B. Energy Efficiency Policies, Programs, and Measures

Demand-side energy efficiency policies and programs reduce utilization of EGUs and avoid GHG emissions associated with electricity generation. These electricity demand reductions can be achieved through enabling policies that incentivize investment in demand-side energy efficiency improvements by overcoming market barriers that otherwise prevent these investments. Barriers include a lack of information on energy efficient options, high transaction costs, split-incentives, lack of product availability, and perceptions of organizational risks. Reducing electricity demand also reduces the associated transmission and distribution losses that occur across the grid between the sites of electricity generation and the end use.

Demand-side energy efficiency is considered a central part of climate change mitigation in states that currently have legislated GHG targets,[77] accounting for roughly 35 percent to 70 percent of expected reductions of these states' power sector emissions.[78] For example, under California's Climate Change Scoping Plan, the state projects reductions of 21.9 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) in 2020 from energy efficiency programs targeting electricity reductions. Taking into account projected reductions of 21.3 $MMTCO_2e$ from California's RPS and the expected 2.1 $MMTCO_2e$ reduction from the Million Solar Roofs program, energy efficiency makes up 48 percent of power sector reductions based on California's Climate Change Scoping Plan.[79] Another state, Washington, projects to reduce 9.7 $MMTCO_2e$ from energy efficiency measures in 2020 through a mix of new and existing programs. Taking into account expected reductions of 4.1 $MMTCO_2e$ from Washington's RPS, energy efficiency makes up 70 percent of expected emissions reductions from stationary energy within the state.[80]

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[77] States with legislated GHG targets include California, Connecticut, Hawaii, Maine, Maryland, Massachusetts, Minnesota, New Jersey, Oregon, Vermont, and Washington.

[78] These reduction target ranges are based on a review of state GHG reduction laws in states with legislated GHG targets.

[79] California Air Resources Board, *Climate Change Scoping Plan* (December 2009). Available at: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

[80] Washington Department of Ecology, *Growing Washington's Economy in a Carbon-Constrained World* (December 2008). Available at: https://fortress.wa.gov/ecy/publications/publications/0801025.pdf.

States have employed a variety of strategies to increase investment in demand-side energy efficiency technologies and practices, including (1) energy efficiency resource standards, (2) demand-side energy efficiency programs, (3) building energy codes, (4) appliance standards, and (5) tax credits. Each of these strategies is described below.

i. Energy Efficiency Resource Standards

Description

Energy Efficiency Resource Standards (EERS) set multiyear targets for energy savings that utilities or third-party program administrators typically meet through customer energy efficiency programs but also through other approaches, such as peak demand reductions, building codes and combined heat and power (CHP). An EERS can apply to retail distributors of either electricity or natural gas, or both, depending on the state. To date, 24 states have mandatory EE requirements in place, two states have voluntary targets, and two more states allow EE to be used to meet part of a mandatory RPS, for a total of at least 28 states with some type of EE requirement or goal.[81,82]

Policy Mechanics

Design

EERS design and implementation details vary by state, and may be expressed as a percentage reduction in annual retail electricity sales, as a percentage reduction in retail electricity sales growth, or as a specific electricity savings amount over a long-term period. A typical EERS sets multiyear targets for energy savings that drive investment in EE programs implemented by utilities or third party administrators. Over the compliance period, an EERS reduces electricity demand by a target amount that utilities must meet. As a result, an EERS indirectly affects utility CO_2 emissions by reducing the use of fossil fuel–fired EGUs.

[81] "State Energy Efficiency Resource Standards (EERS)" (American Council for an Energy-Efficient Economy, April 2014). Available at: http://www.aceee.org/files/pdf/policy-brief/eers-04-2014.pdf.

[82] New Hampshire has been included in this total since its mandatory EERS has been legislated, although the first year of the program is 2018. Delaware and Florida were not included in the totals. Delaware has enacted legislation to create an EERS, but final regulations have not yet been promulgated (Database of State Incentives for Renewables & Efficiency, January 2015). Available at: http://programs.dsireusa.org/system/program/detail/4510. Florida has enacted an EERS, but program funding to date is considered to be "…far below what is necessary to meet targets" ("State Energy Efficiency Resource Standards [EERS]," American Council for an Energy-Efficient Economy, April 2014). Available at: http://www.aceee.org/files/pdf/policy-brief/eers-04-2014.pdf. Ohio's EERS, while included in the total, was frozen for two years beginning in 2015. Cumulative targets will increase again from 2017 (Database of States Incentives for Renewables & Efficiency, December 2014). Available at: http://programs.dsireusa.org/system/program/detail/4542.

Authority

Most state EERS policies are established through legislation. However, there are several instances in which they have been established by PUC orders under broader statutory authority, such as by setting quantitative targets consistent with the achievement of "all cost-effective energy efficiency."[83]

Obligated Parties

Retail electricity suppliers, which are utilities that sell electricity to customers for end-use purposes, are the obligated parties under an EERS.

Measurement and Verification

PUCs generally oversee EERS. Retail electricity suppliers comply with EERS requirements by developing a portfolio of end-use energy efficiency programs that encourage electric utility customers to invest in more energy efficient technologies and practices as described below. Transmission and distribution infrastructure improvements may also count toward EERS programs in some states.[84] PUCs typically rely on independent program evaluators to perform evaluation, measurement, and verification (EM&V) activities that estimate the incremental annual and cumulative energy savings attributable to the programs.[85] These estimates are typically the basis for compliance reports submitted by retail electricity suppliers. See Table 4 for examples of penalties for program noncompliance.

[83] Ernest Orlando, *Benefits and Costs of Aggressive Energy Efficiency Programs and the Impacts of Alternative Sources of Funding: Case Study of Massachusetts* (Lawrence Berkeley National Laboratory, August 2010). Available at: http://emp.lbl.gov/sites/all/files/REPORT%20lbnl-3833e.pdf. An important policy driver for EE programs in six states is a statutory requirement for utilities to acquire "all cost-effective energy efficiency." This policy typically requires utilities and other program administrators to pursue energy efficiency up to the point at which it is no longer cost effective, as defined by cost-benefit tests and procedures REQUIRED by state PUCs. States with all-cost effective energy efficiency policies include: CA, CT, MA, RI, VT, WA. For MA, this goals has translated into achieving annual electric energy savings equivalent to a 2.4 percent reduction in retail sales from energy efficiency programs in 2012.

[84] For example, Ohio allows transmission and distribution infrastructure improvements to count toward its EERS (Database of State Incentives for Renewables & Efficiency, December 2014). Available at: http://programs.dsireusa.org/system/program/detail/4542.

[85] EM&V refers to set of techniques and approaches used to estimate the quantity of energy savings from an EE program or policy. Since energy savings cannot be directly measured, efficiency program impacts are estimated by taking the difference between: (a) actual energy consumption after efficiency measures are installed, and (b) the energy consumption that would have occurred during the same period had the efficiency measures not been installed (i.e., the baseline).

Penalties for Noncompliance

If the obligated parties do not demonstrate compliance with the EERS, they may face financial penalties. The existence and amount of penalties varies across the states. Table 4 provides examples of financial penalties in three states, Pennsylvania, Ohio and Illinois.

Table 4: Examples of Penalties for Noncompliance

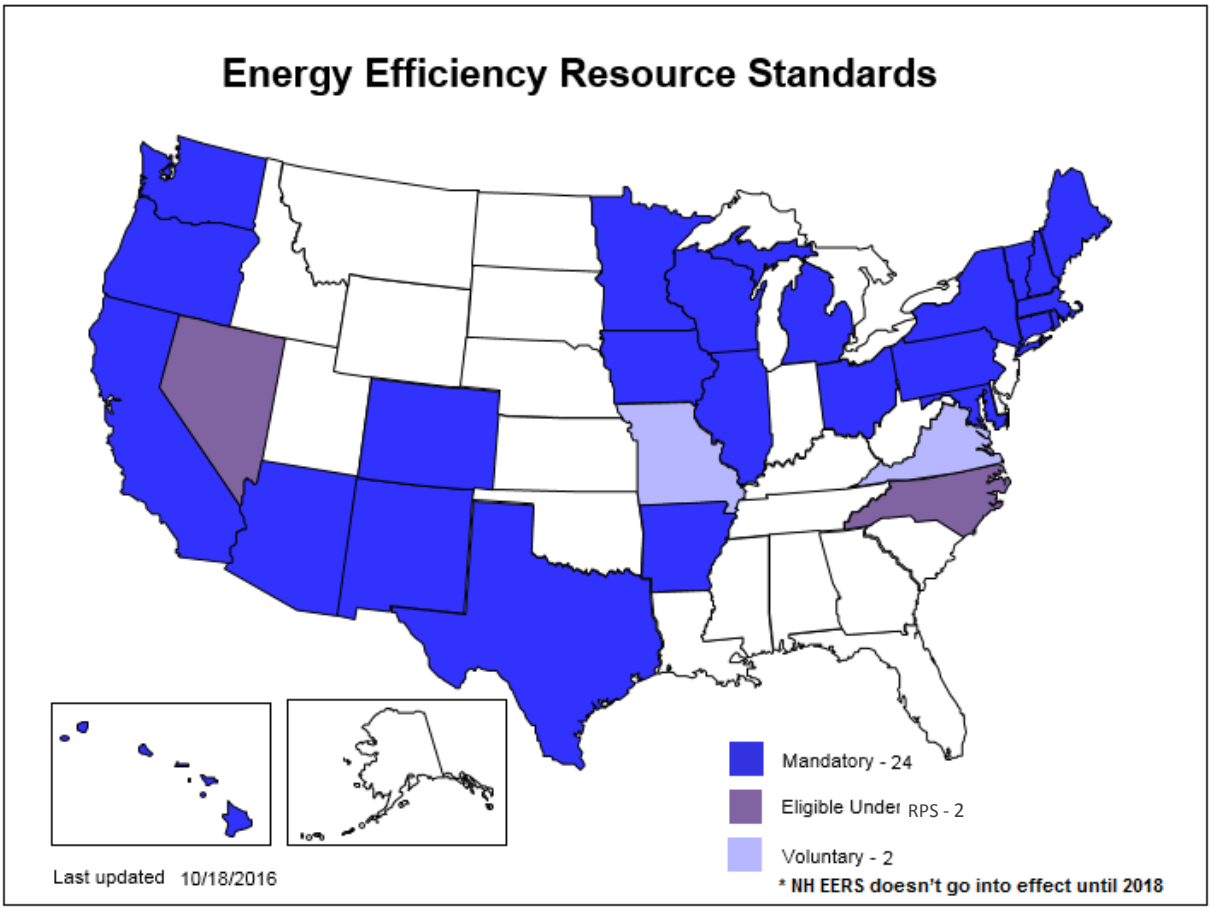
State	Direct Financial Penalties
Pennsylvania	Failure to achieve the requisite reductions in electricity consumption and peak demand during Phase 1 results in one-time fines from $1 million to $20 million. Failure to file a plan with the public utilities commission is also punishable by a fine of $100,000 per day. Costs associated with any such fines may not be passed on to ratepayers.[86]
Ohio	Failure to comply with energy efficiency or peak demand reduction requirements results in the state public utilities commission assessing a forfeiture upon the utility, to be credited to the Advanced Energy Fund. The amount of the forfeiture is either: an amount, per day per under-compliance or non-compliance, not greater than $10,000 per violation; or an amount equal to the then existing market value of one renewable energy credit (REC)[87] per megawatt hour of under-compliance or noncompliance. [88]
Illinois	For both natural gas and electric utilities, failure to submit an energy reduction plan will result in a fine of $100,000 per day until the plan is filed. This penalty is deposited in the Energy Efficiency Trust Fund and may not be recovered by ratepayers. If an electric utility fails to comply with its plan after two years, it must make a contribution to the Low-Income Home Energy Assistance Program (LIHEAP). Large utilities (those with more than 2,000,000 customers on December 31, 2005) must contribute $665,000, and medium utilities (those with between 100,000 and 2,000,000 customers) must contribute $335,000. Utilities that fail to meet their plans again after the third year must make another contribution to the fund ($665,000 for large utilities and $335,000 for medium utilities). After three years of non-compliance, the Illinois Power Agency shall assume control over energy efficiency incentive programs. For natural gas utilities that fail to meet their efficiency plans after three years, large utilities (those with more than 1,500,000 customers on December 31, 2008) must pay $600,000 into LIHEAP, medium utilities (those with 500,000-1,500,000 customers on December 31, 2008) must pay $400,000, and small utilities (those with 100,000-500,000 customers on December 31, 2008) must pay $200,000. If a utility fails to meet the standard for two consecutive three-year planning periods, the Illinois Commerce Commission will transfer responsibility of the utility's energy efficiency programs to an independent administrator. [89]

[86] "Energy Efficiency and Conservation Requirements for Utilities: Pennsylvania" (Database of State Incentives for Renewables & Efficiency, June 2015). Available at: http://programs.dsireusa.org/system/program/detail/4514.
[87] RECs represent the non-energy attributes, including all the environmental attributes, of electricity generation from renewable energy sources. RECs are typically issued in single MWh increments. See the section on Renewable Portfolio Standards for more detail.
[88] "Energy Efficiency Portfolio Standard: Ohio" (Database of State Incentives for Renewables & Efficiency, December 2014). Available at: http://programs.dsireusa.org/system/program/detail/4542.
[89] "Energy Efficiency Standard: Illinois" (Database of State Incentives for Renewables & Efficiency, February 2016). Available at: http://programs.dsireusa.org/system/program/detail/4501.

Implementation Status

As of March 2016, 24 states have an EERS program in place, while at least two have EE targets or goals that are voluntary at this time (see Figure 5). In addition, two states have renewable portfolio standard that allow the option for energy efficiency to meet requirements.[90]

Figure 5: Status of Energy Efficiency Resource Standards by State[91]



Most states are meeting or on track to meet their incremental savings goals, which typically range from an annual reduction in electricity of about 0.1–2.5 percent.[92] In 2014, incremental savings across the 50 states were equivalent to 0.69 percent of retail electricity sales.[93] In 2012,

[90] See footnotes 81 and 82.

[91] States with voluntary EERS: Virginia and Missouri. States eligible under RPS: Nevada, North Carolina. For Nevada, energy efficiency may meet a quarter of the standard through 2014, but is phased out of the RPS by 2025. For North Carolina, its Renewable Energy and Energy Efficiency Portfolio Standard requires renewable generation and/or energy savings of 6 percent by 2015, 10 percent by 2018, and 12.5 percent by 2021 and thereafter. Energy efficiency is capped at 25 percent of target, increasing to 40 percent in 2021 and thereafter. Information from: http://aceee.org/files/pdf/policy-brief/eers-04-2014.pdf.

[92] See footnotes 81 and 82.

[93] "The 2015 State Energy Efficiency Scorecard" (American Council for an Energy-Efficient Economy, October 2015; uses data from 2014). Available at: http://aceee.org/research-report/u1509.

15 of 26 states achieved 100 percent or more of their goals, six states met over 90 percent of their goals, five states achieved over 80 percent of their goals, and only one state realized savings below 80 percent of its goal.[94]

[94] Annie Downs and Celia Cui. "Energy Efficiency Resource Standards: A New Progress Report on State Experience." *American Council for an Energy Efficient Economy* (April 2014). Available at: http://aceee.org/research-report/u1403.