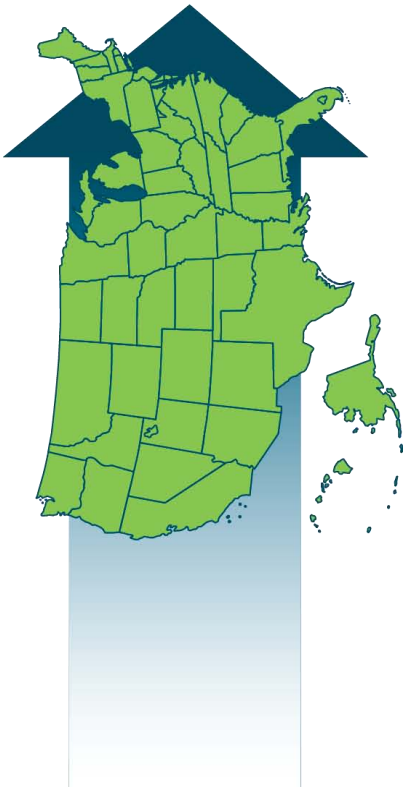
SEE Action

STATE & LOCAL ENERGY EFFICIENCY ACTION NETWORK



Setting Energy Savings Targets for Utilities

Driving Ratepayer-Funded Efficiency through Regulatory Policies Working Group

September 2011

The State and Local Energy Efficiency Action Network is a state and local effort facilitated by the federal government that helps states, utilities, and other local stakeholders take energy efficiency to scale and achieve all cost-effective energy efficiency by 2020.

Learn more at www.seeaction.energy.gov

Acknowledgements

Prepared by Steven Nadel (American Council for an Energy-Efficient Economy) and John Shenot (Regulatory Assistance Project) for the State and Local Energy Efficiency Action Network (SEE Action). Input and review provided by the SEE Action Targets Subcommittee—Bob Balzar (Tennessee Valley Authority), Tom Eckman (Northwest Power and Conservation Council), Dan Francis (American Electric Power), Howard Geller (Southwest Energy Efficiency Project), Jared Lawrence (Duke Energy), and Katrina Pielli (U.S. Department of Energy).

List of Acronyms

ACEEE American Council for an Energy-Efficient Economy

Btu British thermal unit

CFL compact fluorescent lamp

EEPS energy efficiency portfolio standard

EERS energy efficiency resource standard

IRP Integrated Resource Planning

kW kilowatt

kWh kilowatt hour

PUC Public Utilities Commission

Executive Summary

A growing number of states are setting mandatory energy-saving targets. Experience to date indicates that most states are on track to meet the targets that have been set, and that establishing these targets is driving significant and cost-effective energy efficiency savings. However, targets need to be developed with care and many issues considered in setting targets. Among the issues that need to be considered are:

- Legal authority for setting targets
- Who the targets apply to (utilities, a state agency, or some other organization)
- State-wide versus utility-specific targets
- Target levels including what savings are included, how savings are to be evaluated, and specific metrics and baselines to use
- How much flexibility to allow and whether to include cost caps.

Higher targets are feasible if utilities (or third-party program administrators) can count savings from supply-side as well as demand-side efficiency measures, or count savings from codes and standards to some degree as well as from their own programs. One approach that several states are using is to establish initial targets for several years (e.g., 3 years) based on studies and experience in other states, and use the initial experience from these programs to help establish future targets. In cases where targets are set for 10 years or more, it is desirable to periodically review and modify the targets based on actual experience and updated analysis of achievable energy savings potential.

If energy-saving targets are set, the effect of energy efficiency programs on utility costs and revenues needs to be considered. At a minimum, utilities need to be allowed to recover approved program costs from ratepayers in a timely and assured manner, just as they can recover prudent investments in new power plants, transmission lines, or distribution system upgrades. In addition, many states with targets provide utilities with financial incentives for meeting or exceeding targets and/or establish mechanisms to allow utilities to fully recover fixed system costs, even as efficiency programs reduce sales. It is important to address these issues, because efficiency programs are most successful when the utility or third-party program operator has a financial incentive to succeed. At a minimum, the utility or third-party program operator should not be harmed financially. Moreover, addressing these issues is especially important, if not essential, where very challenging targets (savings of 1.5% per year or greater) are adopted.

Table of Contents

List of Figures and Tables

Introduction

This paper describes how electric and natural gas utilities can be motivated by the establishment of numeric targets and goals for energy efficiency program results. We discuss experience with such targets, many of the issues involved, and make recommendations.

Since 1999, states have set specific energy savings goals or energy savings requirements for utilities under their jurisdiction, often with incentives for meeting these goals and sometimes with penalties if goals are not achieved (see Figure 1). At present, 24 states have established such goals or requirements (see Figure 2), and one is pending. These goals or requirements (hereafter referred to as targets) are frequently called energy efficiency resource standards (EERS) or energy efficiency portfolio standards (EEPS). They are somewhat similar to renewable energy standards and renewable portfolio standards, except that they apply to energy efficiency and not renewable energy.

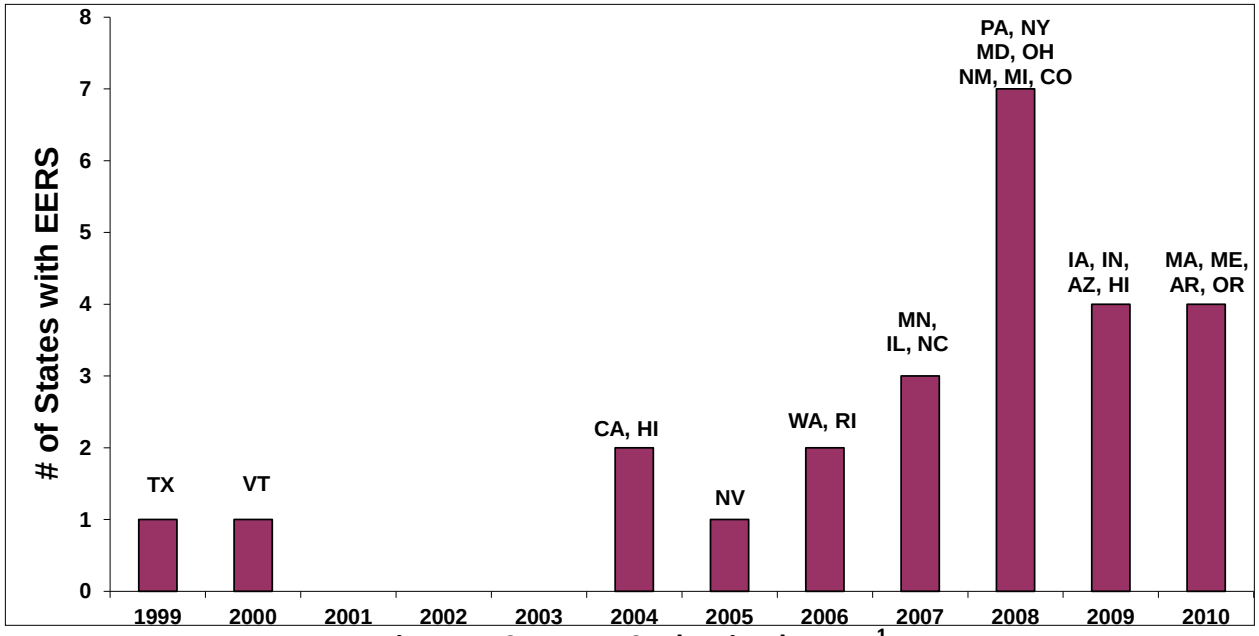


Figure 1. State EERS adoption by year[1]

Source: American Council for an Energy-Efficient Economy 2011

Targets and goals may be specified in various ways. Probably the most common is to express these targets as a percentage of annual electricity or natural gas sales. Thus, utilities might be required to demonstrate that they have operated programs to reduce sales by 0.5% or 1.0% in a year relative to the level of sales that would have been achieved in the absence of such programs. Such goals can also be specified in terms of cumulative impacts, including savings achieved by energy efficiency measures installed in earlier years that are still in place. In this construction, a goal might specify 0.25% savings in the first year, 0.75% savings in the second year (including the 0.25% from the first year), etc. Other metrics that have been used are to specify targets in terms of annual kilowatt hours (kWh) of electricity saved, million British thermal units (Btu) of natural gas saved, or kilowatt (kW) of peak demand savings. In Texas, targets have been set in terms of reduction in the rate of electricity demand growth—currently set at reducing demand growth by 30% annually (e.g., if demand is growing by 1.5% per year, the target is to operate programs that reduce demand by 0.45%).

[1] Hawaii is listed twice since it passed a combined RPS-EERS in 2004 and then a stand-alone EERS in 2009.

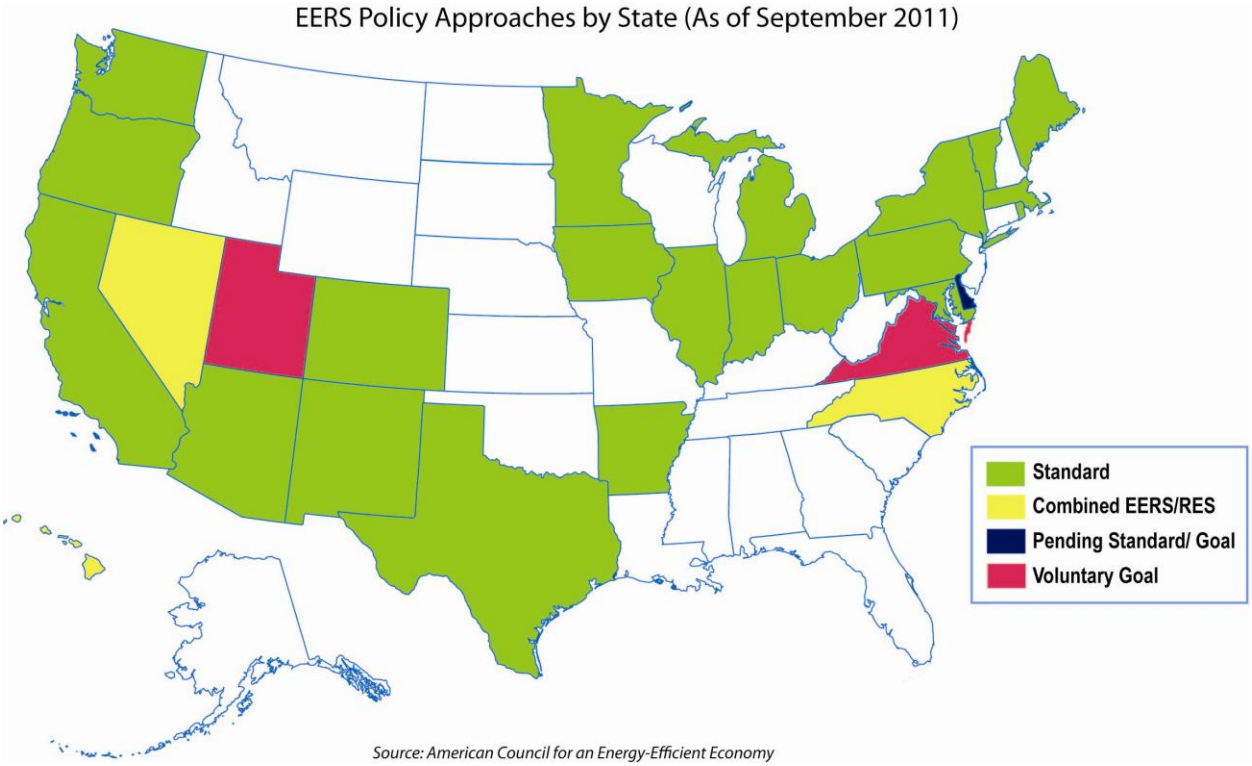


Figure 2. States with an EERS as of September 2011
Source: American Council for an Energy-Efficient Economy 2011

Most states have set targets that are mandatory, meaning there is a strong expectation that targets will be met. In a few cases (e.g., Virginia and Utah) the targets are considered advisory or voluntary, without an expectation they will be met.

In the majority of states, utilities are responsible for meeting targets. In a few states (Oregon and Vermont) utilities provide funding for energy efficiency programs (through rates), but an independent organization administers programs statewide. And in some states (Illinois, Maryland, and New York), authority is split, with utilities responsible for a share of overall targets, and a state agency responsible for the rest. There are also a few unique arrangements, such as Indiana, where the Utility Regulatory Commission directed the utilities to work together to hire a single statewide administrator for core programs. Utilities are to supplement these core programs with utility-specific offerings.

In many states, the specific targets are set by legislation. In other states, targets have been set by state Public Utility Commission (PUCs), either at the specific instruction of the legislature, or by the Commission under its own authority (e.g., in response to general public service laws enacted in the past). Regardless of who establishes the targets, implementation is generally overseen by PUCs and compliance reports are typically prepared by utilities and filed with their PUC.

Why Targets? Why Not?

Savings targets establish specific energy savings goals or requirements that utilities can aim for, and specific goals or requirements that regulators and legislators can use to evaluate utility performance. Savings targets also encourage utilities to minimize costs per unit of energy saved. (In the past, some states had spending targets, which

encouraged spending but did not encourage maximizing savings per dollar invested). Savings targets can also allow programs to start relatively quickly, while more complete analysis takes place on how high targets ultimately should go or how long they should extend. For example, Pennsylvania and Arkansas have both established 3-year savings targets so that programs could ramp-up while their PUCs consider appropriate targets for future years.

On the other hand, savings targets can sometimes be established arbitrarily, with only limited evidence that these specific savings levels are achievable or cost-effective. Targets are typically established for investor-owned utilities statewide, although there sometimes may be variations from utility to utility based on how much savings can be achieved or the cost to achieve these savings. In most states, publicly-owned utilities and/or rural electric cooperatives are not covered by targets, but in a few states they are (e.g., Arizona, Iowa, Michigan, Minnesota, North Carolina). As an alternative to targets, some people argue that the amount of energy efficiency that is achieved should depend on integrated resource planning (IRP) processes. IRP typically considers energy demand and the mix of resources (efficiency, existing plants, plant improvements, and new plants) that can best meet energy needs at low cost and risk to consumers. In some states, IRP and/or requirements for utilities to capture "all cost-effective efficiency opportunities[2]" are used to establish targets.[3]

Energy Efficiency Economics, Rate Impacts, and Bill Impacts

A 2009 American Council for an Energy-Efficient Economy (ACEEE) study examining evaluation results across 14 states found that energy efficiency programs *on average* cost the sponsoring utility or program administrator about 2.5 cents per kWh saved and about $3.40 per million Btu of natural gas saved over the life of energy efficiency measures. When costs paid directly by participants and not the utility are also included, the average cost of efficiency savings is about 4.6 cents per kWh and $6.80 per million Btu.[4] This is far less than the cost of new power plants, which can range from 7 cents to more than 30 cents per kWh.[5] While energy efficiency is often low cost, this does not mean that all energy efficiency is low cost. For some measures the cost is more than 10 cents per kWh. Essentially all states require energy efficiency programs to be cost effective, meaning they cost less than alternative sources of power. (There are a variety of ways to estimate cost effectiveness, a topic that is beyond the scope of this paper.) In some states, if utilities find they cannot meet energy savings targets with cost effective energy efficiency programs, they can petition the PUC to change the targets. To our knowledge, this has not yet been done.
Still, energy efficiency programs do have significant costs. Utilities can spend many millions of dollars on energy efficiency programs and these costs need to be recovered via rates. Thus, energy-efficiency programs can lead to rate increases in the near term, just as new power plants can also lead to rate increases. However, if the costs of energy efficiency programs are less than the cost of new power plants, energy efficiency can reduce, but not eliminate, rate increases in the long term.

Furthermore, because energy efficiency programs reduce energy use, even if *rates go up*, *bills often go down* for those customers who participate in the programs. Bills are the product of rates X consumption. If rates go up 2% (e.g., from 10 to 10.2 cents/kWh) but energy use for a customer goes down 10% (e.g., from 1,000 to 900 kWh due to their efficiency investment), then their bill will go down by 8% (from $100 to $91.80 in this example). As utilities deliver programs over a period of years, presumably every customer will have an opportunity to experience the bill-reduction benefits

For more information on the rate and bill impacts of energy efficiency, see the SEE Action paper listed in the Additional Resources section.

How Are Targets Set?

There are two basic methods by which a legislature, utility commission, or individual utility might establish energy savings targets.

[2] As contained in legislation in several New England states and also a voter initiative in Washington State.
[3] For more information on this topic, see *Using Integrated Resource Planning to Encourage Investment in Cost Effective Energy Efficiency Measures*. www1.eere.energy.gov/seeaction/ratepayer_efficiency.html.
[4] Friedrich, K.; Eldridge, M.; York, D.; Witte, P.; Kushler, M. 2009. Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs. http://aceee.org/research-report/u092. American Council for an Energy-Efficient Economy.
[5] Lazard Associates. 2009. "Levelized Cost of Energy Analysis - Version 3.0" as presented to the Public Service Commission of Wisconsin, Docket No. 6630-CE-302. http://efile.mpsc.state.mi.us/efile/docs/15996/0145.pdf.

The first method is to simply choose a target that is believed to be realistic, based on published studies, expert opinion, historic or recent results of energy efficiency programs within the state, and/or EERS targets or results from another state, such as a nearby state. Although picking a target this way is in theory a simple exercise, assuming that "what works elsewhere will work here" does entail some risks; states do differ. These differences are more likely to be a factor if the targets are aggressive and set at levels that only a few states have achieved.

A more analytical method of setting targets begins with an energy efficiency market potential study. A market potential study considers many factors, including the availability of energy-efficient technologies and products, the extent to which those technologies and products have already penetrated the market and the potential for further deployment, and the cost effectiveness of each. The potential study and cost benefit analysis, when considered together, provide a kind of road map showing how much energy could theoretically be saved if all of the studied measures were fully deployed, and at what cost. This method is also subject to uncertainty, because potential studies often differ widely in their assumptions—it is possible for one study to estimate an achievable efficiency potential[6] of 0.3% of sales each year using very conservative assumptions and another of the same geographic area to estimate an achievable potential of 1.5% per year using more aggressive assumptions. Potential studies can differ widely in terms of the range of efficiency measures that are examined, assumptions about the evolution of measures and their costs, assumptions about consumer adoption of low-cost measures in the absence of programs, and program participation rates. Commonly, potential studies will provide a range of estimates, with results varying as a function of these assumptions. Since assumptions help determine results, it is useful to calibrate potential studies with results actually achieved in similar states. Figure 3 provides one such data source. For more information about potential studies, see the *Guide for Conducting Energy-Efficiency Potential Studies* listed in the Additional Resources section of this report.

Of course, having a road map does not tell one where to go; policymakers will still need to make decisions. For example, if they use the first method, do they want to copy the most aggressive states, the least aggressive states, or states that fall somewhere in between? If they use a potential study, most such studies provide a range of estimates and outside parties may argue that the full range includes both higher and lower numbers. Policymakers will need to weigh the evidence and decide where within the range they want to be.

Some of the policy issues and critical decisions associated with these methods are explored in greater detail in the "Definition of Target Levels" section later section of this paper.

Examination of Targets that Have Been Set

As shown in Figures 1 and 2, 24 states have now adopted savings targets (and one state is pending adoption). Table 1 summarizes the adopted electric targets by year. The figures listed are savings as a percent of total annual utility kilowatt-hour sales. We list all savings achieved in that year, including savings from measures installed that year (sometimes called incremental annual savings) as well as savings from measures installed in earlier years that are still in place. On an incremental annual basis, electric savings targets range from 0.25% to 2.4% per year. In some cases (e.g., in states that will have standards in 2015 and/or 2020 only), the annual values are estimates based on an initial ramp-up period and steady savings after the ramp-up. In addition, 12 states have natural gas savings targets, with incremental annual savings targets as high as 1.5% savings per year.

[6] "Achievable efficiency potential" represents a subset of cost-effective efficiency potential, based on available resources and the use of programs that have been successfully demonstrated elsewhere.

Table 1. Annual State EERS Targets (for reductions in kilowatt-hour sales each year)

Source: American Council for an Energy-Efficient Economy 2011

State	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Cumulative 2020	Type
Arizona	N/A	N/A	1.25%	3.00%	5.00%	7.25%	9.50%	12.00%	14.50%	17.00%	19.50%	22.00%	**22.00%**	Mandatory Standard
Arkansas	N/A	N/A	0.25%	0.75%	1.50%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**1.50%**	Mandatory Standard
California	1.31%	2.56%	3.83%	5.11%	6.17%	7.13%	8.05%	9.00%	9.97%	10.96%	11.95%	12.94%	**12.94%**	Mandatory Standard
Colorado	0.53%	1.29%	2.09%	3.23%	4.44%	5.72%	7.07%	8.49%	10.00%	11.59%	13.25%	14.93%	**14.93%**	Mandatory Standard
Delaware	0.50%	1.25%	2.50%	5.00%	8.00%	11.00%	15.00%	N/A	N/A	N/A	N/A	N/A	**15.00%**	Pending
Hawaii	1.50%	3.00%	4.50%	6.00%	7.50%	9.00%	10.50%	12.00%	13.50%	15.00%	16.50%	18.00%	**18.00%**	Mandatory Standard
Illinois	0.40%	1.00%	1.80%	2.80%	4.20%	6.00%	8.00%	10.00%	12.00%	14.00%	16.00%	18.00%	**18.00%**	Cost Cap
Indiana	N/A	0.30%	0.80%	1.49%	2.39%	3.48%	4.77%	6.26%	7.95%	9.84%	11.83%	13.81%	**13.81%**	Mandatory Standard
Iowa	1.00%	2.20%	3.50%	4.90%	6.30%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**6.30%**	Mandatory Standard
Maine	N/A	N/A	1.00%	2.20%	3.60%	5.00%	N/A	N/A	N/A	N/A	N/A	N/A	**5.00%**	Mandatory Standard
Maryland	0.99%	2.23%	4.70%	7.70%	10.70%	13.70%	16.70%	N/A	N/A	N/A	N/A	N/A	**16.70%**	Mandatory Standard
Massachusetts	1.00%	2.50%	4.50%	6.90%	9.30%	11.70%	14.10%	16.50%	18.90%	21.30%	23.70%	26.10%	**26.10%**	Mandatory Standard
Michigan	0.30%	0.80%	1.55%	2.55%	3.55%	4.55%	5.55%	6.55%	7.55%	8.55%	9.55%	10.55%	**10.55%**	Cost Cap
Minnesota	N/A	1.50%	3.00%	4.50%	6.00%	7.50%	9.00%	10.50%	12.00%	13.50%	15.00%	16.50%	**16.50%**	Mandatory Standard
Nevada	0.77%	0.80%	1.58%	1.62%	2.41%	2.46%	3.00%	3.05%	3.11%	3.16%	3.21%	3.76%	**3.76%**	Combined RES-EERS
New Mexico	N/A	0.86%	1.72%	2.56%	3.38%	4.20%	4.80%	5.40%	5.98%	6.56%	7.32%	8.06%	**8.06%**	Exit Ramp
New York	2.10%	4.22%	6.38%	8.56%	10.76%	12.99%	15.25%	N/A	N/A	N/A	N/A	N/A	**15.25%**	Mandatory Standard

North Carolina	N/A	0.25%	0.50%	0.75%	1.00%	1.25%	1.50%	1.75%	2.13%	2.50%	2.71%	2.92%	**2.92%**	Combined RES-EERS
Ohio	0.30%	0.80%	1.49%	2.29%	3.18%	4.17%	5.17%	6.16%	7.16%	8.15%	10.14%	12.13%	**12.13%**	Exit Ramp
Oregon	N/A	0.80%	1.60%	2.40%	3.40%	4.40%	N/A	N/A	N/A	N/A	N/A	N/A	**4.40%**	Mandatory Standard
Pennsylvania	N/A	N/A	1.00%	1.99%	2.98%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**2.98%**	Cost Cap
Rhode Island	1.16%	2.46%	3.96%	5.66%	7.76%	10.26%	N/A	N/A	N/A	N/A	N/A	N/A	**10.26%**	Mandatory Standard
Texas	0.10%	0.20%	0.30%	0.60%	1.10%	1.60%	2.10%	2.60%	3.10%	3.60%	4.10%	4.60%	**4.60%**	Cost Cap
Vermont	2.25%	4.50%	6.75%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**6.75%**	Mandatory Standard
Washington	0.74%	2.2400%	3.74%	5.24%	6.74%	8.24%	9.74%	11.24%	12.74%	14.24%	15.74%	17.24%	**17.24%**	Mandatory Standard

For combined renewable and energy efficiency standards, we only list the efficiency portion.

Targets generally apply to investor-owned utilities in each state, although a few states include publicly-owned and cooperatively-owned utilities; some states only have targets for the main utilities in the state.

Note: The Tennessee Valley Authority (serving portions of seven southeastern states) recently approved a plan calling for 3.5% savings by 2015 and 6.8% savings by 2020.

Cumulative savings in 2020 (meaning savings in 2020 as a result of measures installed since 2009) range from about 1.5% of sales to more than 20% of sales. States at the low end of this range generally have set targets for only a few years. Many of these are new to energy efficiency and are starting with modest targets before gradually ramping up. Several states have set targets for 3 years with future targets to be set based on their initial experience. In states that have been operating programs for multiple years, incremental annual savings per year generally exceed 1% of sales and in a few cases exceed 2% per year. It is interesting to note that of the top-ten states in the 2010 ACEEE State Energy Efficiency Scorecard all have established mandatory savings targets.[7]

Experience Implementing Targets

According to a June 2011 ACEEE report on EERS progress, states with an EERS are achieving significant energy efficiency savings from utility programs, benefiting electric and natural gas customers by lowering utility bills, improving building comfort, and reducing strains on the utility grid. Nine states are achieving savings levels of 1.2% of annual sales or more,[8] a significant accomplishment considering that in 2006 only one state achieved over 1.2%.[9] Following this group of leading states, nine states with an EERS have climbed close to or above 0.5% savings, including states that only recently adopted full-scale utility energy efficiency programs in the Midwest and Southwest.[10]

Savings Compared to Targets

Overall, the performance of states in comparison to the targets set in EERS policies has been encouraging; most states are meeting or are on track to meet energy savings targets. Thirteen of the twenty states with EERS policies in place for more than 2 years are achieving 100% or more of their targets; only three states are realizing savings below 80% of their targets.

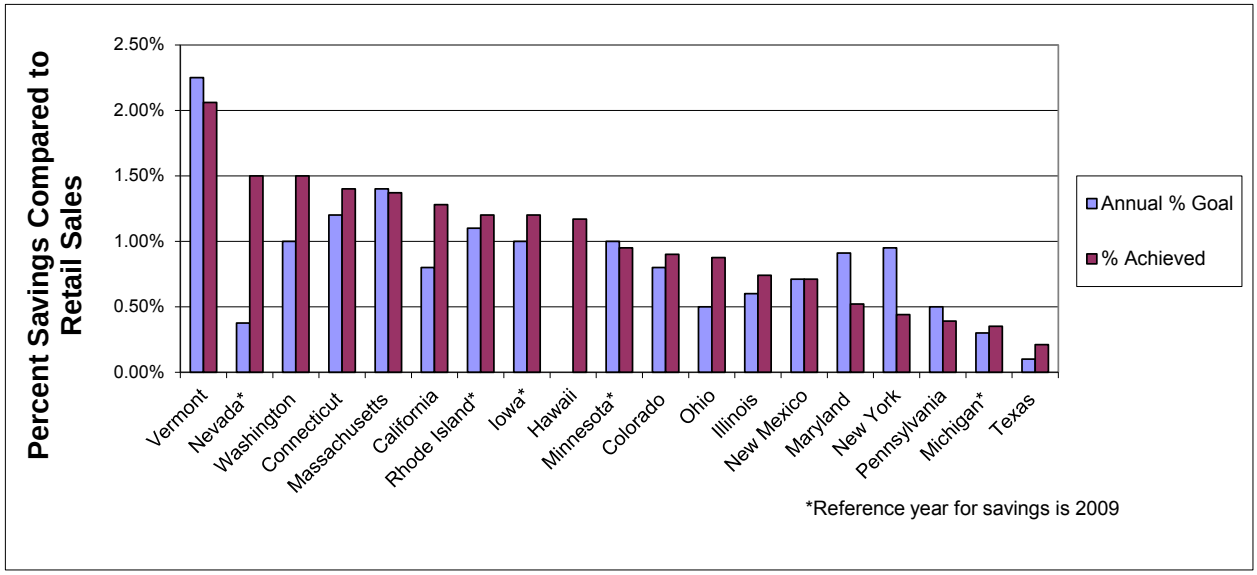


Figure 3. State EERS targets vs. achieved savings in 2010

Source: American Council for an Energy-Efficient Economy 2011

[7] Molina, M.; Neubauer, M.; Sciortino, M.; Nowak, S.; Vaidyanathan, S.; Kaufman, N.; Chittum A. 2010. *The 2010 State Energy Efficiency Scorecard*. http://aceee.org/research-report/e107. American Council for an Energy-Efficient Economy.

[8] Sciortino, M.; Nowak, S.; Witte, P.; York, D.; Kushler, M. 2011. *Energy Efficiency Resource Standards: A Progress Report on State Experience*. http://aceee.org/research-report/u112. American Council for an Energy-Efficient Economy.

[9] Eldridge, M.; Neubauer, M.; York, D.; Vaidyanathan, S.; Chittum, A.; Nadel, S. 2008. *The 2008 State Energy Efficiency Scorecard*. http://aceee.org/research-report/e086. American Council for an Energy-Efficient Economy.

[10] Sciortino, M., et.al., 2011 (see footnote 6).

While the figure above positively portrays states meeting targets, the hard work is yet to come. Savings goals generally ramp up to higher levels than the goals for 2010, meeting goals in the coming years may be challenging and needs ongoing attention and analysis. States that are currently achieving less than 80% of targets (New York, Pennsylvania, and Maryland) are making efforts to get on track to meet goals. In interviews, stakeholders in Pennsylvania and New York expressed confidence they will meet the long-term targets, while Maryland's utilities and regulators are considering next steps.[11]

A few general trends also emerge from interviews with stakeholders in states with EERS policies. Establishing an EERS lays a foundation for increased levels of energy efficiency savings, regardless of prior experience with energy efficiency programs as both experienced states and states new to energy efficiency are reaching their targets. Available data from many states indicates the benefits of programs administered under an EERS outweigh the costs. Meeting EERS targets requires fair and clear regulation, meaning targets for utilities unaccustomed to energy efficiency must be gradual and the evaluation method for savings clear. All parties must be committed to meeting targets. Utilities need to devote proper resources to ensure successful programs and commissions should consider approving sufficient levels of funding and complementary policies, such as timely and assured cost recovery, performance incentives, and decoupling or allowing collection of lost contribution to fixed costs. Finally, ramping-up savings to aggressive levels requires programmatic excellence. While most states are reaching their targets so far, compact fluorescent lamps (CFL) are contributing disproportionately to savings. A recent review of energy efficiency program savings in four states (California, Massachusetts, New York, and Vermont) over the 2005-2009 period found that CFLs accounted for 17% to 58% of total savings, varying by state and year. These leading states are now making efforts to ramp up other measures and reduce reliance on CFLs.[12] Tried and true program designs are fine for meeting targets of 1% savings per year or less, but innovative programs reaching all sectors and achieving deeper savings are needed as well to meet targets of 1.5% per year or higher.

Issues

The list of potential issues to consider when establishing energy savings targets for energy efficiency programs is long. Some utility commissions will review hundreds of pages of market potential analyses, testimony, and briefs before coming to a decision on these issues. Therefore, this paper does not attempt to exhaustively tackle (or even catalog) all the issues. Instead, this paper will introduce decision makers to some of the most difficult or controversial issues that are debated whenever a legislature or a utility commission sets energy efficiency targets.

Legal Authority

One of the most fundamental issues to consider before establishing targets is the question of legal authority. From the perspective of utility commissioners, the key question is "What authority do we have, if any, to promulgate regulations or issue orders that establish energy efficiency savings targets?" Some commissions may even question whether they have the authority to order utilities to implement energy efficiency programs without enforceable numeric targets. The answers vary from state to state.

Without question, utility commissions in multiple states (e.g., Arizona, Indiana, and New York) have ordered energy efficiency programs and established targets based entirely on their broad, non-specific authority to regulate utilities in a manner that serves the public interest, and to order "just and reasonable rates." In addition, some states have IRP statutes that grant or imply goal-setting authority. Commissions in other states may be reluctant to take the same step without specific statutory authorization.

It is becoming increasingly common for state legislatures to specifically mandate that utilities (or a third-party) must implement energy efficiency programs. The legislature, in some cases, specifies funding levels or numeric savings targets that must be achieved, while in other cases it delegates those decisions to the utility commission. Such laws

[11] Ibid.
[12] U.S. Department of Energy. 2010. *Energy Star CFL Market Profile, Data Trends and Market Insights.*

go beyond general authority to set targets and instead mandate that targets be set. Other policy issues, such as those that follow in this paper, may also be addressed in the legislation or delegated. In any event, when this legislative route is taken, the law should specify what roles and responsibilities each party (the commission, the utilities, and any third parties) will have. This approach can go a long way toward preventing the kinds of uncertainty that sometimes arises when a utility commission orders energy efficiency programs or savings targets in the absence of a specific statutory authority.

Targets for Whom?

Before establishing numeric targets, policymakers must decide to whom the targets will apply. For example, if the policy goal is to achieve 1% annual energy savings, who will be held accountable for achieving that 1%?

By far the most common option is to establish savings targets that apply to individual utilities. Continuing with our example, this might mean that each utility in the state is required to achieve 1% energy savings. Note that a state could also enact a policy that assigns different targets to different utilities.

Another key issue is whether to adopt targets only for investor-owned utilities or to cover publicly-owned utilities and electric cooperatives as well. Resolving this issue depends in part on whether the municipal and cooperative utilities are self-governed or regulated by the state utility commission. In addition, a minimum-size threshold can be applied in order to reduce the burden on both smaller utilities and regulatory agencies. (Many states have dozens of very small utilities that taken together represent a very small percentage of total electricity use in the state).

Another option is to set targets that must be achieved by third-party program administrators. This is the path chosen by states with third-party administrators (e.g., Vermont, Oregon, and portions of the programs in Illinois, Maryland, and New York). Under this option, a state assigns responsibility (via statute or contract) and a savings target to an energy efficiency program administrator. States may also choose to create multiple program administrators, as Illinois, Maryland, and New York have done. In these states the majority of responsibility is assigned to utilities and a minority of savings targets assigned to specific state agencies.

State-Wide Versus Utility-Specific Targets

Some argue that it is best for policymakers to apply uniform, percentage-based savings targets to all parties. The arguments in favor of this approach are based in large part on simplicity and fairness, especially in states where targets apply to utilities. In terms of simplicity, it is much easier and cheaper to develop market potential studies that use statewide demographic and economic data to identify statewide potential than it is to develop separate estimates for each utility service territory. Developing separate estimates for customer classes is not quite as difficult, but still poses challenges for some efficiency measures. In terms of fairness, the argument is sometimes made that uniform percentage-based savings targets are inherently more equitable than targets that vary from one utility to the next.

Counter arguments also exist. In particular, if responsibility for achieving targets is placed on utilities, policymakers must consider that there can be substantial differences among utilities. Demand growth, normally driven by economic and demographic forces beyond the control of the utility, differs across service territories. Customer characteristics can be different from utility to utility, even within a state. Utilities also vary in how much of their sales are made to each customer class—i.e., residential, commercial, or industrial—and the opportunities for savings are different in each class. Energy efficiency potential can be different because of all of the above factors, or because of the presence or absence of pre-existing energy efficiency programs in the service territory. And finally, there can be significant differences in which efficiency measures are cost effective, because utilities are not monolithic in terms of their avoided costs or their rates, and because large utilities may benefit from economies of scale. Some states (e.g., Missouri) prefer to decide about the level of energy efficiency program intensity in their IRP process, where all incremental resources can be compared and valued against forecasted needs at the same time.

Hybrid approaches are also possible. For example, the Arkansas Public Service Commission recently set the same set of 3-year efficiency targets for all investor-owned electric utilities in the state (and a separate set of targets for the natural gas utilities) but is allowing individual utilities to argue as part of their implementation plan that a modified target should apply to them. Likewise, the same initial targets can be set state-wide to apply for the first few years, and then individual utility and sector experience can be used to help set targets for subsequent years.

Laws Mandating Acquisition of "All Cost-Effective Efficiency"

Several states, primarily in New England, have enacted laws requiring utilities to acquire "all cost effective" energy efficiency resources. The advantage of this approach is that it sets clear legislative guidance that is intended to lead to aggressive but cost effective targets. States such as Massachusetts and Rhode Island have successfully used this approach. However, such legislation is only as strong as the utility commissions that are asked to implement them. For example, the Connecticut Commission has not approved utility plans and targets that were submitted several years ago. And a decade ago, in Maryland, distribution utilities claimed that they had no avoided generation costs and hence no efficiency savings were cost effective; the Commission did not dispute this contention.

Definitions of Target Levels

EERS policies and energy savings targets in general are quite often misinterpreted outside of the realm of efficiency policy professionals. The most common misinterpretation is that a 1% annual savings target, for example, means total energy sales (or use) next year will be 1% less than this year. Although a policy to this effect could unquestionably be adopted, a 1% savings target almost always means something quite different. Most commonly, if a target of 1% savings is set, it means that the program operator must demonstrate that energy efficiency programs they have operated or contributed to have resulted in energy savings equal to 1% of sales. Thus, if sales in a year would normally grow by 2% but efficiency programs save 1%, then overall sales will grow by 1% (2% minus 1%). This construction allows energy use to continue to grow through, for example, economic development activities that might result in construction of a new factory.

When a percentage savings target is established, the essential formulation is that savings as a percent of sales must exceed a specified number, such as 0.5% or 1%.[13] In setting the savings target, it should be immediately evident that choosing an appropriate value depends on exactly what is meant by "savings" and "sales." Policymakers need to give due consideration to these details and must strive to be as clear as possible from the outset on how the percentage targets will be measured. We will now explore some of these details and the policy implications.

We begin by considering overall energy sales. The most common approach is to define this based on actual data. For the year 2012 for example, the "sales" in the target equation above could be set equal to a baseline level of actual retail energy sales for example, actual sales in 2012, or alternatively sales in 2011 or the annual average of sales over the 3 years from 2009 through 2011. The policy needs to specify whether the baseline level will be static (for example, the average of 2009 through 2011 will be used for all future years) or adjusted each year (for example, "sales" in the previous year). The problem with using current-year sales is that overall sales are not known until the end of the year, meaning program operators do not quite know what the target is until the very end of the year. Most states use an historic but dynamic baseline, meaning the baseline changes over time.

Turning now to the "savings," all current EERS policies seek to measure energy efficiency program achievements. This approach puts the onus on utilities or program administrators to offer programs that achieve meaningful results, regardless of weather and economic conditions, but it also complicates the measurement equation considerably. The first question is which types of savings to include. All states include savings from programs

[13] It should be noted that while most states with targets have specified them in terms of percent of sales, a few states have established absolute targets (e.g., 1,000 Gigawatt hours), and Texas has specified targets in terms of percentage of load growth (although a recent law will change their targets to percent of sales).

operated by the program administrator. In addition, some states include programs operated by state and local governments but others do not. Most states currently do not include savings from building codes and equipment efficiency standards, but an increasing number of states are allowing program operators to receive partial credit for savings from codes and standards, often under the condition that the program operator has made significant contributions toward adoption of the code or standard.[14] Ohio includes savings from utility system efficiency improvements, such as transmission and distribution system improvements. Some states provide credit for energy savings from use of combined heat and power plants, crediting the savings relative to operation of separate steam boilers and power generators.[15]

A few complications are worth mentioning. First, a few states allow industrial customers to opt out of paying for or participating in mandated energy efficiency programs, either an outright opt-out or in exchange for a commitment to invest in their own self-directed programs. When the former happens, this can potentially disrupt assumptions that were used to establish the targets imposed on utilities or program administrators, reducing the pool of available savings. When the latter happens, large industrial customers must demonstrate they have met the savings goals and the utility can count these savings toward its targets, but the large industrial customer pays for its own programs and not the utility's programs. Second, as building codes and equipment efficiency standards get tighter, this cuts into the stock of savings utilities can tap, unless they can get credit for code and standard savings. A good EERS policy will explicitly consider these issues when setting appropriate savings targets.

The third complication is how to measure savings. Savings are typically determined by program evaluations, and there are many ways to evaluate savings. A guide to evaluation is listed in the Additional Resources section. Because of the complexity of evaluation, the details are typically not included in legislation but are left to be determined through regulations, utility commission orders, or individual proceedings. A key point is that evaluation rules should be established at the beginning of a program so program operators know how savings will be evaluated. When evaluation methodology is debated and set after a program period ends, a lot of contention often results.

One of the key points in measuring program achievement is to note the difference between gross and net energy savings. Through statistical or other methods, one could estimate each year how much energy was saved through various energy efficiency measures (e.g., the replacement of inefficient water heaters with efficient models). This estimate would represent gross savings. Net savings, in contrast, would be a different number based on gross savings, minus savings that were expected to happen anyway (e.g., in the absence of programs), plus savings induced by the program but from customers that do not sign up for the program (often called free-drivers or spillover). Expected savings could be based on forecasts made at the beginning of a program, or can be made with various survey and statistical techniques after the end of a program period. If the compliance obligation embedded in state energy efficiency savings targets is based on net savings, it means the mandated programs have to achieve targets, and utilities or program administrators only get credit for the savings beyond a business-as-usual situation. If the compliance obligation is instead based on gross savings, the savings targets can generally be higher than if net savings were used. However, because "free riders" count toward gross savings (free riders are program participants who would have installed efficiency measures in the absence of a program), care must be taken to set up programs and evaluation in ways that ensure program operators have an incentive to minimize and not maximize free riders. Simply, the goal should match the assumptions and bases.

The final piece of our equation is the savings target. As previously noted, policymakers can choose percentage targets that are essentially copied from other states, or they can select targets based on market potential studies. Either way, these targets can then become the compliance obligation, as in "each utility will achieve 1% savings, based on the selected definitions of 'savings' and 'sales,' in Year 2015." Alternatively, the policy can establish energy

[14] For more information on this topic, see *Making Building Energy Codes and Appliance/Equipment Standards Part of Utility Energy Efficiency Portfolios.* Institute for Electric Efficiency.

[15] States that allow combined heat and power as an eligible resource in EERS and renewable portfolio standard policies include: Connecticut, Ohio, Texas, Massachusetts, North Carolina, Pennsylvania, Maine, Washington, Vermont, Arizona, Hawaii, and Nevada.

savings levels (kilowatt hours) as the actual compliance obligation for utilities, with the levels selected based on a desired percentage calculated from savings and sales.

In nearly every state that has adopted some form of EERS, annual targets and/or an annual compliance obligation have been established for one or more future years. In many states, especially those that have not previously mandated energy efficiency programs, the EERS targets ramp up to higher percentages over some period of years. It is worth pointing out that Table 1 the effective targets established by each state policy are shown. Where a target appears to decline each year, it is typically because the target in the policy is based on a static baseline. Table 1 shows the effective target considering normal demand growth.

Flexibility and Cost Controls

One potential way to address the challenges of setting appropriate targets is to build flexibility and cost controls into the EERS policy.

The most fundamental form of flexibility and cost control comes with the policymakers' decision on whether to make the savings targets mandatory or voluntary. Voluntary goals present no real risk to utilities, but they may also fail to achieve the desired results, especially if the goals are ambitious. The degree to which goals are taken seriously by utilities also depends heavily on the attitude of the regulatory commission; e.g., a commission can insist on receiving plans to meet or exceed savings goals and reinforce that it expects utilities to meet the goals in a number of ways. A commission can also provide incentives for meeting goals. On the other hand, utilities are less like likely to take energy savings goals seriously if the commission does not give them priority or attention.

Cost controls can be an explicit or implicit part of an EERS policy. There are several ways to put this idea into practice. In Minnesota, for example, the Public Utilities Commission requires utilities to spend a certain percentage of operating revenues as a fall-back policy to make sure substantial energy efficiency programs continue. This makes the rate impact of efficiency programs a predictable and manageable factor, while turning the savings targets into estimates but not rigid goals. Consequently, more or less savings could result. Furthermore, since there is a spending requirement, efforts to minimize cost per kilowatt hour are not necessarily rewarded, which may overlook some potential cost savings. Other states, for example Illinois, keep the savings targets as a compliance obligation but cap the maximum impact on rates. If the cap is reached, the utility's target is adjusted downward to equal the maximum savings that can be achieved without exceeding the cap. As a result, the savings target may not be reached, particularly as the target becomes more aggressive over time.

In addition to using cost controls, regulators can build flexibility into an EERS policy by allowing for adjustments to the targets based on extenuating circumstances. We are not aware of adjustments yet being made. In addition, some have suggested that specific targets can only be met at high cost (e.g., at a cost in excess of the supply of power supplies). As noted earlier, the Arkansas EERS permits utilities to present arguments in favor of modified targets by providing a specific plan for meeting the targets and the costs of doing so. In Ohio, the PUC is authorized by the legislature to modify the targets if "benchmarks are not reasonably achievable" (and the PUC has specific rules defining these criteria).[16] Some states have also chosen to set targets for just a few years at a time or to modify longer term targets periodically to allow for adjustments based on actual program achievements and changes in the market potential for energy efficiency.

Another form of flexibility is to create an energy efficiency credit trading program, allowing utilities to purchase and sell credits. A utility that is achieving high levels of cost effective energy savings and exceeding its compliance obligation can sell its excess credits to another utility that is struggling to meet its target with cost effective measures. This kind of program can provide an incentive for the former utility to maximize its efforts, rather than

[16] Ohio Admin. Code 4901:1-39-05(J). Also, Arkansas decision Arkansas Public Service Commission. 2010. Order Defining "Comprehensive" in the Planning, Approval and Implementation of Essential Energy Efficiency Services. Order No. 17, Docket No. 08-144-U. Little Rock, AR: Arkansas Public Service Commission.

stopping when it hits its compliance target, while at the same time providing a cost control for the latter utility. Trading is specifically authorized in Nevada and a prior Pennsylvania policy also had this feature.[17]

Flexibility and cost controls can also be provided to utilities by creating credit trading programs that combine or link between an EERS policy and a renewable energy standard. In Ohio, for example, a utility has both of these types of obligations, but if it exceeds its EERS obligation it can apply the excess savings to its renewable energy obligation. However, this approach also can create tension and even opposition between energy efficiency and renewable energy proponents.

Rate Treatment

From the perspective of utilities and ratepayers, one of the biggest issues that must be addressed in an EERS policy, as with any utility energy efficiency policy, is how the costs of programs will be treated in rates. For utilities regulated by a utility commission, it is critically important for commission policy to be clear on this subject. For most municipally-owned and cooperative utilities, guidance should be provided by the utility board and by local elected officials.

State policies are generally explicit about allowing regulated utilities to recover the costs of energy efficiency program administration in retail rates. States may differ significantly, however, in whether their policies compensate utilities in some way for the fact that an EERS policy reduces sales volumes. Energy efficiency, in other words, translates into lost revenue for the utility between rate cases (the effects of energy efficiency programs are taken into account when rates are set). This is significant because utility rates are traditionally designed to allow the utility to recover its fixed and variable costs, and in the case of investor-owned utilities to also earn a return on its investments. If a portion of fixed costs are covered through variable rates, a utility may not fully recover its authorized fixed costs as it ramps up its efficiency programs in response to an EERS. To address this concern, an EERS policy can be paired with a decoupling policy, a lost revenue adjustment, or a straight fixed variable rate design. These concepts are explained in detail in the document *Aligning Utility Incentives with Investment in Energy Efficiency* in the Additional Resources section.

Another issue that may arise with rate treatment is the potential for cross-subsidization among and between customer classes. It is generally understood and accepted that within a customer class, all customers' rates will be equally affected by energy efficiency program costs, but not all customers will take equal advantage of and benefit from those programs. This kind of intra-class subsidization is almost certainly unavoidable, but it can create a political challenge for policymakers.[18] Those customers who do not expect to benefit directly and immediately from the programs may resist the EERS policy. The best way to minimize this problem is to seek to ensure that the offered programs are appropriately advertised and marketed in ways that give the maximum number of customers the opportunity to benefit. Likewise, there is an issue of potential subsidization between classes (e.g., industrial customers subsidizing residential savings or vice versa). States typically address this issue in one of two ways—have each class pay for their own programs or require utilities to have robust program offerings for all classes, so all customers have an opportunity to participate. The ultimate question is whether the energy efficiency programs benefit all customers in the aggregate and over the long term, compared to more traditional supply-side resource options.

[17] The prior Pennsylvania policy combined efficiency with reclaimed coal, but the targets were low enough that no resources were needed and therefore no trading took place. It was replaced with a straight EERS.

[18] Some argue that this problem is no different than that posed by any other kind of expenditure that a utility makes on behalf of all customers—for example, tree-trimming costs. Some customers live in high-rise apartments with no trees in sight, and yet they are obliged to pay the costs of cutting overhanging limbs to keep the lights on.

Incentives and Penalties

The last issue to be discussed here is whether the EERS policy includes penalties for failing to meet targets and/or incentives for achieving or exceeding targets. Policies that impose a penalty for non-compliance can either require a payment (usually recycled into the energy efficiency program budgets) or require that the shortfall be made up in a future year. If the latter policy is adopted, there should be some way to ensure that shortfalls do not get perpetually passed on to future years. Regarding penalties, we are not aware of any state that has yet imposed penalties for failure to meet an EERS, although several states have such procedures "on the books." As discussed earlier, most EERS targets have been met, and in the few cases where program operators are behind, they are taking steps to catch up.

The subject of incentives is a little more complex. Some states allow utilities to keep a small portion of the monetary value of system benefits resulting from energy efficiency programs. This approach helps address the lost revenue issue previously raised, and it creates an incentive for the utility to maximize cost-effective savings. In other states, specific incentives are offered to successful utilities or program administrators. A PUC may allow utilities to earn a specified amount (e.g., $5 million) if the annual savings target is met, perhaps with higher incentives if the target is exceeded. More information about these incentives is provided in the Additional Resources section. Similarly, third-party program administrators may operate under a performance-based contract that includes bonus payments for exceeding targets.

Conclusion and Recommendations

A growing number of states are setting mandatory energy-saving targets. Experience to date indicates that most states are on track to meet the targets that have been set, and that establishing such targets is driving significant and cost-effective energy-efficiency savings. However, targets need to be developed with care and many issues considered in setting targets. Among the issues that need to be considered are:

- Legal authority for setting targets
- Who the targets apply to (utilities, a state agency or some other organization)
- State-wide versus utility-specific targets
- Target levels including what savings are included, how savings are to be evaluated, and specific metrics and baselines to use
- How much flexibility to allow and whether to include cost caps.

Higher targets are feasible if utilities (or third-party program administrators) can count savings from supply-side as well as demand-side efficiency measures, or count savings from codes and standards to some degree as well as from their own programs. One approach that several states are using is to establish initial targets for several years (e.g., 3 years) based on studies and experience in other states, and use the initial experience from these programs to help establish future targets. In cases where targets are set for 10 years or more, it is desirable to periodically review and modify the targets based on actual experience and updated analysis of achievable energy savings potential.

If energy-saving targets are set, the effect of energy efficiency programs on utility costs and revenues needs to be considered. At a minimum, utilities need to be allowed to recover approved program costs from ratepayers in a timely and assured manner, just as they can recover prudent investments in new power plants, transmission lines, or distribution system upgrades. In addition, many states with targets provide utilities with financial incentives for meeting or exceeding targets and/or establish mechanisms to allow utilities to fully recover fixed system costs, even

as efficiency programs reduce sales. It is important to address these issues, because efficiency programs are most successful when the utility or third-party program operator has a financial incentive to succeed. At a minimum, the utility or third-party program operator should not be harmed financially. Moreover, addressing these issues is especially important, if not essential, where very challenging targets (savings of 1.5% per year or greater) are adopted.

Additional Resources

SEE Action Papers

Analyzing and Managing Bill Impacts of Energy Efficiency Program: Principles and Recommendations
www1.eere.energy.gov/seeaction/pdfs/ratepayer_efficiency_billimpacts.pdf

Using Integrated Resource Planning to Encourage Investment in Cost Effective Energy Efficiency Measures
www1.eere.energy.gov/seeaction/pdfs/ratepayer_efficiency_irpportfoliomanagement.pdf

National Action Plan for Energy Efficiency Guides

Guide for Conducting Energy-Efficiency Potential Studies
www.epa.gov/cleanenergy/documents/suca/potential_guide.pdf

Model Energy Efficiency Program Impact Evaluation Guide
www.epa.gov/cleanenergy/documents/suca/evaluation_guide.pdf

Aligning Utility Incentives with Investment in Energy Efficiency
www.epa.gov/cleanenergy/documents/suca/incentives.pdf

Energy Efficiency Resource Standard Papers

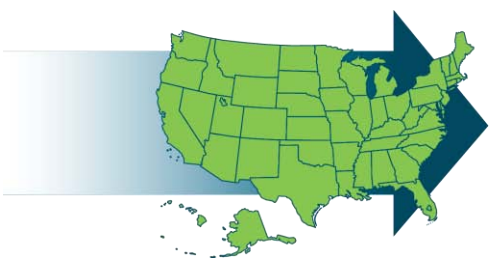
Sciortino, et al. 2011. *Energy Efficiency Resource Standards: A Progress Report on State Experience*.
www.aceee.org/research-report/u112

Nowak, et al. 2001. *Energy Efficiency Resource Standards: State and Utility Strategies for Higher Energy Savings.*
www.aceee.org/research-report/u113

Furrey, et al. 2009. *Laying the Foundation for Implementing A Federal Energy Efficiency Resource Standard*.
www.aceee.org/research-report/e091

Nadel. 2006. *Energy Efficiency Resource Standards: Experience and Recommendations.*
www.aceee.org/research-report/e063.

The Driving Ratepayer-Funded Efficiency through Regulatory Policies Working Group of the State and Local Energy Efficiency Action Network is committed to taking action to increase investment in cost-effective energy efficiency. This document was developed under the guidance of and with input from the working group. The document does not necessarily represent an endorsement by the individuals or organizations of Driving Ratepayer-Funded Efficiency through Regulatory Policies Working Group members or the federal government. However, the working group members do urge consideration of these materials as they believe that the information contained within will promote the deployment of cost-effective energy efficiency.



SEE Action

STATE & LOCAL ENERGY EFFICIENCY ACTION NETWORK