



American Council for an Energy-Efficient Economy

529 14th Street, N.W., Suite 600 Washington, D.C. 20045 202.507.4000 202.429.2248 [www.aceee.org](http://www.aceee.org)

## **Energy Efficiency Resource Standards: A State Model**

**Laura Furrey and Sarah Black**

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529 14<sup>th</sup> Street, N.W., Suite 600, Washington, D.C. 20045  
(202) 507-4000 phone, (202) 429-2248 fax, [www.aceee.org](http://www.aceee.org)

## **Contents**

<b>Abstract.....</b>	<b>3</b>
<b>Introduction .....</b>	<b>3</b>
<b>Model State Energy Efficiency Resource Standard .....</b>	<b>5</b>
Section 1. Definitions .....	5
Section 2. Energy Efficiency Performance Standard.....	9
Section 3. Commission Rulemaking.....	11
Section 4. Energy Efficiency Plan.....	12
Section 5. Measurement and Verification.....	14
Section 6. Reporting.....	16
Section 7. Cost Recovery.....	18
Section 8. Financial Incentives.....	19
Section 9. Buyout Option.....	20
Section 10. Penalties.....	21
Section 11. Energy Efficiency Fund.....	22
<b>References.....</b>	<b>23</b>

## Abstract

This document provides the basic provisions that should be considered for inclusion in a state energy efficiency resource standard. As “model language,” this is intended as an educational resource, providing state legislators, regulators, and other stakeholders with a starting point in drafting a state-specific energy efficiency resource standard and as an initial framework from which the negotiations process may progress, taking into consideration the regulatory environment of the individual state. Given that the energy industry is becoming increasingly more dynamic, this document will continue to change and will consistently be a “work in progress,” attempting to capture the most recent developments in energy efficiency resource standards.

## Introduction

“Energy efficiency” is a means of using less energy to provide the same or greater level of energy services to consumers. Energy efficiency is a clean, cheap and readily available source of energy, one that reduces Americans’ energy bills and green house gas emissions while creating sustainable jobs – today. Over the past several decades, states have enacted a number of policies aimed at saving energy, from establishing appliance standards and building codes to utility policies, such as an Energy Efficiency Resource Standard (EERS).

Studies show that large energy efficiency opportunities are available in all states, with gains on the order of 20%-30% achievable by 2025 (ACEEE 2008; Eldridge et al. 2008a; Elliott et al. 2007a; Elliot et al. 2007b; Geller et al. 2007; Laitner and Kushler 2007). These studies recommend a broad suite of energy policies and programs which, if implemented, could lead to cost-effective reductions in projected future use of electricity from conventional sources. These recommendations typically include adoption of an EERS, expanded demand response<sup>1</sup> initiatives, policies supporting combined heat and power (CHP), manufacturing initiatives, state and local government facilities initiatives, more stringent appliance and equipment efficiency standards and building codes, enhanced research, development and deployment strategies, consumer outreach and education, and low-income efficiency programs (Furrey et al. 2009).<sup>2</sup>

The EERS represents the core of these policies, providing a foundation upon which the other polices may be layered to achieve the greatest savings. For the purposes of this document, an EERS can be defined as a mechanism established by law that encourages more efficient use of electricity and natural gas by requiring utilities to save a certain amount of energy either on an annual basis, on a cumulative basis, or both. Utilities achieve these savings by implementing energy efficiency programs to help their customers save energy in their homes and businesses. The savings targets, generally expressed as a percentage of energy sales (the baseline) slowly increase over time, achieving greater energy savings in subsequent years.

EERS targets are generally achieved through three types of initiatives which are discussed more fully below:

- End-use efficiency measures at customer facilities.
- Distributed generation efficiency measures at end-user sites such as fuel cells, CHP, and recycled energy technologies, with credit for electricity efficiency savings relative to the regional or national average generation-plant efficiency.
- Transmission and distribution improvements that improve efficiency, such as superconducting transmission technology and high-efficiency transformers (Nadel 2006).

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<sup>1</sup> Demand response programs allow the utility to reduce participating customers’ energy use during times of peak demand.

<sup>2</sup> Implementing these types of policies and programs could, for example, lead to energy savings of 29% in Florida (Elliott et al. 2007a), 22% in Texas (Elliot et al. 2007b; Laitner, Elliott, and Eldridge 2007), 19% in Virginia (ACEEE 2008), and 29% in Maryland (Eldridge et al. 2008b).

Utilities implement and administer energy efficiency programs which help consumers reduce energy use. Programs often provide technical resources and assistance to help customers identify which energy efficiency measures will have the biggest impact, and then provide rebates or incentives to pay a portion of the cost of energy efficiency measures. Commonly, a utility will contract with private companies to provide energy services, such as auditing and installation of energy efficiency equipment and appliances.

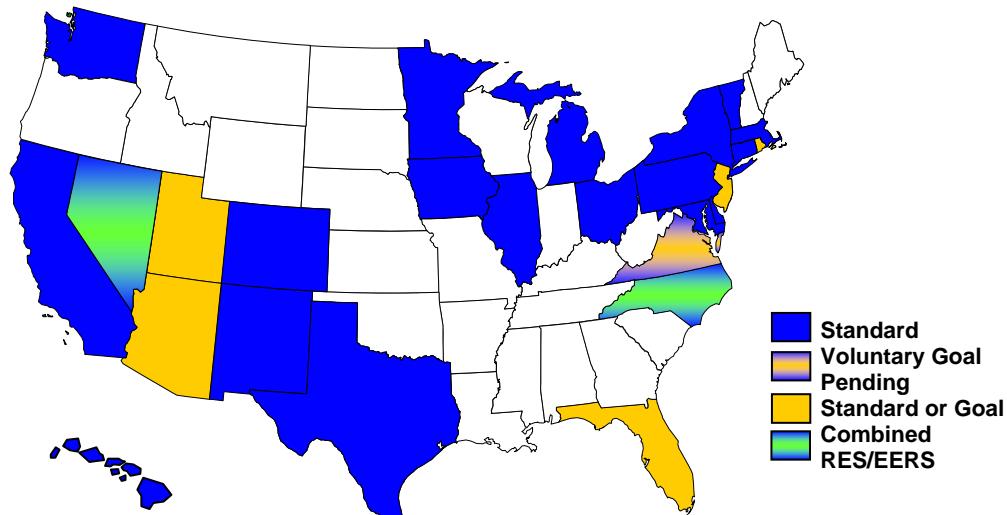
Rebates are usually offered for highly energy-efficient equipment such as air conditioners, water heaters, furnaces, and lighting and for home and commercial building retrofits, such as improving insulation to increase energy savings. For example, testing and sealing heating and air conditioning (HVAC) ducts may qualify for a rebate of up to \$400. Many high-efficiency appliances are also eligible for rebates; a high-efficiency furnace might qualify for a rebate of around \$300 while an Energy Star rated dishwasher might be eligible for a \$50 rebate. Rebate programs vary by utility but are generally an effective way of achieving residential energy savings.

Low-interest loans may also be incorporated to help end-users afford high-efficiency equipment and retrofits. Some utilities also provide incentives to distributors and suppliers for stocking high-efficiency products, and negotiate purchase price buy-downs for efficient equipment, such as CFL bulbs, with suppliers and retailers. Other programs promote efficient new buildings (encouraging energy improvements that exceed building code requirements) and industrial process improvements.

Sometimes the efficiency gains from combined heat and power (CHP) systems and other high-efficiency distributed generation systems savings may be used to meet the established savings targets. Savings from CHP systems are credited to the extent energy is saved relative to conventional power generation of power and steam. Distribution system efficiency improvements can also count toward the savings target goal. Possible improvements include improved transformers and voltage controls or new conductors and wires that lower energy losses. Savings from adoption of improved building codes and appliance standards may also be counted toward the targets if the utility played a significant role in achieving the savings (ACEEE 2009).

As of October 2009, twenty states had an EERS in place, as shown on the map below, while several others were actively considering similar policies. States such as Texas, Vermont, California, Connecticut, and Nevada, which have had an EERS in place for several years, have already realized significant energy savings. For more information about individual state programs, visit ACEEE's *State Energy Efficiency Policy Database* at [www.aceee.org/energy/state](http://www.aceee.org/energy/state). In the last year there have been several concerted efforts to establish a federal EERS, which would set a national goal for utility energy savings. In July 2009, the U.S. House of Representatives passed energy legislation which called for between 5-8% energy savings by 2020.

#### State Energy Efficiency Resource Standard Activity (November 2009)



# Model State Energy Efficiency Resource Standard

A bill to establish an energy efficiency performance standard; to establish energy efficiency programs in this state for electric and natural gas utilities; to prescribe the powers and duties of the [[state public utilities commission]] relating to energy efficiency within the state; and to provide for enforcement.

## Section 1. Definitions.

(A) As used in this act

- (1) Combined Heat and Power (CHP) System – means a system that
  - (a) uses the same energy source for the simultaneous or sequential generation of electrical power, mechanical power, or both, in combination with the generation of steam or other forms of useful thermal energy (including heating and cooling applications);
  - (b) produces at least 20 percent of its total useful energy in the form of thermal energy, and at least 15 percent of its total useful energy in the form of electrical or mechanical power (or a combination thereof);
  - (c) has a net effective heat rate of no more than 7,500 Btu/kWh, calculated on a higher heating value basis;
  - (d) is designed for continuous operation; and
  - (e) if generating electricity, provides such electricity primarily for use by a facility or group of facilities located near the point where the electricity is generated, and from which net wholesale sales of electricity are not in excess of 50 percent of total annual generation.
- (2) CHP Savings – means the displaced electricity due to the electric and mechanical output of a new or upgraded combined heat and power system, adjusted to reflect any increase in fuel consumption by the that system compared to the fuel that would have been required to produce the useful thermal energy output in a separate thermal-only system, as determined in accordance with such regulations as the Commission may promulgate.
- (3) Commission – means the [[state public utilities commission]]
- (4) Cost-effective – means that the program being evaluated meets the total resource cost test (See subparagraph (10)).
- (5) Energy Efficiency – means
  - (a) a decrease in customer consumption of electricity or natural gas achieved through measures or programs that target customer behavior, equipment, devices, or materials without reducing the quality of energy services.
- (6) Energy Efficiency Plan – means an energy efficiency plan under Section 4.
- (7) Natural Gas Utility – means any of the following:
  - (a) an investor-owned business engaged in the sale and distribution of natural gas within this state whose rates are regulated by the Commission.
  - (b) a municipally owned natural gas utility in this state.
  - (c) a cooperative natural gas utility in this state.
- (8) Peak Demand Reduction Programs means any of the following:
  - (a) Programs designed to reduce peak demand through load curtailment or direct load control
  - (b) Programs designed to shift load from on-peak to off-peak periods, including demand response programs
  - (c) Energy efficiency programs specifically designed to achieve savings during peak time periods
- (9) Retail Electric Distribution Utility – means any of the following:
  - (a) any person or entity that is regulated by the Commission for purposes of selling electricity to retail customers in this state.
  - (b) a municipally-owned electric utility in this state.
  - (c) a cooperative electric utility in this state.

- (10) Total Resource Cost test (TRC) – means a standard that is met for an investment in energy efficiency if, on a net present value basis, the total avoided supply-side costs, including representative values for electricity or natural gas supply, transmission, distribution, and other associated costs, are greater than the total costs of administering and delivering the energy efficiency program, including installation costs, incremental measure costs, net costs for any utility or administrator incentives paid by customers, and utility capitalized costs recovered under Sections 7 and 8.
- (a) Any calculation of cost-effectiveness shall include as an avoided supply-side cost a reasonable estimate of future carbon emission costs avoided as a result of the energy efficiency investment.
- (11) Verified Electricity or Natural Gas Savings – means electricity savings or natural gas savings that meet the requirements of Section 5.

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Most definitions recommended above for inclusion in an EERS are self-explanatory. Moreover, many are often already included in other sections of state statutes or administrative code related to public utility regulation. For those that may not be self-explanatory, the explanations are provided below to clarify the intent behind including such terms.

**"Combined Heat and Power (CHP) System"**

CHP systems are an integral part of state EERS programs, representing a significant source of energy savings as well as ancillary benefits, including avoidance of transmission and distribution losses, prevention of electric grid overload and reductions in greenhouse gas emissions. Treatment of CHP systems within the EERS framework can be complex; CHP systems are designed to be site-specific and can differ in design, fuel use and basic technology depending on their application, rendering it necessary for EERS legislative language to recognize that not all CHP is created equal. Additionally, not all CHP and distributed generation should be included within an EERS. An EERS should encourage those systems that are measurably more efficient than the centralized electricity generation serving an area. This should be determined by considering the average heat rate of electricity production in a given state or region, compared to the average heat rate of the applicable electricity production of the CHP or distributed generation system.

In some cases, states have looked to set a minimum efficiency for CHP systems—e.g. 60%—and count the electric output of the system as the creditable amount for the purposes of an EERS. While this approach is easier to administer, it fails to account for the variability in CHP systems and the great differences in efficiency between systems. It also fails to compare the efficiency of the system to the efficiency of the centrally generated electricity. For these reasons, the above definition is encouraged, to ensure that the credited efficiency is truly an improvement in efficiency compared to the centrally generated electricity (Chittum et al. 2009).

**"Cost-effective"**

Generally, energy efficiency cost-effectiveness test results compare the net present value of the sum of benefits to the net present value of the sum of the costs from different perspectives. A benefit-cost ratio greater than one means the program has positive net benefits. A benefit-cost ratio of less than one means that the costs exceed the benefits.

Traditionally, five tests have been used to evaluate the cost-effectiveness of energy efficiency: the participant cost test (PCT), the utility/program administrator cost test (PACT), the ratepayer impact measure test (RIM), the total resource cost test (TRC), and the societal cost test (SCT) (EPA 2008). Each of these tests is defined below. The key questions asked and the benefits and costs compared for each of the tests is detailed in the Table 1, below.

**Total Resource Cost test (TRC):** A test that includes both the participants' and the utility's costs. The benefits for the TRC are avoided energy supply costs. Avoided credit and collection costs should also be included, as they are system costs. The costs in this test are the program costs (including equipment

costs) paid by the utility and the participants, plus the increase in supply costs for any period in which load has been increased. Sometimes includes externalities (DHHS).

**Externalities** - The consequences or impacts of resource decisions that are not directly accounted for in the price paid for the resource (DHHS).

**Societal Cost test (SCT)**: The benefit-cost test that evaluates programs from a broad societal perspective. It is identical to the Total Resource Cost test except that the benefits include beneficial externalities and the costs can include negative externalities. Benefits can include avoiding environmental or social externalities (e.g., reduced pollutant emissions) and “non-price” benefits enjoyed by participants (improved comfort, aesthetic qualities, etc.) (DHHS).

**Utility Cost or Program Administrators Cost test (PACT)**: A benefit-cost test that measures the net costs of a program based on the costs incurred by the utility (including incentive costs) and excluding any net costs incurred by the participant. The benefits for the Utility Cost test are the avoided supply costs of energy and demand. Avoided credit and collection costs should also be included, as they are system costs. The costs for the Utility Cost test are the program costs incurred by the utility, the incentives paid to the customer, and any increased supply costs (DHHS).

**Participants' Cost Test (PCT)**: A test which evaluates DSM programs from the perspective of the program's participants. The benefits include reductions in utility bills, incentives paid by the utility and any state, federal or local tax benefits received. The costs include all out-of-pocket expenses incurred as a result of participating in a program (DHHS).

**Rate Impact Measure Test (RIM)**: A test which measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by a DSM program. The benefits for the RIM are the savings from avoided supply or other system costs. The costs for the RIM are the program costs incurred by the utility, the incentives paid to the participants, decreased revenues for any period when load has been decreased and increased supply costs for any period when load has been increased (DHHS).

**Table 1: The Five Principal Cost-Effectiveness Tests Used in Energy Efficiency**

Test	Acronym	Key Question Answered	Summary Approach
Participant Cost Test	PCT	Will the participants benefit over the measure life?	Comparison of costs and benefits of the customer installing the measure.
Utility/Program Administrator Cost Test	PACT	Will utility bills increase?	Comparison of utility or program administrator costs to supply-side resource costs.
Ratepayer Impact measure Test	RIM	Will utility rates increase?	Comparison of administrator costs and utility bill reductions to supply-side resource costs.
Total Resource Cost Test	TRC	Will the total costs of energy in the utility service territory decrease?	Comparison of program administrator and customer costs to utility resource savings.
Societal Cost Test	SCT	Is the utility, state, or nation better off as a whole?	Comparison of society's costs of energy efficiency to resource savings and non-cash costs and benefits.

Source: EPA 2008.

The most common primary measurement of energy efficiency cost-effectiveness is the TRC, followed by the SCT. A positive TRC result indicates that the program will produce a net reduction in energy costs in the utility service territory over the lifetime of the program. The TRC and SCT cost tests help to answer

whether energy efficiency is cost-effective overall. The distributional tests (PCT, PACT, and RIM) are then used as secondary measurements. The PCT, PACT, and RIM help to answer whether the selection of measures and design of the program is balanced from participant, utility, and non-participant perspectives, respectively (EPA 2008).

It is important to note that there is no single best test for evaluating the cost-effectiveness of energy efficiency. Overall, multiple tests provide a comprehensive approach to evaluating cost-effectiveness of energy efficiency. However, jurisdictions seeking to increase efficiency implementation may choose to emphasize the PACT, which compares energy efficiency as a utility investment on a level equal to other resources. Historically, reliance on the RIM test has limited energy efficiency investment because it is the most restrictive of the five cost-effectiveness tests (EPA 2008).

More detailed information on cost-effectiveness tests and their implementation is available from the U.S. EPA in *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*. A Resource of the National Action Plan for Energy Efficiency. Available at <http://www.epa.gov/cleanenergy/documents/cost-effectiveness.pdf>

## **Section 2. Energy Efficiency Performance Standard.**

### **(A) Performance Standard**

- (1) For each of calendar years 2011 through 2020, retail electric and natural gas distribution utilities shall implement energy efficiency programs that achieve electric and natural gas energy savings equivalent to the following applicable percentages:

Year	Electricity Incremental Savings Target %	Electricity Cumulative Savings Target %	Natural Gas Incremental Savings Target %	Natural Gas Cumulative Savings Target %
2011	0.25	0.25	0.25	0.25
2012	0.5	0.75	0.25	0.5
2013	0.75	1.5	0.5	1.0
2014	1.0	2.5	0.5	1.5
2015	1.0	3.5	0.75	2.25
2016	1.25	4.75	0.75	3.0
2017	1.25	6.0	1.0	4.0
2018	1.5	7.5	1.0	5.0
2019	1.5	9.0	1.0	6.0
2020	1.5	10.5	1.0	7.0
2021	1.75	12.25	1.0	8.0
2022	1.75	14.0	1.0	9.0
2023	2.0	16.0	1.0	10.0
2024	2.0	18.0	1.0	11.0
2025	2.0	20.00	1.0	12.0

- (2) If a utility's incremental energy savings in any year exceed the applicable performance standard established in this section, those extra savings may be carried forward and credited to the next year's standard, subject to the following provisions:
- that the amount of those savings carried forward shall not exceed 1/3 of the next year's standard.
  - that any such savings carried forward shall not be used toward claiming any utility incentive under Sections 7 or 8.
  - however any such savings carried forward may be applied in the consideration of any penalties under Section 10.
- (3) Beginning in 2011, a retail electric distribution utility shall implement additional or expanded peak demand reduction programs that achieve incremental peak demand savings, beyond any peak demand reduction programs existing at the time of this legislation, equivalent to at least seventy-five hundredths of one percent (0.75%) of the baseline for peak demand savings. In 2020, the Commission shall make recommendations to the general assembly regarding future peak demand reduction targets.
- (B) A utility may promote new combined heat and power (CHP) installations as part of their programs to achieve the savings targets outlined in this section, provided that both of the following apply:
- New CHP installations put into operation after the effective date of this legislation can qualify;
  - Savings from upgrades to existing CHP systems can qualify, counting only those savings above what was achieved with the prior system and that save energy relative to the supply-side alternative; and
  - Total claimed savings from such CHP installations can account for no more than twenty percent of the utility's annual savings requirements
- (C) For the purposes of subsections (A)(1), (2), (3) and (4) of this section

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- (1) The baseline for energy savings under subsections (A)(1) and (3) of this section shall be the average of the total kilowatt-hours the retail electric distribution utility delivered in the preceding two calendar years to customers in this state.
  - (2) The baseline for energy savings under subsections (A)(2) and (3) of this section shall be the average of the total cubic feet of natural gas delivered by the natural gas utility in the preceding two calendar years to customers in this state.
  - (3) The baseline for peak demand reduction under subsection (A)(4) of this section shall be the average of the annual peak demand of the retail electric distribution utility in the preceding two calendar years.
- 

The savings targets proposed in this section build on various studies that demonstrate significant available cost-effective savings at the state level and on actual savings targets being achieved in states with experience implementing an EERS as discussed in the introduction.

Annual savings targets are provided to demonstrate the level of savings that must be achieved each year. It is useful to set annual savings targets so that utilities have short-term goals and so that progress can be monitored on an annual basis. Cumulative targets are also provided to demonstrate the overall, long-term level of savings achievable with an EERS. As experience is gained, reaching the higher savings targets can be realized as utilities eliminate programs that are not performing as anticipated and build upon initial programs that are successfully achieving savings by expanding into additional sectors. Most utilities will be able to accrue extra savings in the early years, reducing the new savings needed in the later years.

The model EERS uses the average energy sales in the preceding two years as a baseline because the prior years' sales are known with certainty at the beginning of the target year. Moreover, using the average of two years also works to smooth out yearly variations in sales due to population changes, economic variations, significant weather events, and other causes of fluctuations in energy use.

Although an energy efficiency potential study is not necessary, it may be helpful as a starting point for setting energy efficiency targets. In states that haven't established energy efficiency programs, there is a lot of room for improvement and so the level of achievable efficiency may be fairly high. A potential study conducted by individual utilities, the Commission, or an independent third-party, may help establish reasonable and achievable annual savings targets.

While CHP savings may contribute to the savings required to meet the performance standard in Section 2, the intent of an EERS is to encourage utility-run energy efficiency programs for all of a utility's customer classes. It is therefore necessary to place a limit on the amount of CHP that is eligible to count as energy savings under the standard to prevent a utility from focusing on one source of energy savings, especially in service territories that have substantial potential for CHP applications. Given that CHP can be a significant benefit to the community, especially when used in the manufacturing and institutional settings, in those areas with greater-than-average potential for CHP savings the Commission should consider increasing the percentage of savings allowed from CHP systems.

**Section 3. Commission Rulemaking.**

- (A) Within 90 days after the effective date of this act, the Commission shall promulgate rules specifying the procedure for a retail electric distribution utility or a natural gas utility to develop and submit an energy efficiency plan as described in Section 4 to meet the energy efficiency performance standard set forth in Section 2.
- 

An EERS will generally be administered by the state utility Commission, as the Commission generally has jurisdiction over all investor-owned utilities in its state, and in some states (albeit a minority of states) it also has jurisdiction over public utilities such as municipal power systems and rural cooperatives. The Commission generally has most of the information it needs to administer an EERS program, such as annual electricity sales and utility efficiency program energy savings. The Commission should conduct a rulemaking to work out the details of administering a program (Nadel 2006). The rules would then provide clear guidance so that utilities know exactly what information the Commission needs in an energy efficiency plan in order to make decisions regarding which programs should or should not be administered.

#### **Section 4. Energy Efficiency Plan.**

- (A) An energy efficiency plan shall do all of the following:
- (1) Propose a set of energy efficiency programs, including peak demand reduction programs, that include offerings for each customer class, including low-income residential. The Commission shall allow providers flexibility to tailor the relative amount of effort devoted to each customer class based on the specific characteristics of their service territory.
  - (2) Specify necessary funding levels for proposed energy efficiency programs.
  - (3) Describe how energy efficiency costs will be recovered, as provided in Section 7.
  - (4) Seek, to the extent feasible and reasonable, that charges collected from a particular customer rate class are spent on energy efficiency programs for that rate class.
  - (5) Demonstrate that the proposed energy efficiency programs and funding are sufficient to ensure the achievement of applicable energy efficiency performance standards under Section 2.
  - (6) Demonstrate that the utility's energy efficiency programs will collectively be cost-effective, using the Total Resource Cost Test provided in Section 1.
  - (7) Provide for the practical and effective administration of the proposed energy efficiency programs. The Commission shall allow utilities flexibility in designing their energy efficiency programs and administrative approach. A utility's energy efficiency programs or any part thereof, may be administered, at the utility's option, by the utility, alone or jointly with other utilities, by a state agency, or by an appropriate, experienced organization selected after a competitive bid process.
  - (8) Include a process for measurement and verification of incremental energy savings from each energy efficiency program pursuant to Section 5. All such evaluations shall be subject to public review and Commission oversight.
  - (9) Allow for the coordination of energy efficiency programs with the energy efficiency programs of other utilities under the direction of the Commission pursuant to subsection (E).
- (B) An energy efficiency plan may provide for the utility to facilitate third-party loans to customers to finance energy efficiency measures.
- (C) Within 90 days after the effective date of this act and biennially thereafter, a retail electric distribution or natural gas utility shall file an energy efficiency plan with the Commission.
- (D) Within 90 days of receiving an energy efficiency plan from a utility and after an opportunity for public comment, the Commission shall approve, approve with changes consented to by the utility, or reject the plan.
- (1) If the Commission rejects the plan the Commission shall state the reasons for its action.
  - (2) Within 30 days after the Commission rejects a plan, the utility shall submit a revised plan that addresses the reasons for rejection cited by the Commission.
  - (3) Within 30 days after receiving a revised plan and after an opportunity for public comment, the Commission shall approve, approve with changes consented to by the utility, or reject the revised plan. If the Commission rejects the revised plan, the Commission shall state the reasons for the rejection.
  - (4) Any delay caused by the failure of a utility to file an acceptable revised plan under sub-paragraph (2) shall not be used as a reason to avoid penalties under Section 10.
  - (5) The procedure for rejected plans shall be repeated until a revised plan is approved or approved with changes consented to by the utility. The Commission's action under this subsection does not affect the applicability of the requirements of Section 2 or Section 10.
- (E) The Commission may coordinate energy efficiency programs among consenting utilities where feasible, if doing so would help to maximize energy savings on a statewide basis. However, money spent by a utility to comply with this act shall only be used to fund energy efficiency programs that provide services in that utility's service territory.

Submitting an energy efficiency plan to the Commission helps ensure that the public has the opportunity to participate in the program planning process and ensure that programs produce actual benefits. It is important for utilities to provide the Commission with program spending and savings data on a programmatic basis so that the Commission, upon review, has a baseline level of information for comparison purposes.

As part of any energy efficiency plan portfolio, it is essential that programs targeted toward low-income customers are included as energy costs tend to be a disproportionately large percentage of these customers' incomes. Moreover, studies have shown that these programs successfully reduce energy use and costs for low- and limited-income households while at the same time improving the quality of life for low-income citizens, and upgrading the buildings they occupy. Beyond these very real and direct benefits associated with improved energy efficiency, these programs yield numerous other benefits to household occupants, the community and utility services providers. Low-income energy efficiency programs can be done under a variety of structures and they can span a wide scope in terms of the size of the program and the types of services provided, from audit programs offered by small cooperative utilities to statewide programs with multiple program partners offering comprehensive energy services (York et al. 2005).

Because of their particular focus on the special needs of disadvantaged households, low-income energy efficiency programs are generally not held to the same cost-effectiveness criteria as utility energy efficiency "resource" programs (i.e., they are not judged with a strict TRC test). Although specific low-income programs may not individually be cost-effective, the entire portfolio of programs proposed by the utility should, as a whole, be cost-effective. As such, more typically, the focus is on the magnitude of utility bill savings to participating customers, rather than the utility system avoided production costs. Also, low-income programs often include broader "non-energy benefits" such as lowered credit and collection costs and avoided bad debt for the utility, and improved health and safety for customers (York et al. 2005).

## **Section 5. Measurement and Verification.**

- (A) Within 180 days after the effective date of this act, the Commission shall promulgate rules regarding measurement and verification of electricity and natural gas savings under this section, including —
- (1) Procedures and standards for defining and measuring eligible electricity savings and natural gas savings which shall —
    - (a) specify the types of eligible energy efficiency and energy conservation measures;
    - (b) require that energy consumption estimates for customer facilities or portions of facilities in the applicable base and post-participation time periods used for estimating savings be adjusted, as appropriate, to account for changes in weather, level of production, and building area;
    - (c) account for the useful life of electricity and natural gas saving measures;
    - (d) allow for the use of deemed savings values, where justified, for specific, commonly-used efficiency measures;
    - (e) allow for savings from a program to be estimated based on a statistical sample of participating customers and extrapolated to all participating customers; and
    - (f) exclude savings that —
      - (i) are not properly attributable to measures carried out by the entity seeking the credit for such savings (or a designated agent of the entity); or
      - (ii) have already been credited under this section to another entity or to the same entity; and
  - (2) Procedures and standards for third-party verification of reported electricity savings or natural gas savings.
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Monitoring and verification is an important part of an EERS program. Monitoring and verification help ensure that savings targets are met and provide information on program accomplishments. They also provide the necessary credibility, transparency, and consistency needed to use energy efficiency as a resource to help meet economic, environmental, and energy system goals (Nadel 2006).

Evaluation, measurement and verification procedures are typically determined by the state utilities Commission. Estimated savings should be adjusted for changes in weather, production levels and changes in building floor area to ensure that savings are attributable to energy efficiency measures. For CHP savings, for example, the energy usage can be read from a meter on the system. Based on data from the power pool, a formula can be used to determine the annual energy savings relative to buying power from the local utility. For programs aimed at commercial and residential customers, savings can be estimated by taking a sampling of participants, determining the energy savings that are attributed to a certain program through billing analysis, extrapolating those estimated savings to all participants and then comparing the energy use of participants versus non-participants (which provide the business-as-usual baseline). Savings should be documented on a program-by-program basis. Energy savings are reported to the state utilities Commission, which reviews the reported savings and makes revisions if deemed necessary (ACEEE 2009).

In Texas, for example, utilities pay incentives to commercial and industrial project sponsors for certain measures installed in new or retrofit applications. Typical projects include chillers, lighting, and industrial process retrofits. For residential and small commercial programs they provide incentives for installation of a wide range of measures that reduce system peak demand, energy consumption and energy costs. In Texas, utilities pay incentives to Energy Efficiency Service Providers and customers with incentives based on deemed energy savings when available. Deemed savings estimates are predetermined, validated estimates of energy and peak demand savings attributable to specific common energy efficiency measures. These estimates are periodically updated. Otherwise, the Energy Efficiency Service Providers and utilities must follow the measurement and verification protocol adopted by the Public Utilities Commission of Texas. In this case, the incentives are based upon verified peak demand or energy

savings using the International Performance Measurement and Verification Protocol. The Commission hires an independent evaluation expert to help with review of program evaluation reports (ACEEE 2009).

## **Section 6. Reporting.**

- (A) By a time determined by the Commission, each utility shall submit to the Commission an annual report that provides information relating to the actions taken by the utility to comply with the energy efficiency performance standards under Section 2. By that same time, a municipally-owned utility shall submit a copy of the report to the governing body of the municipally-owned utility, and a cooperative utility shall submit a copy of the report to its board of directors.
- (B) An annual report under subsection (A) shall include all of the following information:
  - (1) The estimated annual electricity or natural gas savings achieved by the utility through energy efficiency programs provided during the reporting period.
  - (2) An estimate of the annual and life-cycle carbon dioxide emissions avoided by the energy efficiency programs operated during this reporting period.
  - (3) The estimated incremental peak reduction achieved through peak demand reduction programs during this reporting period.
  - (4) Expenditures made on energy efficiency and peak demand reduction programs during the reporting period and anticipated future expenditures to comply with this subsection.
  - (5) The cost-effectiveness of implemented programs.
  - (6) Any other information that the Commission determines necessary.
- (C) Concurrent with the submission of each report under subsection (A), a municipally-owned utility shall submit a summary of the report to its customers in their bills with a bill insert and to its governing body.
- (D) Concurrent with the submission of each report under subsection (A), a cooperative utility shall submit a summary of the report to its members in a periodical issued by an association of rural electric cooperatives and to its board of directors.
- (E) A municipally-owned utility or cooperative utility shall make a copy of the report available at its office and shall post a copy of the report on its website. A summary under this section shall indicate that a copy of the report is available at the office or website.
- (F) The Commission shall monitor reports submitted under subsection (A) and ensure that actions taken under this act by utilities serving customers in the same distribution territory do not create an unfair competitive advantage for any of those utilities.
- (G) In accordance with rules it shall adopt, the Commission shall produce and make publicly available an annual report containing the results of its verification of the annual levels of energy efficiency and of peak demand reductions achieved by each utility pursuant to subsection (A) of this section. A copy of the report shall be provided to the consumers' counsel and be made available on the Commission's website.
- (H) Five years after the effective date of this legislation, and every five years thereafter, the Commission shall produce a report that includes all of the following information:
  - (1) A summary of data collected under this section, including the required annual reports.
  - (2) The status of energy efficiency in this state.
  - (3) For the total portfolio of energy efficiency programs, a comparison of the cost of the energy efficiency and the cost of electricity from a new conventional coal-fired electric generating facility and a new combined-cycle natural gas generating facility .
  - (4) A discussion regarding how the Commission is fulfilling the requirements of subsection (F).
  - (5) An evaluation of whether this Act has been cost-effective.
  - (6) A description of the impact of this Act on employment in this state. The Commission shall consult with other appropriate agencies of the department of labor and economic growth in the development of this information.
  - (7) Any recommendations the Commission may have concerning amendments to this subpart, including changes in the performance standard percentage limits under Section 2.

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Energy savings and program spending should be documented on a program-by-program basis. This information should be reported to the state utilities Commission, which reviews the reported savings and

makes revisions if deemed necessary. It may also be useful to have an independent, third-party verification of the savings to ensure transparency and accuracy in the reporting. Such a verification process would be similar to an auditor reviewing the utility for tax purposes; however this review would evaluate energy savings.

Reporting allows the Commission to determine whether savings targets are met. If the Commission does not know whether a utility has met the required energy savings, it will not be able to assess performance incentives, if available, or penalties, if applicable. Reporting on a programmatic basis also allows the utility and the Commission to evaluate the performance of specific energy efficiency programs. The portfolio of programs can then be altered to eliminate programs that are not achieving the anticipated results and to expand funding for those programs that are operating successfully.

## **Section 7. Cost Recovery.**

- (A) The Commission shall allow a utility that undertakes approved energy efficiency programs to recover the actual costs of implementing the programs. Costs exceeding the overall funding levels specified in the energy efficiency plan may be recovered as long as those costs are prudent and reasonable.
- (1) Costs shall be recovered from all classes of customers by volumetric charges applied to utility bills.
  - (2) Upon petition by a utility and after an opportunity for public comment and hearing, the Commission may authorize the utility to capitalize certain costs of implementing approved energy efficiency programs.
  - (3) To the extent feasible, charges collected from a particular customer rate class shall be devoted to energy efficiency programs and services for that rate class. However, the established funding level for low-income residential programs shall be provided from each customer rate class in proportion to that customer rate class's funding of the utility's total energy efficiency programs.
  - (4) Charges shall be applied to distribution customers regardless of the source of their electricity or natural gas supply.
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One of the most problematic barriers to overcome when considering the implementation of utility energy efficiency or demand-side management (DSM) programs is that of financial risk. States have found several regulatory mechanisms to encourage development of utility DSM programs, including provisions to recover costs and create financial incentives (Section 8).

Cost Recovery is a process whereby a utility is able to recover, through rates, the costs of implementing DSM programs. These costs can include staff costs, expenses, consultants, and rebates. Costs can either be "expensed" in the year they were spent or "capitalized" over a period of time. All utilities with DSM programs receive cost-recovery of some type. Typically costs can be recovered as long as they are "just and reasonable" (Kushler et al. 2006, Nadel 2006).

The mechanism by which a utility recovers the cost of energy efficiency programs generally differs from state to state. Utilities usually recover program costs in one of three ways: though rates, tariff riders, or system benefits charges or a combination of mechanisms (e.g., combining a public benefits charge with the ability to recover program costs in rates) (Kushler et al. 2006).

ACEEE research has found that program cost recovery is a minimum threshold for utility-sector customer energy efficiency programs to be funded and delivered. Utilities or other program administrators cannot be expected to operate "serious" programs without adequate funding and assurance that program costs can be recovered, whether via rates, tariff riders, or system benefits charges, thus this is an integral element for any state developing an EERS (Kushler et al. 2006).

## **Section 8. Financial Incentives.**

- (A) Within 90 days after approval of initial plans, the Commission shall promulgate rules regarding the ability of a utility to earn a financial incentive, on an annual basis, for exceeding the energy efficiency performance standard under Section 2.
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Financial incentives are bottom-line profits for program administrators based on performance, meaning that administrators reach or exceed the savings targets established by an EERS. Although the specific details regarding incentive levels and mechanisms are not specified in this model language, performance incentives have been widely adopted across the country—twenty-one states currently have a performance incentive mechanism, and another nine states are considering establishing incentives. In the last two years, Colorado, Kentucky, Michigan, Ohio, Oklahoma, North Carolina, Texas, South Carolina, Washington and Wisconsin have put new performance incentives in place (IEE 2009). More information on specific state-level financial incentive mechanisms can be found in ACEEE's *State Energy Efficiency Policy Database* ([www.aceee.org/energy/state](http://www.aceee.org/energy/state)).

Performance incentives are particularly important as a tool enabling utilities to overcome financial concerns related to the cost of providing energy efficiency programs. Briefly, the three major hurdles are assuring cost recovery for the programs' direct costs, addressing the "lost revenue" disincentives of reduced customer energy use due to energy efficiency measures, and providing their shareholders with a reward for good performance in providing customers with energy efficiency programs and services (Kushler et al. 2006).

There are a variety of approaches that have been used to provide financial incentives that reward utilities for successfully reaching or exceeding program goals. These include:

- allowing utilities to earn a rate of return on energy efficiency investments equal to supply-side and other capital investments,
- providing utilities an increased rate of return either on the energy efficiency investment specifically or overall utility investments,
- providing utilities with a specific financial reward for meeting certain targets, and
- providing utilities with an incentive equal to some proportion of the overall net benefits the programs produce (i.e., "shared savings").

In some states, positive financial incentives are balanced with negative financial penalties for poor performance or refusal to implement programs. See Section 10 for more information.

As utilities and related organizations seek to increase the savings and associated benefits from energy efficiency programs, it is advantageous to address disincentives from energy efficiency improvements, as well as consider positive incentives for reaching or exceeding established targets for such programs (Kushler et al. 2006).

As an example, in Texas a utility that exceeds 100% of its goal receives a bonus of 1% of the net benefits for every 2% that the goal has been exceeded, with a maximum of 20% of the utility's program costs. Additionally, a utility that meets at least 120% of its goal with at least 10% of its savings achieved through Hard-to-Reach programs (which benefit customers with an annual household income at or below 200% of the federal poverty guidelines) can receive an additional bonus equal to 10% of the regular performance bonus (PUCT Substantive Rules).

**Section 9. Buyout Option.**

- (A) In lieu of achieving actual savings to comply with the applicable performance standard under Section 2, a retail electric distribution or natural gas utility may pay each year to the [[energy efficiency fund]] created [[in Section 11]] by not later than a time determined by the Commission a buyout fee in an amount equal to, as adjusted for inflation in accordance with such regulations as the Commission may promulgate:
    - (1) \$0.08 per kWh otherwise required to be procured that year through energy efficiency measures by the retail electric distribution utility; or
    - (2) \$0.80 per therm otherwise required to be procured that year through energy efficiency measures by the natural gas utility.
  - (B) Utility costs under this section shall be recoverable under the method identified in Section 7(A)(1).
  - (C) If a utility chooses to exercise its option under paragraph (A) it shall be ineligible for any financial incentives such as those created under Sections 7 or 8.
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Although a buyout option is not a common feature of existing state EERSes ACEEE recommends including it as a means of giving market players the flexibility of having a fall-back plan. Should a utility be incapable or unwilling to implement the necessary energy efficiency programs to achieve the performance standard, they can instead pay a predetermined amount per kWh or therm into an energy efficiency fund administered by the state. The energy efficiency fund will support in-state energy efficiency programs in lieu of programs administered by the utility. See Section 11 for more information. It is important to note that the cost of the buyout option must be greater than the actual cost of energy efficiency, as an incentive to implement programs rather than choosing this approach.

## **Section 10. Penalties.**

- (A) If the Commission determines, after notice and opportunity for hearing, that a retail electric distribution or natural gas utility has failed to comply with an energy efficiency or peak demand reduction requirement of Section 2, the Commission shall assess against the utility a civil penalty for each such failure in an amount equal to:
    - (1) \$0.10 per kWh of undercompliance or noncompliance by the retail electric distribution utility; or
    - (2) \$1.00 per therm undercompliance or noncompliance by the natural gas utility.
    - (3) \$100 per kW of undercompliance with the peak reduction requirement
  - (B) The costs of any civil penalty assessed under this subsection shall in no circumstance be recoverable by the utility from utility customers through rates, surcharges, or under any other cost recovery mechanism, including those created pursuant to Section 7.
  - (C) Revenue from any civil penalty assessed under this subsection shall be deposited to the credit of the *[[energy efficiency fund]]* created *[[in Section 11]]* for the sole purpose of reinvestment in energy efficiency programs.
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ACEEE recommends that penalties be set higher than alternative compliance payments, such as the buyout option (previous section), to encourage utilities to proactively use energy efficiency programs or the alternative compliance payment and minimize penalty situations (Furrey et al. 2009).

The use of defined penalties for non-performance is not a common practice at the state level. Rather, the “penalties” seem to take the form of the potential to not earn eligible incentive amounts (Kushler et al. 2006). The use of actual penalties for noncompliance, however, acts as an enforcement mechanism, forcing utilities to either save energy (for which they can recover the cost) or to have their shareholders pay for it. This also provides some assurance that energy savings will be achieved as penalty funds are to be used for energy efficiency programs run through the state energy office or other associated agency.

Ohio uses a “forfeiture” mechanism to ensure compliance in meeting energy savings targets. For more information on Ohio’s model, see ORC §4928.66(C), available at <http://codes.ohio.gov/orc/4928.66>.

**Section 11. Energy Efficiency Fund.**

- (A) There is hereby established in the state treasury the [state] Energy Efficiency Fund, into which shall be deposited all energy efficiency revenues remitted under division (B) of this section. Revenues deposited into this fund shall be for the exclusive purposes of funding state energy efficiency programs created under [[relevant state code/act]] and paying the programs' administrative costs. Money unspent in a year shall be carried forward to be spent in the subsequent year. Interest on the fund shall be credited to the fund.
  - (B) Energy efficiency revenues shall include all of the following:
    - (1) Revenues from payments, repayments, and collections under the state energy efficiency program and from program income;
    - (2) Revenues from buyout payments under Section 9;
    - (3) Revenue from civil penalties assessed under Section 10;
    - (4) Interest earnings on the energy efficiency fund.
  - (C) The Commission shall select a qualified organization or agency to serve as administrator of the Energy Efficiency Fund.
  - (D) The Commission shall arrange for a biennial independent audit of the Energy Efficiency Fund and administration thereof.
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If a buyout option and/or penalties are utilized, it is important to create a repository for the funds that will accrue from such payments. It is also helpful to explicitly state that monies in the Energy Efficiency Fund are for the sole purpose of funding energy efficiency programs to avoid such funds going to the general state treasury.

The funds may be administered by any organization or relevant agency. If administered by a third-party organization, fund administration should be awarded through a competitive bidding process to provide transparency. A relevant agency, such as the state energy office, may also be an appropriate fund administrator as many state energy offices have practical experience operating energy efficiency programs.

A biennial independent audit of the fund is another method for providing transparency and ensuring proper fund management.

An energy optimization administrator to properly allocate funds which accrue from alternative compliance payments was created through energy efficiency legislation in Michigan and may be a useful example. For more information, see Michigan Senate Bill No. 213, Act No. 295, Public Acts of 2008, effective October 6, 2008.

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