4.1 Energy Efficiency Resource Standards

Policy Description and Objective

Summary

Energy efficiency resource standards (EERSs) require obligated parties—usually retail distributors of electricity—to meet a specific portion of their electricity demand through energy efficiency (NCSL 2014). As of March 2015, 27 states have some type of energy efficiency requirement or goal. Twenty-three states have mandatory energy efficiency requirements, two states have voluntary targets, and two states allow energy efficiency as a compliance option for their renewable portfolio standard (RPS)[15] (ACEEE 2014d; DSIRE 2015).

EERS designs vary considerably across the states. They vary in terms of:

- The target type—incremental or annual, relative (percent) or absolute (gigawatt-hour, or GWh), rolling or fixed.
- Responsible entities.
- The portion of load covered.
- The stringency of targets.

EERS programs have been around since 1999. Among existing programs, relative incremental energy savings targets range from as low as 0.1 percent of energy demand for a new program to 2.5 percent for more established programs (ACEEE 2014d).

Depending on the state, EERSs generally apply to retail distributors of either electricity or natural gas, or both. Utilities or third-party program administrators are responsible for meeting multi-year targets for energy savings through energy efficiency programs targeting customer facilities. However, in some states, additional measures or programs, such as peak demand reductions, building code changes, increased onsite generation (e.g., fuel cells and combined heat and power[CHP]), and efficiency improvements to transmission and distribution systems, can also facilitate compliance (Nadel 2006).

Effectively designed and explicit energy efficiency standards can help ensure that energy efficiency opportunities are pursued to meet electricity demand at least cost while reducing peak loads, lowering electricity bills, supporting a reliable grid, reducing air emissions, and providing other non-energy-related benefits such as reduced adverse health impacts. (See Chapter 1, "Introduction and Background," for more on the benefits of energy efficiency.) The energy, environmental, and economic benefits of EERSs are well documented by retrospective evaluations, like those from the Efficiency Vermont program (Efficiency Vermont 2014a). To avoid double-counting reductions, many programs (including those in Colorado, Massachusetts, and Pennsylvania) report their net savings, which take into account secondary effects and exclude savings that would have occurred without the program (NREL 2014). The American Council for an Energy-Efficient Economy (ACEEE) found that states generally exceeded their savings targets with overall savings of 20 million megawatt-hours (MWh), surpassing combined 2012 targets of 18 million MWh. These savings could power around 2 million homes for a year (ACEEE 2014b).

[15] Delaware and Florida were not included in the totals. Delaware has enacted legislation to create EERSs, but final regulations have not yet been promulgated (DSIRE 2015). Florida has enacted EERSs, but program funding to date is considered to be "…far below what is necessary to meet targets" (ACEEE 2014d). Due to the wide variety of EERS programs with varying levels of stringency and funding, different sources may report different state counts of EERS programs.

Objective

Market barriers, regulatory disincentives, and/or insufficient information about the opportunities for energy efficiency or its benefits limit investment in cost-effective energy efficiency. Many states are overcoming these barriers and stimulating investment in cost-effective energy efficiency with EERSs, helping to realize a large amount of cost-effective efficiency potential available nationwide. Estimates vary, but recent studies show remaining achievable potential on the order of 15 to 20 percent of U.S. electricity demand that could be met through energy efficiency over the next 10 to 15 years (ACEEE 2008, 2014a; Sreedharan 2013). This potential exists in states with newer energy efficiency programs as well as those that have been offering programs for a decade or more.

Benefits

EERSs can result in significant reductions in both electricity and natural gas consumption. In addition, EERS programs are simple to administer and cost-effective, and they complement other energy policies by supporting policy development or compliance. They also reduce the strain on power grids. States have found the merits of these programs include:

- *Electricity savings*. Under an EERS, the amount of electricity savings required depends on the initial target and how quickly the target gets ramped up over time. Market forces affecting electricity demand may also affect targets. Electricity sector EERS targets range widely between programs. On the low end, Texas has an incremental target of 20 percent of forecasted electricity sales *growth* (0.1 percent of total sales); meanwhile, on the upper end, Massachusetts has a target of 2.6 percent of total annual electricity *sales*. See Table 4.1.1 for a summary of current targets.
- *Cost-effectiveness*. Energy efficiency remains one of the most cost-effective resources for addressing electricity system needs (ACEEE 2012). The aggregate EERS targets allow energy providers to combine savings across multiple end-uses and sectors, providing the flexibility to cost-effectively meet the overall savings goals. States have found the design of energy efficiency program portfolios can ensure that all customers who contribute through ratepayer funding have the opportunity to reduce energy bills directly by participating in energy efficiency programming (see Section 4.2, “Energy Efficiency Programs”).
- *Long-term rate benefits*. The savings associated with energy efficiency offer long-term bill savings and contribute to stability because they are typically realized on an ongoing basis throughout the measure lifetime. Energy efficiency investment costs may increase energy rates slightly in the initial years of a program; however, states have found reduced energy bills over the program’s lifetime provide a rapid payback on these investments and provide price moderation benefits. For example, Vermont’s Efficiency Vermont program reports savings of $2.30 for every dollar spent on electricity demand reduction programs (Efficiency Vermont 2014a). Moreover, states have found these costs compare favorably to the ongoing costs of new energy production and delivery infrastructure investments (NAPEE 2006). The levelized cost of electricity for energy efficiency programs has been estimated at three to five cents per kilowatt-hour (kWh) of electricity service demand, in which is lower than all forms of new electricity generation (ACEEE 2012).
- *Reduce the strain on the power grid.* In some regions, energy efficiency has been formally incorporated into the region’s forward capacity market (FCM), which procures electricity capacity through an auction a few years before the electricity actually needs to be delivered, lessening the short-term strain on power

grids and reducing the need for new electricity generation capacity.[16] In Independent System Operator (ISO) New England's FCM, energy efficiency efforts submitted by Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont combined to reduce electricity demand by 1,723 GWh and summer peak demand by 223 megawatts (MW) in 2012. ISO New England forecasts that during the 2018–2022 time period, these states will contribute annually an average of 1,563 GWh (about 1 percent) of forecast electricity demand and 212 MW of summer peak demand savings from energy efficiency into the FCM (ISO New England 2014).

- *Simplicity.* EERSs create a straightforward, quantified energy savings target for energy providers that can easily be measured against and modified over time.
- *Complements other energy policies.* EERS policies can also complement other policies, although they often contribute to the same energy efficiency savings. EERSs work in concert with market-based programs, such as emissions cap and trade programs like the Regional Greenhouse Gas Initiative (RGGI), because energy efficiency avoids greenhouse gases (GHGs) and lowers the cost of meeting the cap. EERSs encourage states to consider energy in their integrated resource plans. Other policies may complement and enhance the outcomes of an EERS including, for example, financial incentives in utility ratemaking (see Section 7.2, "Policies That Sustain Utility Financial Health").

States with EERSs

EERSs were first used primarily in restructured states as a policy approach to replace the integrated planning requirements that were often eliminated as part of restructuring.[17] (For more information about restructuring, see Chapter 7, "Electric Utility Policies.") However, they have recently been employed as an effective policy in nine states with a traditional regulatory model, and in six states that have suspended restructuring of their market. See Table 4.1.1 for more details. As shown in Figure 4.1.1, as of March 2015, 23 states have adopted mandatory EERS policies,[18] and another four states have adopted voluntary policies or enabled energy efficiency to count towards the state RPS (ACEEE 2014d; DSIRE 2015). These 27 states represent 64 percent of total electricity sales in the United States (EIA 2013).

[16] FCMs are a mechanism to ensure sufficient supply and demand resources are available when needed and reliability standards are met. Capacity markets reflect the value of electricity supply that is necessary to meet forecasted demand and reserves on a sufficiently forward planning horizon. They also provide a forecasted price signal to show the value and expected revenues that support financing for capital-intensive projects. In many markets, customer-sited resources, including energy efficiency, can participate in FCMs.

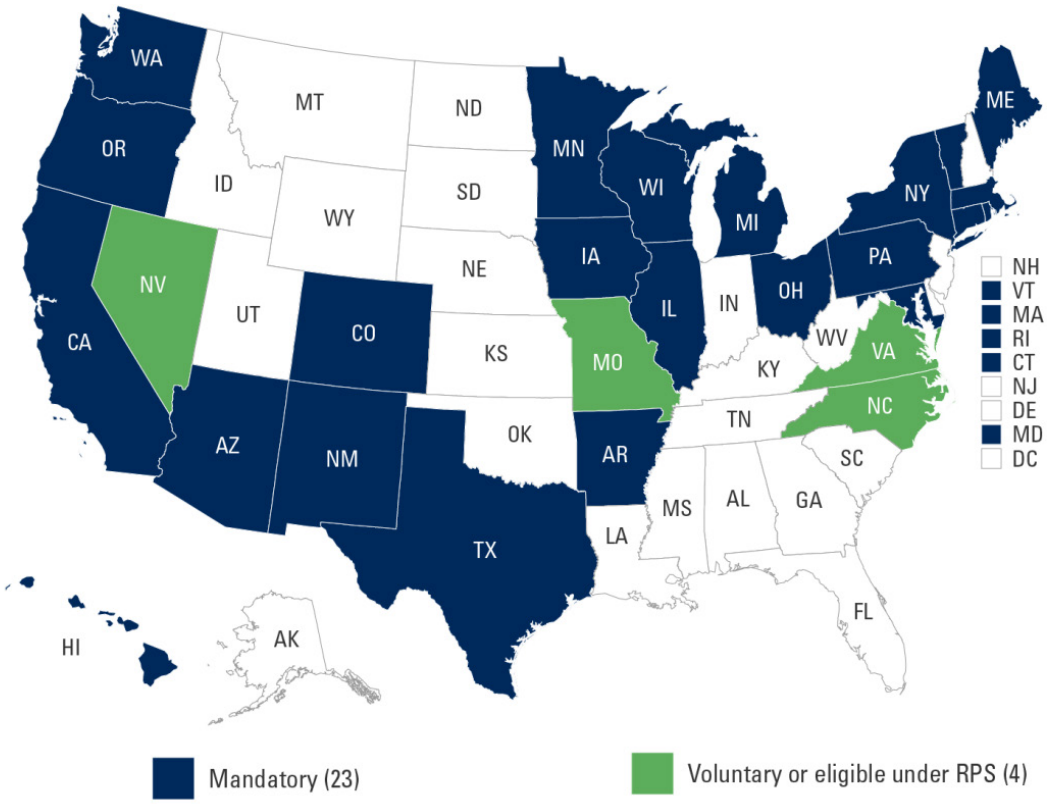
[17] From the 1920s to the 1990s, providers of electricity in the United States were vertically integrated entities providing generation, transmission, distribution, and retail supply services in franchised service territories. These natural monopolies were either state-owned or privately owned and subject to price and entry regulation. Many were subject to integrated resource planning requirements, including required filings to state authorities to demonstrate that all resources, including energy efficiency and renewable resources, were considered in planning for a least-cost resource mix to reliably meet electricity demand over a 20- or 30-year planning horizon. Beginning in the 1990s, a series of state and federal initiatives "restructured" electricity markets to reflect the observation that some of these functions, such as generation and retail service, were potentially competitive, while others, including transmission and distribution, were natural monopoly functions. Market restructuring took many forms, but the underlying concepts involved the divestiture of generation from utilities, the formation of organized wholesale spot energy markets, non-discriminatory mechanisms for rationing transmission resources, the introduction of retail choice programs, and the establishment of oversight and coordination functions.

[18] Included in this count is the Ohio EERS whose targets have been frozen for 2015 and 2016 before continuing, subject to a program review.

In addition, several states with public benefits funds[19] (PBFs) have conducted energy efficiency analyses, potential studies, and goal-setting exercises to explore the adoption of an EERS program.

Overall, states have been meeting or exceeding EERS targets while achieving other benefits. In 2012, overall state energy savings of 20 million megawatt-hours (MWh) surpassed combined energy efficiency targets of 18 million MWh (ACEEE 2015). For example, two of Illinois' electric utilities, the Commonwealth Edison Company (ComEd) and Ameren Illinois, both exceeded their electricity savings goals for each of the first 5 years of that state's EERS. In 2012, ComEd and Ameren Illinois reported net savings of 828 GWh and 331 GWh, respectively, amounting to about 1 percent of electricity sales in their combined service territories (ACEEE 2014b). From 2006 to 2014, California estimates its EERS achieved net savings[20] of $1.8 billion (CPUC 2014a). Cumulative peak electricity demand savings reached 1,300 MW from 2004 to 2009, avoiding the need to build three power plants (CPUC 2014a).

Figure 4.1.1: States That Have Adopted EERSs



Sources: ACEEE 2014d; VA, MO sourced from DSIRE 2015.

[19] PBFs (also called system benefits charges or Universal Systems Benefits Programs) were established in many states as a mechanism for ensuring continued investment in energy efficiency, renewable energy, and research and development in the face of market restructuring and diminished incentives for the market to provide these resources. The funds are collected either through a small charge on the bill of every electric customer or through specified contributions from utilities. The charge ensures that money is available to fund these investments.

[20] Net savings reflect utility savings above those that would have been achieved in the absence of the EERS program. Total savings are called gross savings.

Table 4.1.1: Current and Pending State EERS Policies

State	State Regulatory Status	EERS	Applies to	Savings Target
Arizona	Restructuring suspended	Mandatory	Electric and gas utilities	Incremental electricity savings starting at 1.25 percent in 2011 and rising to 2.5 percent in 2016. Annual energy savings of 22 percent from electricity and 6 percent from natural gas by 2020.
Arkansas	Restructuring suspended	Mandatory	Electric and gas utilities	Rises to 0.9 percent incremental savings by 2015 for electricity; 0.6 percent by 2015 for gas.
California	Restructuring suspended	Mandatory	Electric and gas utilities	0.85 percent incremental savings by 2020 for electricity.
Colorado	Regulated	Mandatory	Electric and gas utilities	Rises from 0.8 percent incremental savings in 2011 to 1.7 percent in 2020 for electricity. Gas IOUs must target spending at more than 0.5 percent of annual revenues.
Connecticut	Restructured	Mandatory	Electric and gas utilities	Incremental electricity savings targets of about 1.4 percent to 2015; cumulative natural gas savings of 60 million therms through 2015.
Hawaii	Regulated	Mandatory	Electric utilities	About 1.4 percent incremental savings each year through 2030 (about 30 percent of forecast electricity sales).
Illinois	Restructured	Mandatory	Electric and gas utilities	Rises from 0.2 percent incremental savings in 2008 to 2 percent in 2015 for electricity. Utilities with cost cap limitations can average incremental targets of 0.9 percent. Gas targets rise from 0.2 percent in 2011 to 1.5 percent in 2019, reaching 8.5 percent annual savings in 2020.
Iowa	Regulated	Mandatory	Electric and gas utilities	Incremental electricity savings of about 1.4 percent and gas savings of between 0.7 percent and 1.2 percent of retail sales between 2014 and 2018.
Maine	Restructured	Mandatory	Electric and gas utilities	Incremental savings targets of about 1.6 percent for electricity and 0.2 percent for gas; annual 20 percent reduction target for electricity and gas.
Maryland	Restructured	Mandatory	Electric utilities	Per capita electricity savings of 10 percent by 2015 compared to 2007 baseline.
Massachusetts	Restructured	Mandatory	Electric and gas utilities	Incremental savings rise from 1.4 percent in 2010 to 2.6 percent by 2015 for electricity; 0.63 percent in 2010 to 1.14 percent by 2015 for gas.
Michigan	Restructured	Mandatory	Electric and gas utilities	Ramps up to 1 percent incremental electricity savings from 2012; 0.75 percent incremental gas savings from 2012. Targets post-2015 are TBD.
Minnesota	Regulated	Mandatory	Electric and gas utilities	1.5 percent incremental electricity and gas savings from 2010 with flexibility to adjust down to as low as 1 percent.
Missouri	Regulated	Voluntary	Electric utilities	Annual electricity savings of 9.9 percent by 2020, 1.9 percent incremental savings thereafter.

Table 4.1.1: Current and Pending State EERS Policies

State	State Regulatory Status	EERS	Applies to	Savings Target
Nevada	Restructuring suspended	Voluntary (RPS)	Electric utilities	Energy efficiency can meet up to 25 percent of requirements towards Nevada's RPS.
New Mexico	Restructuring suspended	Mandatory	Electric utilities	5 percent annual reduction in electricity sales from 2005 by 2014, 8 percent by 2020.
New York	Restructured	Mandatory	Electric and gas utilities	About 1 percent incremental electricity savings and 0.5 percent incremental gas savings per year through 2015.
North Carolina	Regulated	Voluntary (RPS)	Electric utilities	Energy efficiency can meet up to 25 percent of requirements towards North Carolina RPS to 2018 and 40 percent of the 2021 targets.
Ohio	Restructured	Mandatory	Electric utilities	22 percent annual savings by 2027 (2 percent incrementally by 2021).
Oregon	Restructured	Mandatory	Electric and gas utilities	1.4 percent incremental electricity savings from 2013; 0.4 percent incremental gas savings by 2014.
Pennsylvania	Restructured	Mandatory	Electric utilities	3 percent annual electricity savings by 2013, rising to 5.3 percent by 2016.
Rhode Island	Restructured	Mandatory	Electric and gas utilities	Incremental savings rise to 2.6 percent by 2017 for electricity; 1.1 percent by 2017 for gas.
Texas	Restructured	Mandatory	Electric utilities	Savings of 20 percent of incremental load growth in 2011 (about 0.1 percent incremental savings) and 30 percent from 2013 onwards.
Vermont	Regulated	Mandatory	Electric and gas utilities	2.1 percent incremental savings for electricity each year from 2015 to 2017; 246,000 net MMBtu of incremental thermal efficiency savings each year from 2015 to 2017.
Virginia	Restructuring suspended	Voluntary	Electric utilities	Retail electric energy consumption target of 10 percent from 2006 levels by 2022.
Washington	Regulated	Mandatory	Electric utilities	About 1.4 percent incremental electricity savings from 2010.
Wisconsin	Regulated	Mandatory	Electric and gas utilities	About 1.8 billion kWh incremental electricity savings each year from 2011 to 2014 and about 73 million therms of incremental gas savings each year from 2011 to 2014.

IOUs = Investor-owned utilities

Note: "State regulatory status" refers to the way each state's electricity market is structured. In a regulated state, the public utility commission (PUC) regulates IOUs that generate, transmit, and distribute electricity. In a restructured state, electricity generation may be owned and operated by independent power producers, with the PUC regulating the distribution service that is still provided by IOUs. A few states began to restructure their markets but subsequently suspended this activity, so they are effectively still regulated markets. See the introduction to Chapter 7 for more information about utility regulation and restructuring. Also see *Examples of Legislation/Regulation* for each state at the end of this section.

Sources: ACEEE 2015; DSIRE 2015; EIA 2010

Designing Effective EERS

EERS policies include three basic features: quantitative targets that indicate the required amount of energy savings over a specific period, a designated entity or group of entities that is required to meet the targets and demonstrate compliance, and a set of activities that can be used to meet the targets. A number of key design elements have emerged from EERS efforts to date that influence the policy's flexibility; the balance of benefits, costs, and risks borne by utilities and customers; and the overall policy impact. These design considerations include:

- Participants in different aspects of the process.
- Target setting.
- Coverage.
- Eligible savings measures.
- Funding.
- Interaction with federal policies.
- Interaction with state policies.

States can typically draw from other states' experiences in considering approaches to these considerations. States have also drawn upon their own past experience with designing and administering energy efficiency programs.

Participants

- *State legislatures.* In most states, legislation is required to set EERS targets. Legislatures either set EERS targets in legislative language or direct an executive agency to do so. In either case, states designate an executive agency to administer implementation of the targets.
- *Public utility commissions (PUCs).* In some states, PUCs have the authority to set EERS targets directly. PUCs are often the agencies that administer and evaluate EERSs given their oversight of utilities.
- *Utilities*. Given the direct impact on the utility sector, when designing EERSs and developing accompanying ratemaking and other regulatory policies, legislatures and PUCs typically seek input on the potential impacts on utility profitability and ongoing operations. In most states, utilities are assigned specific energy efficiency goals and administer the ensuing energy efficiency programs. However, several states including Wisconsin, Maine, and Vermont, as well as Washington, D.C., have their own mechanisms for administration and oversight. Alternatively, some states designate third-party entities to serve in this capacity. Regardless of administrator, the program funding required to meet the resource standard typically comes from ratepayers.
- *State energy offices*. State energy offices can play a constructive role in the development of EERSs by collaborating with utilities to propose and implement energy efficiency programs. Since these offices do not rely on electricity sales for revenue, they do not have any inherent disincentive to invest in energy efficiency. The New York State Energy Research and Deployment Authority has been particularly active in the design and roll-out of the state's EERS (ACEEE 2014b).
- *Customers/general public.* States have held public workshops and created public comment processes to help inform topics such as potential economic impacts, costs, and benefits, including health benefits and other reduced emission effects. The Arkansas Public Service Commission (APSC) engaged the community

early on by holding 12 public workshops and filing over 250 testimonies, comments, and legal briefs to collect input and build support for their EERS (APSC 2010).

- *Public interest organizations.* Groups representing consumers, environmental interests, and other public interests have been involved to offer technical expertise as well as public perspectives.

Target Setting

Under EERSs, numerical energy savings targets are established by statute or by a state utility commission.

These targets may be defined in a number of different ways, including:

- Targets based on savings that are incremental, meaning new to that year, or annual (sometimes referred to as cumulative and including both incremental and past year savings).
- Targets measured in relative terms (percent of sales) or in absolute terms (e.g., GWh of savings per year).
- Targets specified as a portion of load growth or base year sales.
- The basis for the relative measure may be a fixed year (e.g., a percentage of 2010 sales) or a rolling period of time (e.g., a percentage of the previous 3 years' sales).
- Targets can address peak electricity demand (e.g., MW capacity).
- Targets may be specified on a "gross" basis or on a "net" basis. Gross savings include those savings that would have occurred in the absence of EERSs, while net savings net away estimates of baseline savings.

When setting targets, many states analyze their specific energy efficiency potential and estimate the benefits of energy efficiency; they then weigh these against the costs and the availability of funding. Analyzing the potential for energy efficiency will help policy-makers understand what may be realistically achieved cost-effectively. States have found that considering the additional benefits of increased energy efficiency provides a broader context for understanding the impacts of EERS policies. The share of state electricity and gas load that is covered by the target will directly affect the overall savings achieved. Timing and duration, as well as funding and related cost recovery issues, are also key considerations in setting the target.[21]

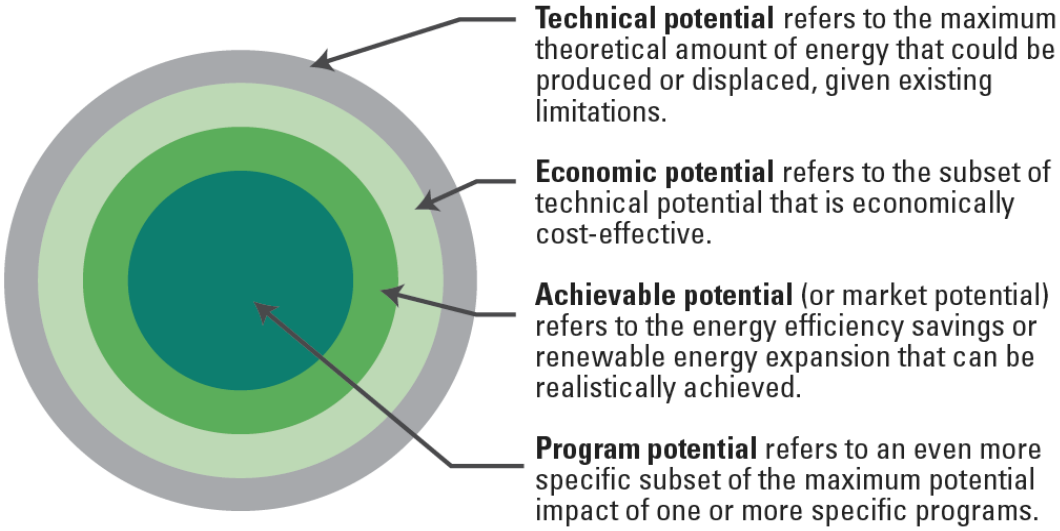
Analysis of Efficiency Potential

States have set EERSs based on analysis and program experience within the state or in states believed to be comparable. Described in Figure 4.1.2, state analysis typically includes a robust study of the technical, economic, and achievable potential for energy efficiency—the latter being the potential most typically considered in target setting—combined with a review of past program experience with energy efficiency measures (EPA 2007).

Energy efficiency potential studies consider what energy-efficient technologies and products are available, the degree to which those technologies and products may be further deployed in the market, and the cost-effectiveness of each. A potential study will help policy-makers understand what kind of electricity demand reductions can be achieved and at what cost (SEE Action 2011). States can also consider the potential for CHP to achieve savings, as described in the text box, "EERS and CHP."

[21] For more information about setting targets, see SEE Action papers by SEE Action (2011) and NREL (2014).

Figure 4.1.2: Energy Efficiency Savings Potential



In 2013, California commissioned a report on the technical, economical, and achievable potential for energy efficiency initiatives through 2024. The study found that in 2015 alone, California has an achievable potential of 2,244 GWh for energy efficiency programs, building codes, and equipment standards. This increases to a cumulative 21,844 GWh over the 10-year period (Navigant 2014). In a proposed ruling released in September 2014, the California Public Utilities Commission (CPUC) used this estimate to propose a 2015 statewide goal of 2,203 GWh, of which 1,562 GWh is set to come from energy efficiency programs and the rest from codes and standards (CPUC 2014b). These respective savings total 0.8 percent and 0.6 percent of statewide electricity consumption (EIA 2013).

EERS and CHP

Though all EERSs allow end-use energy savings to contribute to compliance, some states allow new CHP projects, a type of supply-side energy efficiency measure, to also contribute (EPA 2015). States that have explicitly identified CHP as a qualifying resource typically assign minimum efficiency requirements for the CHP project and assign separate, distinct targets for CHP. CHP projects in Massachusetts, Michigan, Pennsylvania, and Connecticut have contributed to meeting EERS objectives (SEE Action Network, 2013).

Analysis of the Benefits of Energy Efficiency

In addition to estimating efficiency resource potential, states have used power sector and economic impact models to estimate the benefits of energy efficiency, including emission reductions, lower long-term power prices and total power costs from avoided energy infrastructure investments, and net benefits to the economy (e.g., increased gross state product and increased jobs and wages). When determining its targets, California estimates multiple benefits associated with avoided electricity use. Benefits from avoided electricity use include the avoided cost of the energy, the avoided costs of building new peak generation capacity, the reduced costs of operating a reliable electricity grid, the avoided costs of expanding transmission and distribution lines, the value of avoided GHG emissions, the public health benefits associated with decreased emissions of air pollutants, and the reduced cost of compliance with the RPS resulting from lower sales (E3 2011).

Timing and Duration

States often determine the timing and duration of EERSs by considering how quickly targets can be ramped up to optimal levels from program initiation, and how long it will take to achieve the final program goal. Generally, only a portion of the total energy savings potential can be realized in a given year because of considerations like the time it takes for a technology or program to penetrate and transform the market, as well as limits on funding. States have found that reviewing regulatory compliance deadlines and developing an analysis of achievable efficiency potentials for specific years can help inform these considerations. To determine a realistic timeframe for ramping up and achieving energy efficiency program goals, states also usually consider their existing experience with energy efficiency programming, and for new types of programs, the experience of similar states.

Coverage

The options for achieving significant load coverage under an EERS depend on the entities under the state's jurisdiction. In the majority of states, PUCs typically do not have the authority to set requirements for municipally owned, federally owned, or rural cooperatively owned utilities. State legislation is often necessary to specify requirements and oversight for these entities. Vermont's EERS achieved 94 percent[22] coverage of its electricity load through a statewide energy efficiency provider rather than coordinating with the state's 22 municipally owned utilities. In 1999, the Vermont Public Service Board (PSB) created a statewide energy efficiency utility (EEU) known as Efficiency Vermont, funded through a per-kWh fee on customers' electricity bills (NREL 2014; Vermont PSB 2014). Arizona established its EERS to target a 22 percent annual savings in retail electricity sales from investor-owned utilities (IOUs) by 2020. Cooperatively owned utilities in Arizona are also subject to the EERS; however, they are obligated to achieve only 75 percent of the annual IOU targets (ACEEE 2015). Some EERSs have established targets for electric utilities alone, while others (e.g., California and Illinois) have set savings goals for both electric and gas utilities. States have sometimes included provisions to ensure that the energy efficiency measures used (and hence the energy bill savings) are distributed among customer classes (e.g., residential, industrial, commercial) and income levels.

Eligible Savings Measures

There are a wide variety of energy efficiency programs with varying levels of certainty that can be implemented. States must decide what types of programs will be eligible in their EERS. More traditional programs that have established measurement and verification methods may take the form of appliance rebate programs or energy audits with follow-up home efficiency improvements. To give states more flexibility in finding cost-effective efficiency savings, eligible programs can be expanded to include CHP, behavior change programs, supply-side efficiency improvements, and credit for advocacy work that promotes stronger building codes and appliance standards. These programs provide a greater challenge for savings verification, but as measurement and verification methods for these programs mature, the uncertainty associated with program savings is reduced (NREL 2014).

Funding

States establish funding sources to pay for utility or public programs that help achieve the efficiency resource goals. Different approaches include one or more of the following: utilizing funds from a state PBF to support energy efficiency investments, allowing utilities to recover program costs through adjusted rates, allowing

[22] The City of Burlington runs its own energy efficiency programs.

utilities to earn a return on investment on energy efficiency analogous to that earned on energy sales, and allocating allowance auction revenues to support energy efficiency.[23]

EERS design may involve defining how funds will be raised, spent, and accounted for in meeting goals. For example, California recognizes an electricity "loading order" where the PUC requires utilities to invest in cost-effective energy efficiency as a procurement resource using funds that would otherwise go to purchasing power; the utilities also use PBFs and efficiency resource acquisition funds to meet the overall goals.

Some states also include cost-containment provisions in their EERS. These provisions can either cap program expenditures as a percentage of electricity sales or limit the increase in electricity rates to recover program costs. Eight states currently have some form of cost-containment provision (NREL 2014).[24]

Interaction with Federal Policies

A variety of federal programs, partnerships, and technical assistance is available to help states achieve their energy efficiency goals. The U.S. Department of Energy (DOE), through the State Energy Program (SEP), provides funding to state energy offices for energy efficiency and renewable energy purposes. 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 state energy offices to create public-private partnerships geared towards addressing critical clean energy challenges. The ENERGY STAR® program offers energy program planning assistance and facilitates best practice exchange among programs. It also defines efficiency criteria for more than 70 product categories, as well as whole-building performance for new homes and commercial and industrial buildings (see Section 4.2, "Energy Efficiency Programs," for a broader discussion of ENERGY STAR activities). The EPA CHP Partnership and DOE Technical Assistance Programs can offer similar assistance on CHP (see Chapter 6, "Policy Considerations for Combined Heat and Power," for a broader discussion of CHP).

Federal incentives can also make it easier to comply with an EERS. Federal programs that include tax credits for energy-efficient measures or improved appliance standards can reduce the cost or support compliance with EERSs. EERSs that produce verifiable capacity savings can have favorable short and long-term electricity resource adequacy[25] implications reflected in a variety of organizations. These include federally jurisdictional wholesale markets overseen by the Federal Energy Regulatory Commission, the North American Electric Reliability Council, regional reliability organizations, regional transmission organizations, and transmission-owning companies.

Interaction with State Policies

States have found that EERSs can complement other energy efficiency policies and serve as a framework for a suite of policies and programs. Some of these policies include building codes, lead by example programs, appliance standards, energy savings performance contracting, and financing programs that promote energy efficiency. Moreover, complementary policies can improve the success of EERSs. Policies that address cost

[23] Some of the states participating in the RGGI use the latter funding mechanism.

[24] The eight states are California, Illinois, Maine, New Mexico, Pennsylvania, Rhode Island, Washington, and Wisconsin.

[25] Resource adequacy pertains to both the short-term reliability of the electricity grid and ensuring sufficient generation resources are available to meet longer term reliability concerns.

recovery for the lost sales associated with energy efficiency (such as lost revenue adjustment and decoupling mechanisms) remove the financial disincentive for pursuing energy efficiency, while additional performance incentives tied to EERS targets can provide positive incentives to utilities. All of these help program administrators achieve their targets.

Program Implementation and Evaluation

EERS implementation occurs primarily through designated utilities and other program implementers. However, continued state involvement is important in overseeing the development of implementation rules and may be important in ensuring the necessary funding is available. In Texas, for example, where the electric distribution utilities must meet the EERS goals, the utility commission is actively involved in determining how efficiency goals are met, approving plans submitted by utilities and awarding performance bonuses for energy savings (ACEEE 2015). State energy offices also play an important role, which can include analyzing the benefits of an existing or potential EERS and promoting measures that contribute to compliance. In Illinois, the EERS implementation is split between electric utilities and the Illinois Department of Commerce and Economic Opportunity (DCEO), with DCEO responsible for achieving 25 percent of the program's energy savings by targeting state and local governments, school districts, and low-income households (ACEEE 2014b).

Some utilities design and implement their own customer-funded programs using in-house staff. Others contract with third-party service providers who are responsible for installing energy efficiency measures at residences and businesses. These third-party energy efficiency providers may include air conditioning contractors, insulation installers, lighting contractors, retail electric providers, energy service companies, and other energy efficiency service contractors. The energy efficiency providers receive incentive payments from the utility for installing energy efficiency measures that result in peak demand reductions and electricity savings. Most large utilities contract out to full service, third-party implementers that manage all elements of their energy efficiency portfolios, including policy and planning, technical analysis, and implementation. See Section 4.2, "Energy Efficiency Programs," for more discussion on program implementation.

Best Practices: Implementing EERS

States have found the following best practices helpful when implementing an EERS:

- Use a clear basis for assessing compliance.
- Set a long-term goal with the opportunity to revisit every 5 to 10 years.
- Set strong goals.
- Coordinate EERS with market transformation programs, PBFs, and other programs to facilitate the market changes that are needed to reach EERS goals.
- Ensure that the electricity and natural gas demand forecasts used in supply-side resource filings reflect energy savings goals.
- Distinguish between energy efficiency programs aimed at new construction and equipment replacement upon failure and programs aimed at retrofitting existing, still operational equipment or facilities. Appropriate baselines may be based on building codes, equipment standards or common industry practice for the former, and program participants' pre-program efficiency levels or characteristics of the latter.

States have found that evaluation, measurement, and verification (EM&V) is a key element of a successful EERS. EM&V is used to provide accurate, transparent, and consistent measurements of program impacts, which help to assess the program's costs and benefits, design, and implementation. (See the *Approaches to Evaluation, Measurement, and Verification* section below for more detailed information on the approaches states are using for EM&V.)

As state programs mature, states are able to refine their programs based on past experience. In California, CPUC's 2015 savings targets were largely informed by a stakeholder-vetted report that CPUC commissioned to project the state's future energy efficiency savings potential. In addition to the potential study, CPUC considered the past performance of what utilities had been able to achieve (ex post savings) against the

original estimates that went into the targets for that period (ex ante savings) (CPUC 2014b). In Vermont, Efficiency Vermont has refined the operation of its statewide program based on various program evaluation activities. Program refinements include collecting additional customer data to provide a more accurate measurement of savings, allowing more flexible timelines for customers to take up projects while maintaining current incentives, and investing in new software to enhance customer engagement and improve the efficiency of data collection and feedback efforts (Efficiency Vermont 2014).

Oversight

States have found that some form of oversight is needed while implementing EERSs. For IOUs, the oversight organization is usually the PUC. PUCs may require that independent third-party evaluators conduct impact evaluations. Some PUCs have hired evaluators to guide the PUC. Some states have decided to establish official oversight or advisory bodies, typically composed of stakeholders who periodically review the EERS program to determine whether its goals are being met, whether its goals should be renewed or adjusted, and whether other aspects of implementation need modification. For example, the Massachusetts Energy Efficiency Advisory Council (EEAC) is a body that guides the development, implementation, and long-term direction of the state's efficiency programs. The EEAC is made up of representatives from a variety of stakeholder organizations, including residential consumers, energy efficiency experts, realtors, small businesses, nonprofits, non-voting utility representatives, and key government agency staff (ACEEE 2014b).

Approaches to Evaluation, Measurement, and Verification

The two principal approaches for evaluating, measuring, and verifying the energy efficiency measures that states use to meet their EERS targets are the "deemed savings" approach and the measurement-based approach. State PUCs are the entities typically charged with approving, overseeing, and verifying the application of these approaches by the independent companies hired to perform the evaluation work.

The deemed savings approach involves estimating energy savings by combining verification that the energy efficiency measure has been installed and can at least be partially attributed to the program with the pre-calculated or "deemed" savings from using that measure. Although this approach is not as accurate as the measurement-based approach, it can provide a defensible estimate of avoided consumption while minimizing the complexity and cost of EM&V by drawing on the extensive field experience from other states. The use of deemed savings is most appropriate for simpler measures, such as a residential refrigerator or other plug-in appliance, whose performance characteristics are well established and not highly interactive with other building characteristics.

Deemed savings are calculated by subtracting the energy-efficient measure's energy use from the energy use of a conventional measure. These savings estimates often take into account other key characteristics such as hours of use or local climate (i.e., heating and cooling degree days). It is also possible to adjust deemed savings methods to account for the following:

- *Persistence of savings*. How long the savings from measures should be counted. Persistence includes both the expected lifetime and the performance degradation of the measure. It also includes failure rates.
- *Free ridership*. Savings that program participants would have achieved regardless of program intervention. These savings would be netted out from gross deemed savings estimates.
- *Spillover effects*. Increased savings from indirect effects not directly covered in the deemed savings calculation. This could include additional measures by program participants not directly captured by the program, or measures from non-program participants who are influenced by the program.

- *Interactive effects with other measures.* For example, efficient lighting reduces waste heat and therefore interacts with heating and cooling systems.

While deemed savings approaches can provide greater certainty in program planning because the estimates are readily available, assumptions need to be reviewed periodically and programs need to invest in studies related to usage, persistence, and other key parameters. States often prioritize these evaluations to target measures that represent a large portion of program savings or where key uncertainties have arisen. Technical resource manuals are often used as a credible source for deemed savings methodologies and measurements. Deemed savings should be specific to recent state or regional technical resource manuals, as factors such as climate, behavioral, and equipment assumptions may vary by region and over time. At least 11 states have developed technical reference manuals to estimate savings from energy efficiency measures (ACEEE 2014c).

Best Practices: Evaluating, Measuring, and Verifying EERS Policies

States have found the following best practices helpful when evaluating, measuring, and verifying an EERS:

- Establish key baseline, tracking system, and reporting practices for affected markets and technologies prior to program implementation.
- Draw on other states' experiences and technical reference manuals to establish rigorous and workable measurement, verification, and reporting protocols.
- In addition to quantitative impact evaluation, provide for a qualitative evaluation process that enables program administrators to obtain useful feedback and improve program effectiveness over time.
- Evaluate programs operated under an EERS policy at appropriate intervals, so that agency overseers can gauge compliance with energy savings goals.
- Utilize an independent, third-party verifier to help build confidence in results. (See *Approaches to Evaluation, Measurement, and Verification* section.)
- Provide evaluation results to oversight agencies, program administrators, and other participants. Adjust future energy savings goals, as needed.

The other EM&V approach used to ensure that EERS targets are being achieved is a measurement-based approach. It is most widely used for larger and more complex energy efficiency projects. The most well-known and referenced example is the International Performance Measurement and Verification Protocol (IPMVP). The IPMVP provides an overview of current best practice techniques available for estimating results of energy efficiency, water efficiency, and renewable energy projects in commercial and industrial facilities. The IPMVP was developed with DOE sponsorship and is currently managed by a nonprofit organization that continually publishes new materials available to the public (EVO 2014).

The DOE Uniform Methods Project (UMP) is another example of a measurement-based EM&V approach. It provides a framework and set of protocols to assist in determining energy efficiency program savings. These protocols are targeted towards individual measures as well as entire energy efficiency programs. The UMP is designed to streamline the EM&V process by providing program administrators and policy-makers with a single, straightforward, and credible resource to use (DOE 2014).

In addition to the IPMVP and UMP, some states have developed their own EM&V resources to support the achievement of EERS targets and related goals. For example, California maintains a robust set of protocols that is maintained on the California Measurement Advisory Council (CALMAC) website (CALMAC 2014).

State Examples

Arizona

Arizona's EERS experience highlights the flexible options utilities can use to meet targets. In 2010, Arizona established their EERS at a cumulative 22 percent savings in retail electricity sales from IOUs by 2020. Incremental targets are also specified, starting with savings of 1.25 percent in 2011. Cooperatively owned utilities are also subject to the EERS; however, they are obligated to achieve only 75 percent of the annual IOU targets. Arizona also has a cumulative natural gas savings target of 6 percent by 2020 (ACEEE 2015).

While some states cap EERS expenditures as a percentage of electricity sales, Arizona's EERS does not have any cost caps for IOUs. To offer flexibility, savings in peak demand can count for up to 10 percent of the energy target annually and up to 2 percent of the overall 22 percent target. Peak savings are converted to estimated energy savings assuming a 50 percent annual load factor.[26] Energy efficiency from building codes where the affected utility has undertaken an EM&V study can provide additional sources of savings for utilities. CHP equipment that is not eligible for Arizona's Renewable Energy Standard can also be counted towards Arizona's EERS (ACC 2009). Utilities can meet savings requirements through a number of methods including demand-side management incentives, peak demand reductions, building codes, CHP systems, self-direction, and existing demand-side management programs that achieved energy savings between 2004 and 2011. To accommodate large industrial users with established energy efficiency programs, facilities may direct up to 85 percent of their program payments towards cost-effective onsite energy efficiency measures (ACEEE 2015).

The Arizona Public Service Company, the largest utility in Arizona, has been successful in the first years of the program. Arizona Public Service has reported cumulative energy savings equivalent to 3.2 percent of retail sales from 2011 to 2012, exceeding the 3 percent savings target. These savings have resulted in a net benefit to consumers of more than $200 million in 2012 alone (APS 2013). In 2012, Arizona electric utilities saved 693 GWh, or 1.66 percent of retail sales (ACEEE 2014d, 2015).

Website: http://www.azcc.gov/Divisions/Utilities/default.htm

Arkansas

Arkansas' EERS experience highlights the process the state went through to develop its program. Arkansas undertook a multiple-year development and engagement process before establishing their EERS in 2010. In October 2008, the APSC opened the Sustainability Energy Resources Docket (No. 08-144-U). This docket directed the APSC to explore the current status and potential for Arkansas' sustainable energy resources and technologies by looking at existing efforts within the state as well as nationwide. The APSC also established the Innovative Ratemaking Docket (No. 08-137-U) to explore how the utilization of new technologies and innovative regulatory frameworks can support energy efficiency efforts. From 2008 to 2010, the APSC engaged the community by holding 12 public workshops and filing over 250 testimonies, comments, and legal briefs in order to work towards the objectives put forward in the dockets (APSC 2010). During this time, APSC also directed electric and gas utilities to pilot a wide range of energy efficiency programs (ACEEE 2011).

[26] Load factors describes the relationship between annual peak end-use demand in MW (or peak output) and annual electricity sales (or generation) in MWh. The formula is *Annual Electricity Sales (MWh) / (Peak Demand (MW) * 8760 Hours per year).*

In December 2010, the APSC published the APSC Sustainable Energy Resources Action Plan for Arkansas (APSC 2010). The Action Plan established the EERS by including them in 10 orders designed to increase energy efficiency in Arkansas. The APSC issued orders to complement the EERS by:

- Aligning incentives of customers and utilities, accomplished by introducing utility performance incentives and a lost revenue adjustment mechanism to make up for decreased sales.
- Promoting a high standard for EM&V of energy efficiency programs.
- Promoting customized energy efficiency projects at large commercial and industrial facilities, enabling facilities to self-direct energy efficiency funds to which they are contributing (ACEEE 2011).

The Arkansas Action Plan established EERS incremental savings targets for utilities, rising from 0.25 percent of electricity sales in 2011 to 0.75 percent in 2013 and from 0.2 percent of gas sales in 2011 to 0.4 percent in 2013. Since then, targets have been scaled up to 0.9 percent of electricity sales and 0.6 percent of gas sales by 2015. The APSC is currently conducting an evaluation of the EERS to see how they can be improved before setting targets for 2016 and beyond (ACEEE 2015).[27]

Website: http://www.apscservices.info/ee.aspx

California

California's EERS experience highlights the state's reforms to align utility and other stakeholder incentives with EERS objectives. Since 2004, the California EERS programs have set ambitious energy savings goals for both electric and gas utilities. Following the passage of Assembly Bill 2021 in 2006, the California Energy Commission (CEC), CPUC, and other stakeholders were required to develop a statewide estimate of all cost-effective electricity and gas savings and to develop annual energy savings and demand reduction goals for the state's four largest IOUs. This study must be updated every 3 years (DSIRE 2014). Each IOU acts both as a portfolio manager and program administrator and seeks approval from CPUC (CPUC 2013). The energy efficiency program portfolio must meet California's cost-effectiveness tests, and CPUC must set energy savings goals for IOUs to achieve all cost-effective reductions identified by the IOUs. In addition, energy efficiency programs must align with CPUC strategic plan objectives, and 20 percent of the budget must be competitively bid on by third-party implementers (CPUC 2014a).

California found that the following mechanisms have led to the success of their EERS:

- A "loading order" for investing in energy resources, through which cost-effective energy efficiency and conservation resources are to be selected first, followed by onsite generation, then renewable generation. The cleanest available fossil fuel generation resources are acquired to meet any remaining resource needs (CPUC 2014a).
- Utilities are required to reduce their demand forecasts to reflect the adopted energy efficiency savings goals, and are therefore further motivated to ensure that reductions are achieved. The utilities' achievements are subject to rigorous EM&V, overseen by CPUC.

[27] In 2013, Arkansas was awarded $500,000 in competitive funding from DOE to help ensure that robust savings goals continue to be pursued during the second 3-year phase of the EERS rollout.

- CPUC also adopted decoupling ratemaking mechanisms that break the link between the utilities' revenues and sales, removing disincentives for utility investments in energy efficiency. (See Section 7.2, "Policies That Sustain Utility Financial Health.")
- The Energy Savings Performance Indicator provides financial incentives for achieving energy efficiency savings, setting strong goals, advocating for stronger building codes and appliance standards, and establishing "non-resource" programs that support the goals of cost-effective energy conservation but do not directly result in savings (DSIRE 2014).

The rules that govern all aspects of portfolio management and program administration are found in the CPUC energy efficiency policy manual (CPUC 2013). The energy savings goals were adopted by CPUC and established through a collaborative effort between the CEC and key stakeholders (CPUC 2004).

California has met its program targets and achieved considerable savings (ACEEE 2014b). In 2009, California IOUs invested $786 million in the state's EERS through ratepayer funds. This investment saved Californians 3,000 GWh of electricity (1.2 percent), 28 million therms of gas (0.2 percent), and over 540 MW of electricity demand (0.9 percent). Throughout the life of these measures, Californians are expected to save 30,000 GWh and 530 million therms. An estimated 60 percent of these savings and net savings would not have occurred without EERS program intervention (CPUC 2011; CEC 2015). From 2006 to 2014, accounting for program and customer costs, California's EERS program has resulted in overall savings of $1.8 billion (CPUC 2014a).

Websites:
http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Energy+Efficiency+Goals+and+Potential+Studies.htm
http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/40212.pdf
http://www.cpuc.ca.gov/PUBLISHED/REPORT/28715.htm
http://www.cpuc.ca.gov/NR/rdonlyres/1E2FFBF2-E93D-4FEA-BD38-00D83576BB2E/0/CPUCEEPrimer_.pdf

Illinois

Illinois' EERS experience highlights a hybrid implementation approach between utilities and a state agency. The Illinois Power Agency Act of 2007 sets incremental electric and gas savings, ramping up from 0.2 percent electricity savings in 2008 to 2 percent in 2015 and thereafter. Gas savings of 0.2 percent start in 2011 and ramp up to 1.5 percent by 2019, with the goal of 8.5 percent cumulative savings for natural gas by 2020 (ACEEE 2015). This Act also divides the role of implementing the EERS between the electric utilities and the Illinois DCEO, with DCEO responsible for achieving 25 percent of the program's energy savings by targeting state and local governments, school districts, and low-income households. While targets have been set for each year of the program, expenditures are also now capped at 2 percent of the price per kWh, up from 0.5 percent at the start of the program. Due to the expenditure cap, the energy savings targets were revised downward for 2011–2013.

Illinois electric utilities ComEd and Ameren both exceeded their electricity savings goal for each of the first 5 years of the EERS. In 2012, ComEd and Ameren reported net savings of 828 GWh and 331 GWh respectively, amounting to around 1 percent of electricity use. In addition, gas utilities saved 24.5 million therms in 2012, just shy of their collective savings goal of 25.9 million therms (ACEEE 2014b).

The Illinois EERSs are part of a broader effort that includes an RPS requirement, and are intended to gain the combined benefits of reduced demand growth and increased clean generation. This twin approach has broad support from utilities, environmental and consumer groups, and other stakeholders.

Website: http://www.icc.illinois.gov/en/ecenergy.aspx

Vermont

Vermont's EERS experience highlights its program implementation through a single statewide administrator. Most EERS programs are created at the state level but implemented through state utilities. However, since Vermont has 22 municipally owned utilities, the state decided it was more efficient to implement its EERS through a single statewide administrator. In 1999, the Vermont PSB created a statewide EEU known as Efficiency Vermont, funded through a per-kWh fee on customers' electricity bills (Vermont PSB 2014). The state periodically issues a request for proposals to determine the statewide administrator for Efficiency Vermont. It also uses a performance-based contract to ensure performance against goals.

While Efficiency Vermont administers statewide energy efficiency programs, in 2000, the Vermont PSB allowed the City of Burlington Electric Department to implement these services in Burlington (BED 2014a). Each year, the Burlington Electric Department releases a plan coordinated with Efficiency Vermont to increase program efficacy and both EEUs are responsible for implementing energy efficiency measures for their respective areas.

Efficiency Vermont works with municipalities to improve energy efficiency by producing outreach and informational efficiency materials, such as the *Municipal Guide to Vermont Energy Codes and Above-Code Programs*. Efficiency Vermont also runs targeted programs, including:

- The Municipal Street Lighting Program, which offers financial incentives and guidance on switching to efficient LED technologies.
- The Light Meter Loan Program, which allows municipalities to borrow meters to determine appropriate street lighting levels and eliminate unnecessary lights (Efficiency Vermont 2014c).
- Energy competitions in schools and homes. For instance, the Whole School Energy Challenge reduced electricity consumption in 13 participating schools by 7 percent, while the Vermont Home Energy Challenge enlisted 79 communities in a competition to weatherize 3 percent of local homes in one year (Efficiency Vermont 2014a).

Efficiency Vermont has a 3-year electricity reduction target from 2012 to 2014 of 274,000 net MWh, equal to about 6.6 percent of total generation (ACEEE 2015). Through the end of 2013, savings totaled 198,150 kWh, or 72 percent of the target. Relative to a target of 41,920 kilowatts (kW) of saved peak summer demand, Vermont has achieved 25,724 kW (61 percent) of reductions. The program has also been cost-effective, with $2.30 of total electric benefits being generated for every dollar spent on the electricity demand programs. Efficiency Vermont is also 93 percent and 125 percent of the way towards meeting respective spending goals on programs geared towards low-income communities and the residential sector (Efficiency Vermont 2014a). As for regional targets, in 2013 the Burlington Electric Department reported electricity savings of 7,006 MWh, 95 percent of the way towards its goal of 7,334 MWh (BED 2014b). Efficiency Vermont has also set goals for specific towns with large peak demands to avoid the need for expensive new infrastructure that would raise rates statewide. For example, the St. Albans and Susie Wilson localities have achieved 71 percent and 104 percent of their respective goals to date (Efficiency Vermont 2014d).

Website: https://www.efficiencyvermont.com/About-Us

What States Can Do

States can look to other states for best practices, as both restructured and traditional utility markets have set EERS goals for utilities. For instance, in 2011, the District Department of Energy contracted with the Vermont Energy Investment Corporation to form the DC Sustainable Energy Partnership (DCSEU 2015). EERS goals can be administered in association with PBFs or regulated utility efficiency programs. Because an EERS can support multiple purposes, including Clean Air Act compliance plans, utility-sector resource plans, and climate action plans, states can set EERS goals within the context of broad energy and environmental policy goals. States with existing EERSs can continue to assess and refine the standards as new information about potential opportunities and successful approaches becomes available.

Action Steps for States

States have found that the key steps to establishing EERSs are:

- Conduct a robust analysis of energy efficiency potential, an economic assessment of potential benefits and costs, and a determination of the range of savings targets that would be realistic for the EERS.
- Establish a stakeholder engagement process to gather input and build support for the program.
- Design and develop the EERS program by determining appropriate goals and timeframes, the sectors covered by the goals, the way the program will be funded, the kinds of programs that can be implemented, and the interaction with other state and federal programs.
- Define an implementation and evaluation process that sets rules and procedures for identifying efficiency programs, funding sources, EM&V requirements and procedures, and general oversight.
- Provide for periodic evaluation and program review at specified intervals.
- Consider complementary policies that incentivize utilities to invest in energy efficiency.

Information Resources

Information about States

Title/Description	URL Address
ACEEE State and Local Policy Database. This database includes information on energy efficiency policies currently implemented at the state and local level. It tracks policy activity across multiple sectors, including government, utilities, transportation, buildings, and alternative approaches such as CHP and appliance standards.	http://database.aceee.org/
Arizona Corporation Commission (AZCC). The AZCC website contains information on Arizona's electric utilities, including an electronic docket for regulations, calendars, and current issues.	http://www.azcc.gov/Divisions/Utilities/default.htm
Energy Efficiency. This APSC website contains information on current energy efficiency rules, a Technical Reference Manual, and annual utility reports.	http://www.apscservices.info/ee.aspx
State of California Energy Action Plan. This website contains the text of the California Energy Action Plan.	http://docs.cpuc.ca.gov/published//REPORT/28715.htm
Energy Efficiency Potential and Goals Studies. This CPUC site has compiled information on the potential and goals set for energy efficiency in California, including the 2013 Navigant study.	http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Energy+Efficiency+Goals+and+Potential+Studies.htm
CPUC Energy Efficiency Primer. This document provides an overview of CPUC regulation and goals for energy efficiency.	http://www.cpuc.ca.gov/NR/rdonlyres/1E2FFBF2-E93D-4FEA-BD38-00D83576BB2E/0/CPUCEEPrimer_.pdf
Illinois Commerce Commission. This site contains information on programs, services, hearings, workshops, and regulations related to electric utilities.	http://www.icc.illinois.gov/en/ecenergy.aspx
About Efficiency Vermont. This website provides resources to residences and businesses, including initiatives, plans, reports, and white papers.	https://www.efficiencyvermont.com/About-Us
Focus on Energy Program: Partnering with Wisconsin Utilities. This website provides resources for finding out about and participating in Wisconsin's energy efficiency programs.	https://focusonenergy.com/

EERS Policy Resources

Title/Description	URL Address
Measurement and Verification Portal. This website provides numerous resources, ranging from implementation guidelines to checklists and other resources, to help organizations implement an EM&V program.	http://ateam.lbl.gov/mv/
Guideline 14-2002 – Measurement of Energy and Demand Savings. This document provides guidelines for reliably measuring energy and demand savings of commercial equipment.	http://www.techstreet.com/ashrae/products/1645226
CALMAC. California's statewide CALMAC evaluation clearinghouse website contains resources for deemed savings and project-specific EM&V techniques.	http://www.calmac.org
The Efficiency Vermont Technical Reference Manual. Vermont provides a set of deemed-savings methods in this manual.	https://www.veic.org/resource-library/the-efficiency-vermont-technical-reference-manual-%28excerpts-from%29

Title/Description	URL Address
2005/2006 Biennial Plan: Minnesota Natural Gas and Electric Conservation Improvement Program. This plan was submitted to the Minnesota Department of Commerce by Xcel Energy on June 1, 2004.	http://pbadupws.nrc.gov/docs/ML0520/ML052010211.pdf
Interim Opinion: Updated Policy Rules for Post-2005 Energy Efficiency and Threshold Issues Related to Evaluation, Measurement and Verification of Energy Efficiency Programs. CPUC held several workshops on EM&V to discuss the performance basis, metrics, and protocols for energy efficiency program EM&V, including incentive, training, education, marketing, and outreach programs.	http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/45783.htm
IPMVP Public Library of Documents. IPMVP Inc. is a nonprofit organization that develops products and services to aid in the EM&V of energy and water savings resulting from energy/water efficiency projects—both retrofits and new construction. The site contains the IPMVP, a series of documents for use in developing an EM&V strategy, monitoring indoor environmental quality, and quantifying emission reductions.	http://www.evo-world.org/index.php?option=com_content&view=article&id=272&Itemid=379&lang=en
Energy Performance Contracts for Local Governments: Industry Standards and Best Practices Guide. EM&V guidelines are included in the New York State Energy Research and Development Authority's request for applications for performance contracting.	http://www.dec.ny.gov/docs/administration_pdf/epcguide.pdf
Sixth Northwest Conservation and Electric Power Plan. This document presents the 2010–2014 targeted conservation measures and economics.	http://www.nwcouncil.org/energy/powerplan/6/plan/
PA Knowledge Limited 2003: Standardized Methods for Free-Ridership and Spillover Evaluation-Task 5 Final Report. This 2003 report is used by Massachusetts utilities to estimate free ridership and spillover effects.	Contact PA Consulting at: http://www.paconsulting.com
Setting Energy Savings Targets for Utilities. This report reviews how states have set EERS targets, discusses the issues involved, and provides recommendations.	https://www4.eere.energy.gov/seeaction/system/files/documents/ratepayer_efficiency_targets.pdf
Southern California Edison's 2012 Demand Response Load Impact Evaluations Portfolio Summary. This report summarizes the load reduction capability from Southern California Edison's (SCE) portfolio of Demand Response (DR) programs.	http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/62A8F5E44C447F0688257B410052EC7B/$FILE/R.07-01-041_DR+OIR-SCE+DR+Portfolio+Summary+2012+-+Final.pdf
State Energy Efficiency Resource Standards: Design, Status, and Impacts. This 2014 report reviews the key design features of EERSs for electricity, explores state-level design variations in EERSs, and provides an estimate of the savings required by currently-specified EERSs in each state.	http://www.nrel.gov/docs/fy14osti/61023.pdf
Putting a Floor on Energy Savings: Comparing State Energy Efficiency Resource Standards. This study aggregates information about the requirements of existing EERS policies for electricity sales in the United States by converting quantitative goals into comparable terms across states and comparing U.S. policies to those of the European Union.	http://www.rff.org/RFF/Documents/RFF-DP-12-11.pdf

Examples of Legislation/Regulation

State	Title/Description	URL Address
Arizona	Arizona Administrative Code R14-2-2401. This code established an EERS target of 22 percent by 2020.	http://www.azsos.gov/public_services/Title_14/14-02.htm
Arkansas	Order Establishing a Collaborative to Develop an Evaluation, Measurement, and Verification Protocol and Propose EM&V Amendments to the Commission's Rules for Conservation and Energy Efficiency Programs. This document is part of a series of orders to update and further define energy efficiency programs.	http://www.apscservices.info/pdf/08/08-144-u_155_1.pdf
	APSC Sustainable Energy Resources (SER) Action Guide. This document established an initial EERS.	http://www.apscservices.info/pdf/08/08-144-U_153_1.pdf
California	California Interim Opinion: Administrative Structure for Energy Efficiency (Decision 05-01-055). This CPUC rule sets the administrative structure and process for energy efficiency programs.	http://docs.cpuc.ca.gov/published//FINAL_DECISION/43628.htm
	Decision establishing energy efficiency savings goals and approving 2015 energy efficiency programs and budgets. This decision, an EERS update, was released for public comment in September 2014.	http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M107/K150/107150165.PDF
Illinois	Interim Opinion on the Administrative Structure for Energy Efficiency: Threshold Issues. This act, also known as the Illinois Power Agency Act, established EERSs that require incremental annual electric and savings.	http://www.ilga.gov/legislation/ilcs/ilcs4.asp?DocName=002038550HArt%2E+1&ActID=2934&ChapterID=5&SeqStart=100000&SeqEnd=3700000
Vermont	Triennial Plan: 2015–2017. This Efficiency Vermont document outlines the triennial plan for reduction goals in Vermont.	https://www.efficiencyvermont.com/docs/about_efficiency_vermont/annual_plans/evt-triennial-plan-2015-2017.pdf

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ACEEE. 2014d. State Energy Efficiency Resource Standards (EERS) April 2014. American Council for an Energy-Efficient Economy. Accessed July 23, 2014.	http://www.aceee.org/files/pdf/policy-brief/eers-04-2014.pdf
ACEEE. 2015. State and Local Policy Database. American Council for an Energy-Efficient Economy. Accessed March 4, 2015	http://database.aceee.org/
APS. 2013. Arizona Public Service Company 2012 Demand Side Management Annual Progress Report. Arizona Public Service Company. Accessed July 23, 2014.	http://www.swenergy.org/news/news/documents/file/APS%202012%20DSM%20Annual%20Report.pdf
APSC. 2010. APSC Sustainable Energy Resources (SER) Action Guide. Arkansas Public Service Commission. Accessed September 30, 2014.	http://www.apscservices.info/pdf/08/08-144-U_153_1.pdf
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BED. 2014b. 2013 Energy Efficiency Annual Report. Burlington Electric Department. Accessed September 30, 2014.	https://www.burlingtonelectric.com/sites/default/files/Documents/Energy_Eff/2013-energyefficiencyannualreport.pdf
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