energy audits, rebates for home retrofits, and business and industrial technical assistance. The Commission approved the program filings in 2014 for a 3-year period, and programs are in the early stages of implementation. The Mississippi State Energy Office also received a competitive SEP grant award from DOE in 2013 to build and expand upon its energy efficiency success to date.

Additional state actions related to energy efficiency programs are also expected to be taken in the future. Such actions may include evolving more comprehensive program portfolio plans, developing more detailed guidelines for EM&V, and developing stakeholder working group processes that facilitate program improvements outside the formal regulatory process.

What States Can Do

Experience from the states with energy efficiency programs demonstrates that the policy is an effective mechanism for securing investment in cost-effective energy efficiency and meeting important state energy objectives. States can use the best practices and information resources in this guide to establish new energy efficiency programs or strengthen existing programs to deliver even greater benefits.

Action Steps for States

The following four steps can be used both by states interested in developing a new PBF program or those interested in strengthening an existing program:

- Assess energy efficiency potential. States can begin the process by assessing current levels of energy efficiency spending within their state, analyzing all of their options for achieving greater levels of efficiency, and analyzing the energy and cost savings that energy efficiency programs would offer.
- Determine program funding needed to capture cost-effective energy efficiency. Consider appropriate program funding levels and establish funding mechanisms that can avoid the potential for funds to be diverted to other purposes. Studies show energy efficiency spending could be increased significantly and still be used cost-effectively. Conduct an efficiency potential analysis and economic screening process to identify the most cost-effective mix of new program targets. Include consideration of energy efficiency's role as a potential reliability tool and how its costs in that context compare to other options.
- Leverage federal, state, and local programs. Explore opportunities to leverage federal and state grant funds, as well as technical assistance and tools available from federal programs such as ENERGY STAR. States should also coordinate with other federal, state, and local energy efficiency policies and programs for effective program implementation and design.
- Measure and communicate results. Measure results, evaluate the effectiveness of energy efficiency programs, and report progress annually. Communicate the benefits of energy efficiency programs to state legislatures, PUCs, and other stakeholders. Document lessons learned and opportunities to enhance the program's effectiveness.

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Information Resources

Funding, Administration, and Cost-Effectiveness

Title/Description	URL Address
Who Should Deliver Ratepayer-Funded Energy Efficiency? A 2011 Update. This report, updating a 2003 report for the Colorado Public Utilities Commission by the Regulatory Assistance Project, offers guidance to state legislators and utility regulators as they consider ways to make the administration and delivery of energy efficiency more effective.	https://www4.eere.energy.gov/seeaction/system/files/documents/rap_sedano_whoshoulddeliverratepayerfundedee_2011__11_15.pdf
Whose Perspective? The Impact of the Utility Cost Test. This study for the 2012 International Energy Program Evaluation Conference examines the theory behind different utility cost test perspectives, the rationale for adopting each test, and key outcomes.	http://www.cadmusgroup.com/wp-content/uploads/2012/11/TRC_UCT-Paper_12DEC11.pdf
ACEEE State and Local Policy Database. This ACEEE database includes comprehensive information on energy efficiency policies and programs currently implemented at the state and local level. The database tracks policy activity across multiple sectors, including government, transportation, buildings, CHP, and appliance standards.	http://database.aceee.org/
Energy Efficiency Cost-Effectiveness Screening in the Northeast and Mid-Atlantic States. This survey, prepared for NEEP's Regional EM&V Forum, describes key issues and differences related to current cost-effectiveness testing practices, and it identifies areas where guidance can on cost-effectiveness testing can be improved.	http://www.neep.org/sites/default/files/resources/EMV_Forum_C-E-Testing_Report_Synapse_2013%2010%2002%20Final.pdf

Program Design

Title/Description	URL Address
ENERGY STAR Utility and Regional Energy Efficiency Program Sponsors (EEPS) Resources. This website provides resources for EEPS on home improvement, residential and commercial products and programs, residential new construction, and commercial and industrial programs.	http://www.energystar.gov/index.cfm?c=reps.pt_reps
Regional Energy Efficiency Organizations (REEOs). REEOs provide technical assistance to states and municipalities to support efficiency policy development and adoption, along with program design and implementation. This policy brief provides an overview on and Web links to the six REEOs.	http://www.seealliance.org/wp-content/uploads/REEO-GeneralEEPolicyBrief-2014.pdf
Database for Energy Efficiency Resources. This California Public Utilities Commission (CPUC) database contains information on selected energy-efficient technologies and measures, including estimates of the energy-savings potential for these technologies in residential and nonresidential applications and data on the costs and benefits of energy-efficient measures.	http://www.deeresources.com/
Demonstration of Energy and Efficiency Developments (DEED) Program. The American Public Power Association's DEED Program is a research demonstration program dedicated to improving the operations and services of public power utilities by supporting and demonstrating innovative developments.	http://www.publicpower.org/Programs/Landing.cfm?ItemNumber=31245&navItemNumber=37529

Title/Description	URL Address
Leaders of the Pack: ACEEE's Third National Review of Exemplary Energy Efficiency Programs This 2013 presents the results of ACEEE's third national review of exemplary programs. The report identifies and profiles 63 leading programs that span the wide array of program types offered to utility customers.	http://aceee.org/research-report/u132
ENERGY STAR Industrial Energy Efficiency Resources for State and Utility Programs. This website contains tools and resources to help states and utilities understand energy use in the industrial sector and learn how to work with manufacturers to improve energy efficiency, develop stronger energy efficiency programs, and promote industrial energy performance improvement.	https://www.energystar.gov/buildings/industrial-energy-effiicency-resources-state-utility-programs
ENERGY STAR Partner of the Year Awards Winners. This website contains descriptions of energy efficiency programs which have received ENERGY STAR awards for promotion of ENERGY STAR products, homes and tools to support broader market transformation for energy efficiency.	www.energystar.gov/awards
California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects. CPUC's 2001 Standard Practice Manual provides guidelines for utility-sponsored energy efficiency programs. This report is an updated version of CPUC's *Standard Practice for Cost-Benefit Analysis of Conservation and Load Management Programs*, first written in 1983.	http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf
Consortium for Energy Efficiency (CEE) Program Resources. CEE releases resources that are the result of CEE members analyzing business prospects, identifying energy efficient products and services, and engaging manufacturers and other market stakeholders to develop credible approaches for encouraging market uptake and achieving verifiable energy savings.	http://www.cee1.org/content/cee-program-resources
Energy Efficiency Policy and Program Resources. This SEE Action website offers resources and discussion forums for the design and implementation of policies and programs that can drive investment in energy efficiency.	https://www4.eere.energy.gov/seeaction/resources
Regional Energy Efficiency Database (REED). NEEP's REED is a public resource that contains electric and natural gas energy efficiency program data for 10 jurisdictions in the Northeast. NEEP has also developed annual reports to provide an overview of the high-level impacts of energy efficiency programs at the state and regional level.	http://www.neep.org/initiatives/emv-forum/regional-energy-efficiency-database
Energy Efficiency Quick Start Programs: A Guide to Best Practices. The Southeast Energy Efficiency Alliance, the REEO serving the Southeastern states, released this guide to share best practices for designing and implementing energy efficiency programs quickly. This information can also be helpful to other regions as well.	http://www.seealliance.org/wp-content/uploads/Quick-Start-Best-Practices-041414-FINAL.pdf
Midwest Energy Efficiency Alliance (MEEA) Program Best Practices Information. MEEA, the REEO serving the Midwestern states, shares case studies and best practices information with energy efficiency program administrators. This information can also be helpful to other regions as well.	http://www.mwalliance.org/newsletter/meea-minute-monthly-newsletter-january-2014 http://www.mwalliance.org/resources/case-studies-best-practices
Association of Energy Service Professionals (AESP). AESP is a member-based association dedicated to improving the delivery and implementation of energy efficiency, energy management and distributed renewable resources. AESP also recognizes outstanding achievement in program design.	http://www.aesp.org/ https://c.ymcdn.com/sites/aesp.site-ym.com/resource/resmgr/Awards/AESP_Energy_Awards_POSTERS.pdf

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Evaluation

Title/Description	URL Address
The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures. Under the Uniform Methods Project, DOE is developing a framework and a set of protocols for determining the energy savings from specific energy efficiency measures and programs. In 2013, DOE published the first set of protocols.	http://energy.gov/eere/downloads/uniform-methods-project-methods-determining-energy-efficiency-savings-specific
ENERGY STAR Unit Shipment Data. This website collects information on qualified product unit shipment data to determine the market penetration of ENERGY STAR products and evaluate the overall performance of the program.	http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data
FedStats. FedStats provides data and trend information for more than 100 federal agencies that are engaged in production and dissemination of official federal statistics, including the Energy Information Administration (EIA) and EPA.	http://fedstats.sites.usa.gov/
A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs. This ACEEE report provides the results of a comprehensive survey and assessment of the current state of the practice of utility-sector energy efficiency program evaluation across the 50 states and the District of Columbia.	http://www.aceee.org/sites/default/files/publications/researchreports/u122.pdf
Efficiency Valuation Organization (EVO). EVO is a non-profit organization that develops and promotes the use of standardized protocols, methods and tools to quantify and manage the performance risks and benefits associated with end-use energy efficiency, renewable-energy, and water-efficiency business transaction.	http://www.evo-world.org
Proceedings of the International Energy Program Evaluation Conference (IEPEC). The IEPEC is an annual professional conference for energy program implementers; evaluators of those programs; local, state, national, and international representatives; and academic researchers involved in evaluation. This website contains proceedings from past conferences, beginning with the 1997 IEPEC.	http://www.iepec.org/?page_id=26
State Energy Efficiency Program Evaluation Inventory. The U.S. Energy Information Administration released this 2013 inventory of state program evaluations to support their long-term energy forecasts, though the summary of information may also be helpful to states designing their own energy efficiency program evaluations.	http://www.eia.gov/efficiency/programs/inventory/
EM&V. This SEE Action website provides policy and program resources for EM&V, including the EM&V Resource Portal, which serves as a compendium for energy efficiency program administrators and project managers.	https://www4.eere.energy.gov/seeaction/topic-category/evaluation-measurement-and-verification
Energy Efficiency Program Impact Evaluation Guide. This 2012 guide, prepared by SEE Action's EM&V Working Group, describes and provides guidance on approaches for determining and documenting energy and non-energy benefits resulting from end-use energy efficiency programs.	https://www4.eere.energy.gov/seeaction/publication/energy-efficiency-program-impact-evaluation-guide

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