Eight Approaches to Enable Greater Energy Efficiency: A Guide for State Government Officials

Prepared by

The National Council on Electricity Policy

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NATIONAL COUNCIL ON ELECTRICITY POLICY MEMBER ORGANIZATIONS

The National Council on Electricity Policy (National Council) is a unique venture between the National Association of Regulatory Utility Commissioners (NARUC), the National Association of State Energy Officials (NASEO), the National Conference of State Legislatures (NCSL), National Association of Clean Air Agencies (NACAA) and the National Governors Association Center for Best Practices (NGA). The National Council also includes participation by the Federal Energy Regulatory Commission (FERC), U.S. Department of Energy (DOE), and the U.S. Environment Protection Agency (EPA). Established in 1994, the National Council enables better coordination between federal and state entities responsible for electricity policy and programs. Our members understand that improved intrastate, regional and federal coordination can result in more informed electricity policy decisions.

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Introduction

In recent years, energy efficiency and conservation have taken on a new importance. As our nation struggles with satisfying new energy demand with less-carbon intensive approaches, state regulators, utilities, legislators and others now agree that efficiency often provides the fastest and least expensive way to meet energy needs of states. The benefits of energy efficiency are many: well designed energy efficiency programs can delay the need for new power plants, gas wells, and oil rigs and expanded transmission and distribution capacities; energy efficiency programs can be designed to meet the unique energy profiles of each state; and energy efficiency and conservation programs can often be a cost-effective near-term solution for energy and environmental challenges.

Yet despite their benefits, efficiency and conservation face barriers. Investments in efficiency cost more up-front than investments in equivalent, less-efficient technologies (e.g., efficient lights are more costly than inefficient lights, well-insulated homes cost more to build than those with less insulation, higher efficiency furnaces and air conditioners cost more than the least efficient models). Although homeowners, business owners or government will usually recoup these higher costs through energy savings over the course of a few years, they might need special financing, regulations that are friendly to efficiency, or other government intervention to make the measures cost-effective in the short term.

The purpose of this Energy Efficiency Guide is to provide state officials with a broad framework to encourage energy efficiency and conservation.[1] This document is a practical resource for any state official with an interest in this topic, but it may be most useful to those who are new to efficiency and conservation. Consequently, this guide is not meant to be comprehensive; state officials will need to craft and tailor these approaches to match their own needs and recognize that additional approaches to energy efficiency exist beyond those that are included in this document.

The National Council on Electricity Policy has developed *Basic Approaches to Enable Greater Energy Efficiency: A Guide for State Government Officials (Energy Efficiency Guide)* to complement its mission to assist the four arms of state government most involved in electricity policy development and implementation: governors, legislators, energy office officials, and utility regulators. The National Council provides informational materials, such as this guide, to enable effective, innovative and more informed energy policy decisions.[2] This document is also a resource for state environmental regulators to better understand the importance of integrating air policies with state energy policies.

[1] This Guide refers to both energy efficiency, which is typically the use of technology to reduce energy use, as well as energy conservation, which usually refers to behavioral changes that reduce energy consumption.

[2] Many of these measures are discussed in the National Action Plan for Energy Efficiency (www.epa.gov/solar/documents/napee/napee_report.pdf), the U.S. EPA's State and Local Climate Change Division (www.epa.gov/climatechange/wycd/stateandlocalgov/index.html), the U.S. Department of Energy; Energy Efficiency and Renewable Energy (www.eere.energy.gov).

The *Energy Efficiency Guide's* 8 Basic Approaches to Enable Energy Efficiency:

1. Make early decisions about your efficiency effort.
2. Create financial and/or tax incentives for energy efficiency.
3. Strengthen and enforce building codes to encourage energy efficiency.
4. Lead by example: mandate state facility efficiency.
5. Consider energy efficiency resource standards.
6. Develop rate structures that encourage energy efficiency.
7. Monitor and verify efficiency program results.
8. Examine innovative approaches to encourage energy efficiency.

For every energy efficiency practice outlined in this document, the following are explained:

- What, why and how a particular approach enables efficiency
- How sample states have structured their approaches to energy efficiency
- Implementation challenges and opportunities
- Roles of each arm of state government in addressing energy efficiency

Energy efficiency is often called the "fifth fuel" or even the "first fuel" by some States and stakeholder groups. Improving grid reliability, reducing greenhouse gas emissions, and saving consumers money also makes the case for greater investment in the types of energy efficiency measures discussed in the following pages.

1. Make Early Decisions about Your Efficiency Effort

If your state is unfamiliar with how to get started with energy efficiency, here are a few early steps to explore before taking action:

- Take advantage of a wealth of existing resources,
- Determine the proper vehicles for implementing efficiency,
- Determine how to adequately and sustainably fund the effort, and
- Set goals for targeted, short-term wins (i.e. highlighting projects with quicker payback periods) and for enduring approaches.

The outcomes of these decisions will affect the subsequent mechanisms your state may explore, and the steps taken to implement them.

Take advantage of existing resources

Efficiency has been gaining traction for years as supply choices become more difficult and the obstacles to more widespread end-use efficiency become more easily overcome. The passage of the American Recovery and Reinvestment Act of 2009 is intended to inject billions of dollars in spending on efficiency and much of this has been routed through state agencies. Moreover, the likelihood that national climate legislation will be enacted soon highlights the importance of state engagement in understanding the options available. If you are new to efficiency, this first section highlights a few key areas to help you get engaged.

Much of the best information available has been assembled through the National Action Plan on Energy Efficiency, an effort started in 2005 that has brought together utilities, regulators, Governors, energy offices, customers, and other stakeholders to increase attention to, remove barriers to, and increase investment in cost-effective energy efficiency. Participants have developed a number of resources that can help, including guides to:

- Energy efficiency basics
- Aligning incentives with demand-side resources
- Resource planning with efficiency
- Efficiency program evaluation
- Testing programs for cost-effectiveness

These and other resources are available online at http://www.epa.gov/eeactionplan.

The National Council on Electricity Policy has also created tools and resources that can help, including guides to financing energy efficiency programs and to state programs that support energy efficiency, such as the 2006 *State and Regional Policies That Promote*

Energy Efficiency Programs Carried out by Electric and Gas Utilities [3]. These are available at http://www.ncouncil.org/resources.cfm.

Picking vehicles for implementing your efficiency program

When deciding to move efficiency forward, a key question to resolve at the earliest stages is who will implement the programs. Several entities could play this role, though three models have emerged among states that have sophisticated efficiency programs:

1. The electric or gas utility company or heating oil companies can be the implementing entity.
2. A government agency, such as a state energy office, can be the implementing entity.
3. A non-governmental or quasi-governmental provider, such as an energy services company (also called an "ESCo") or the efficiency utility operated in Vermont, can be the implementing agency.

Arguments exist for each approach. Some favor utility implementation of energy efficiency, because as the company that provides electric power to your home it may have unique abilities to identify and implement efficiency opportunities on a broad basis. Others argue that utilities may be reluctant to promote efficiency when their business is selling electricity. They suggest that the State is better positioned to provide efficiency through a State entity such as an Energy Office. Finally, some argue that a quasi-private provider leverages the sales-neutrality of the State while harnessing competitive forces to encourage robust implementation. In many states a combination of two or three of these approaches is used, with utility efforts complemented with State and non-utility programs.

Determine how to fund your effort sustainably

Several areas have been explored for financing energy efficiency in the National Council's 2007 document on financing energy efficiency[4]. The major types of energy efficiency financing it describes - performance contracting, tax-exempt lease purchase agreements, utility demand side management, tax incentives, system benefit funds, capital bonding, loans, grants and Pay As You Save (PAYS) - have been authorized in a variety of states and have unique characteristics.

One key to success in financing energy efficiency is sustained and sufficient funding for programs. Without this, programs are less likely to be successful over time.

[3] This resource, also called the "Section 139 Study", is also available online at http://www.oe.energy.gov/DocumentsandMedia/DOE_EPAct_Sec._139_Rpt_to_CongressFINAL_PUBLIC_RELEASE_VERSION.pdf

[4] This document is the second in a series on financing electricity resources and focuses on programs for States to finance energy efficiency, available online at http://www.ncouncil.org/Documents/FINAL.EE.Financing.pdf.

Choose short- and long-term goals and objectives

Before selecting efficiency programs to get started with, it may be important to set goals and objectives for the program. Which areas will receive priority? Programs that lead to a comprehensive and enduring approach, such as new construction codes and standards? Or targeted programs that achieve early wins and build excitement from a quick return on immediate action, such as commercial lighting retrofits?

How each branch of state government can make early decisions about efficiency programs			
Governors	*Legislators*	*Utility Commissions*	*State Energy Offices*
1. Convene key stakeholders in planning a comprehensive efficiency effort. 2. Propose and support energy office and commission efforts on efficiency. 2. Prioritize policy objectives and broad time-frames for meeting goals.	1. Similar to #1 for Governors. 2. Consider enabling and funding mechanisms that provide enduring support to efficiency programs. 3. Review successful programs in other states that are similar to program/incentive being considered.	1. Engage utilities and other potential efficiency providers through a notice of inquiry. 2. Encourage efficiency in utility resource planning.	1. Administer weatherization and demand-side resources plans; connect these with synergies in utility-provided programs and those provided by others.

2. Create Financial Incentives for Energy Efficiency

Financial incentives for energy efficiency come in the form of tax incentives, grants and rebates, and loan programs. These incentives are among the most common ways that states promote energy efficiency. Currently, 22 states have a tax incentive to promote energy efficiency.[5] In all but 7 states and the District of Columbia, the State and/or the utilities offer a loan program of some kind. Finally, either the state or the utilities in every state except Arkansas, South Carolina, and West Virginia offer a rebate or grant program to encourage energy efficiency.[6] The variety among these programs is tremendous. Examples of several types of energy efficiency financial incentives, taken from the Database of State Incentives for Renewables & Efficiency (DSIRE), are highlighted in Table 1.[7]

Table 1: A Sample of State Energy Efficiency Incentives

State	Incentive Description
Tennessee	Offers a 0% interest business loan in designated communities, capped at $300,000, to cover the full cost of energy efficiency measures identified through an energy audit.
New York	Offers a maximum rebate of up to $850,000 for upstate residents and $1.65 million for Con Edison customers who meet the requirements of the Energy $mart New Construction Program that encourages energy efficient building practices.
Oregon	Oregon's Business Energy Tax Credit (BETC) is for investments in energy conservation, recycling, renewable energy resources, sustainable buildings, and less-polluting transportation fuels. The maximum incentive provided is $20 million for renewable energy equipment manufacturing facilities and $10 million for other projects.

Buildings consume over 40 percent of the nation's energy, so addressing energy efficiency in buildings and the appliances used inside them is critical to any state efficiency plan. Energy efficient buildings or appliances often cost more than their non-efficient equivalents. Although the people who purchase them will benefit over a period of several years from energy savings, the high up-front costs of energy efficiency can make the efficient purchase unattractive to many consumers. Loans that cover these up front costs and allow people to pay back principal and interest from energy savings, rebates that cover incremental costs, and tax incentives that do the same can overcome this first-cost hurdle. Since energy bills are lower for energy efficient buildings, net operating costs for efficient buildings (mortgage plus utility bills) are usually lower, making energy efficiency a smart economic decision if financing is available.

Gaining political support for certain financial incentives is sometimes difficult, especially during a slow economy. In such circumstances it can be hard justify a tax measure or fee increase to support energy efficiency. States also need to be careful that they are not

[5] "Financial Incentives for Energy Efficiency." Database of State Incentives for Renewables & Efficiency. April 15, 2009. http://dsireusa.org/summarytables/FinEE.cfm?&CurrentPageID=7&EE=1&RE=1
[6] Ibid.
[7] Ibid

subsidizing too much of what people would do even in the absence of the subsidy. States should consider measuring the effect that their programs have on influencing purchasing decisions and saving energy in order to evaluate such programs' cost effectiveness.

How each branch of state government can create financial incentives for energy efficiency			
Governors	*Legislators*	*Utility Commissions*	*State Energy Offices*
1. Propose and support adoption of efficiency loan, grant or tax incentive programs.	1. Consider adoption of energy efficiency loan, grant or tax incentive programs. State legislatures are the only body that can approve a tax incentive. 2. Establish these programs based on best practices in states that have been operating similar programs for many years (example states are listed above).	1. Utility commissions have almost no role in tax programs to support energy efficiency. However, they may have an important role in overseeing efficiency financing programs through which utilities offer financial incentives and seek recovery of the costs of those incentives through rates.	State energy offices often administer energy efficiency loan or rebate programs. In a limited number of states, such as Maryland, they may certify buildings or other facilities as being eligible to receive a tax credit.

3. Strengthen and Enforce Building Codes to Encourage Energy Efficiency

Energy efficiency standards for homes and commercial buildings are set in state building energy codes. States and/or local governments adopt their own building codes but generally base them on a nationally accepted residential or commercial model code. The national residential model code is known as the International Energy Conservation Code (IECC), most recently updated in 2009.[8] The commercial model code is set by the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE). The latest ASHRAE commercial building code is ASHRAE 90.1-2007, Energy Standard for Buildings except Low-Rise Residential Buildings.[9] These two national organizations adopt a new residential or commercial code approximately every three years, which are then certified by the U.S. Department of Energy.

New iterations of the codes tend to be more stringent than their predecessors. For example, the 2009 IECC residential code is approximately 15% more stringent than the 2006 version.[10] The 2004 version of ASHRAE 90.1 is about 12% more stringent than the 1999 version. A state may opt to adopt the new code as it is written, adopt is with modifications, or not adopt it at all. Finally, local governments may adopt their own codes in the absence of statewide building codes.

While Florida and California are the only two states to reference the 2009 IECC residential code, a total of 31 states and the District of Columbia reference a 2003 IECC or better. On the commercial side, again, Florida and California are the only two states that reference the ASHRAE 90.1 – 2007 standard. Thirty-four states and the District of Columbia reference an ASHRAE 90.1 standard that is no older than 2001. For both the commercial and residential sector, a number of States have no statewide code (leaving adoption and enforcement to local city and/or county governments) or the codes in place are significantly less stringent than the most recent IECC and ASHRAE codes and standards.[11]

Why develop building codes for energy efficiency? Building codes create a uniform set of standards for new buildings within the jurisdiction that adopts them, providing assurance to homebuyers or businesses moving into new construction that the facilities meet a certain minimum standard. While there are upfront costs associated with upgrading buildings to comply with codes, the payback periods are relatively short. One study in Nevada found that upgrading commercial buildings to be compliant with their

[8] International Code Council. April 15, 2009. http://www.iccsafe.org/news/nr/2009/0128_2009IECC.html
[9] American Society of Heating, Refrigerating, and Air Conditioning Engineers. 2009. April 15, 2009. http://www.ashrae.org/
[10] International Code Council. April 15, 2009. http://www.iccsafe.org/news/nr/2009/0128_2009IECC.html
[11] "Status of State Energy Codes." Building Energy Codes Program. February 27, 2009. U.S. Department of Energy. April 15, 2009. http://www.energycodes.gov/implement/state_codes/index.stm. Please note that the Building Codes Assistance Project has slightly different numbers which can be found at http://bcap-energy.org/node/5.

energy efficiency codes would have a payback period of only two years.[12] Building codes also save money for homeowners. For example, a Government Accountability Office study estimated that households in Louisiana and Mississippi could save from $167 to $233 per household per year by updating to the 2006 model residential codes.[13] Energy efficient building codes can significantly reduce building energy load growth and carbon dioxide emissions while boosting the local economy through job creation and spending cost savings locally (money that might have been spent on out of state energy services – this is a highly questionable assertion).[14]

Building codes face several challenges:

- Some homebuilders may object to stringent building energy codes, claiming that they add to the cost of building new homes.
- Where building code compliance rates are low, adopting a new building code provides little assurance that this code will actually be implemented. Some states, such as Minnesota, have proactive training programs to help builders understand and meet their stringent residential energy code.
- In some states, the state government adopts the building code but the local government enforces the code.
- Building energy codes may apply only to new construction which, while an important part of the building stock, does nothing to reduce energy use in existing commercial and residential buildings.

How each branch of state government can strengthen and enforce building codes to encourage EE			
Governors	*Legislators*	*Utility Commissions*	*State Energy Offices*
1. Propose and support adoption of statewide building codes modeled after the most recent, nationally accepted residential and commercial codes. 2. Support mechanisms to fund education, outreach and enforcement of such building energy codes.	1. Consider legislation to adopt the most recent versions of statewide building energy codes. Include in such legislation a mechanism to fund training, outreach and enforcement of these codes.	1. Limited role except to the extent that utilities may be entitled to cost recovery for research, outreach, education or other methods related to building energy codes.	1. State energy offices often serve as support to the office of state building inspector, which is responsible for training and enforcement of building energy codes.

[12] "Building Codes for Energy Efficiency." National Action Plan for Energy Efficiency. July 17, 2008. U.S. Environmental Protection Agency. April 15, 2009. http://www.epa.gov/cleanenergy/documents/buildingcodesfactsheet.pdf

[13] "Important Challenges Must Be Overcome to Realize Significant Opportunities for Energy Efficiency Improvements in Gulf Coast Reconstruction." GAO-07-654. June 2007. United States Government Accountability Office. April 15, 2009. http://www.gao.gov/new.items/d07654.pdf

[14] "Building Codes for Energy Efficiency." National Action Plan for Energy Efficiency. July 17, 2008. U.S. Environmental Protection Agency. April 15, 2009. http://www.epa.gov/cleanenergy/documents/buildingcodesfactsheet.pdf

4. Lead by Example: Mandate State Facility Efficiency

Lead by example energy efficiency programs set goals for reducing energy use in state government facilities. These goals come in the form of: (1) requirements for high performance new construction; (2) requirements to reduce energy use across the board (e.g., require a 15% reduction in energy use across all state agencies); (3) requirements to purchase energy efficient products; and (4) requirements to purchase efficient vehicles. These programs are common, with more than 40 states operating under some type of goal to reduce energy consumption in state facilities. A number of states require new state-funded buildings and renovations to meet Leadership in Energy and Environmental Design (LEED) standards, which usually result in a 20-30 percent energy efficiency improvement over most state energy codes. States often use performance contracting to pay for their energy savings programs. In a performance contract, a private company conducts an energy audit of a state building, installs energy efficiency upgrades and retrofits, and guarantees the energy and cost savings. The company takes a portion of those savings to repay the capital that it invested in the energy efficiency equipment, and the state benefits immediately from the energy savings without paying an upfront cost.

Table 2: Sample Lead by Example Programs

State	Incentive Description
California	California's Executive Order S-20-04 requires the state to reduce grid-based electricity usage in state buildings by 20% by 2015 (compared to a baseline year of 2003).
Minnesota	Minnesota's Executive Order 05-016 set a goal of reducing energy use in state government facilities, on a weather-normalized Btu per square foot basis, by 10% reduction by 2006, using 2005 as a baseline year.
New York	Executive Order 111 by Governor George Pataki, continued via Executive Orders 1 and 9 by Governor Patterson, required state agencies and authorities to cut their energy use by 35% by 2010, using a baseline year of 1990.

States adopt lead by example programs for a number of reasons. First, these types of programs demonstrate to the private sector that energy use reduction programs are practical. Second, the government gains credibility when requiring or incentivizing the private sector to undertake programs to reduce energy use. Third, states adopt lead by example programs in order to reap the financial, environmental and energy security benefits of energy use reduction programs.

States face several challenges and considerations related to lead by example programs that fall into the following categories:

1. States need to secure financing to cover the initial costs of lead by example programs. In addition, state governments often are prohibited from engaging in multi-year agreements to finance energy efficiency improvements, since they operate on an annual budget.

2. Year to year state budgets that provide a set budget for utility costs do not provide an incentive to reduce energy bills. Agencies would have a greater incentive to invest in efficiency if they could carry over their energy bill savings from one year to another.

How each branch of state government can lead by example and mandate state energy facility efficiency			
Governors	*Legislators*	*Utility Commissions*	*State Energy Offices*
1. Adopt Executive Orders to require reductions in energy use in state government facilities. 2. Fund the Lead by Example program so that state facility managers have access to capital (perhaps through a loan or other financing program). Include funding to operate the lead by example program that supports outreach to state agencies, technical support and monitoring of steps towards meeting goals.	1. Consider adopting legislation to require state facilities to reduce energy consumption or meet enhanced building efficiency standards, such as LEED or Green Globes. 2. Consider legislation that would provide a financing mechanism like performance contracting to help state agencies make energy efficiency improvements.	1. Utility commission involvement in this area will be limited except to the extent that commissions may approve rates and rates structures that allow regulated utilities to offer financial incentives to state agencies that reduce energy consumption.	1. Serve as the primary outreach and technical resource to state agencies that are tasked with reducing their energy consumption. 2. Often serve as the state entity in charge of monitoring progress towards meeting goals set out in statute or executive order. 3. May serve as the central source for information about financing mechanisms for energy efficiency in state facilities.

5. Consider adopting Energy Efficiency Resource Standards

What are energy efficiency resource standards?

An Energy Efficiency Resource Standard (EERS) requires that energy providers in a state meet a quantified energy efficiency goal. This goal can be applied to electricity consumption, natural gas consumption or both fuels. States can express the goal as a percentage reduction in total energy or peak energy usage or they can express it in terms of a reduction in growth of energy usage. They usually develop this goal after an assessment of the magnitude of their energy savings potential (see Approach 1 in this guide). In 2008, for instance, Michigan adopted an Energy Efficiency Resource Standard mandating savings of 0.75% of prior year electricity sales and 0.5% of prior year natural gas sales by the year 2011, and becoming increasingly more stringent over time.[15]

An EERS is really a policy that aims to stimulate a series of programs and efforts to reach the efficiency goal—utility financing programs, rebates and grants, technical assistance or other similar programs. States typically impose EERS on investor owned, regulated utilities. Some states adopt an EERS as part of a renewable portfolio standard—so that utilities have the option to meet their portfolio obligation through either energy efficiency or by building or buying renewable energy.

States can design an efficiency resource standard that allows utilities to comply by using a market based system of "white tags." In this system, one white tag would be equal to one MWh of energy savings and the utility would be required to hold enough white tags to demonstrate that it has met its total energy savings goal, denominated in MWh. The utility could either generate its own verified energy savings to produce white tags or it could buy them from homes, businesses or others that had produced verified energy savings. Currently, only Connecticut has a working market based system for energy efficiency white tags.

Eighteen states have an EERS in place and five states have the policy pending.[16] The EERS is a relatively new policy in most cases, with little demonstrated experience – few EERS policies were in place prior to 2006. Texas was the first state to adopt an EERS, in 1999, followed by Vermont in 2000.

[15] "Energy Efficiency Resource Standards." October 24, 2008. Pew Center on Global Climate Change. April 15, 2009. http://www.pewclimate.org/what_s_being_done/in_the_states/efficiency_resource.cfm

[16] Nadel, Steve. "Energy Efficiency Resource Standards." February 2009. American Council for an Energy Efficient Economy. April 15, 2009. http://www.narucmeetings.org/Presentations/EERS%20NARUC%202-09.pdf. Please note that the Federal Energy Regulatory Commission (www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-eeps.pdf) and the Pew Center on Global Climate Change (http://www.pewclimate.org/what_s_being_done/in_the_states/efficiency_resource.cfm) have slightly different reporting methods.

Table 3: Sample of State Energy Efficiency Resource Standards[17]

State	EERS Description
Connecticut	Utilities must procure a minimum 1% of electricity sales from Class III resources in 2007, 2% in 2008, 3% in 2009 and 4% in 2010. Class III resources include both efficiency and distributed generation.
Illinois	Utilities must meet annual savings goals of 0.2% of energy delivered in 2008, 0.4% in 2009, rising to 2% annually for 2015 and subsequent years.
Minnesota	Legislation requires 1.5% annual energy savings from electric and natural gas sales starting in 2010, 1% of which must come from energy efficiency.
New Mexico	Utilities must achieve savings of 5% of 2005 electricity sales by 2014 and 10% by 2020.
Texas	Initial EERS requirement of 10% of load growth, subsequently boosted to 20% of load growth by 2009. Further studies will determine feasibility of a 30% and 50% standard by 2011 and 2016 respectively.

An EERS sets a clear policy statement and quantified goal for utilities to follow and for utility commissions to enforce. Rather than mandating specific programs, it is intended to allow utilities flexibility to pursue a variety of programs.

The success of an efficiency resource standard depends on two factors:

1. Programs within the resource standard framework: An energy efficiency resource standard depends on the success of other policies and regulations that may encourage or discourage utilities from making investments in energy efficiency.
2. Measurement of the goals: An Energy Efficiency Resource Standard can be measured by summing up the results of all energy efficiency programs to see if they meet the goal, or by comparing energy consumption between years in order to see if the utilities have met their reduction. The former approach is more difficult to measure but is also independent of other factors such as reductions in energy use that could result from an economic slowdown or unusually cool weather.

[17] "State Energy Efficiency Resource Standard (EERS) Activity." May 2008. American Council for an Energy Efficient Economy. April 15, 2009. http://aceee.org/energy/state/policies/EERS_Summary_5-7-08.pdf

How each branch of state government can be influential in state adoption of EERS			
Governors	*Legislators*	*Utility Commissions*	*State Energy Offices*
1. Propose and support adoption of an energy efficiency resource standard.	1. Consider laws creating an energy efficiency resource standard. 2. Consider complementary policies such as those that would enable utility regulators to adopt rate mechanisms that encourage utilities to invest in energy efficiency.	1. Pursuant to state law, adopt rules to enforce the efficiency resource standard. 2. Consider complementary regulatory practices to develop ratemaking practices that encourage (or do not discourage) utility investments in energy efficiency.	1. State energy offices may have a limited role in actual implementation of adoption of the standard. 2. State energy offices may lead or participate in energy efficiency potential studies that help determine the energy efficiency resource standard goals.

6. Develop Rate Structures That Encourage Energy Efficiency

Traditional utility regulations often reward utilities for increasing their sales (or "throughput") of electricity and natural gas. Energy efficiency efforts often run counter to this conventional rate structure and have the effect of reducing electricity and gas sales, thereby reducing a utility's revenue stream and profit. Under this conventional model of utility regulation, not only is there no incentive for utilities to pursue energy efficiency, there is a strong disincentive for them to pursue efficiency programs.

There are a number of approaches that a State can take to remove this disincentive and/or actually incentivize energy efficiency. State efforts to reform their regulations in this area can come in three general categories:

- **Ensure cost recovery for energy efficiency investments.** Regulated utilities will be more likely to invest in efficiency if they have confidence that state regulators will allow them to recover their costs for those investments.
- **Prevent lost sales as a result of energy efficiency from hurting providers.** Mechanisms to address lost margins can help keep utilities' revenues stable and remove the disadvantages of reducing sales.
- **Provide performance incentives for energy efficiency results.** Rather than simply removing the disadvantages of energy efficiency investments and addressing concerns about cost recovery, some states have gone further and given utilities financial incentives to invest in energy efficiency.

Table 4[18] illustrates several state approaches to developing rate structures that allow for cost recovery, provide incentive recovery mechanisms or address the throughput incentive.

Table 4: Examples of State Approaches to Regulatory Incentives for Energy Efficiency

State	Incentive Description
California	Decoupled utilities' revenues from utilities' profits. To do so, the utilities collect revenues based on revenue forecasts rather than actual sales. The utility commission periodically resets the utilities' rates based in part on the difference between actual and forecasted revenues.
Connecticut	Utilities can earn performance management fees if they meet between 70% and 130% of their predetermined goals tied to lifetime energy savings, demand savings, among other metrics.
Massachusetts	Allows utilities to recover revenues lost as a result of energy efficiency investments for all gas efficiency programs. Utilities track lost revenues

[18] "Chapter 2: Utility Ratemaking & Revenue Requirements." July 2006. National Action Plan for Energy Efficiency. April 15, 2009. http://www.epa.gov/cleanenergy/documents/napee/napee_chap2.pdf. A complete state-by-state list is available on the website of the Institute for Electrical Efficiency, http://www.electric-efficiency.com/

	and then must recover those revenues, through rates, within three years.
New York	Distribution utilities collect a higher proportion of their revenues as a result of fixed rates rather than through variable rates subject to increase or decrease as electricity sales fluctuate. This reduces their incentive to increase their electricity sales.
Nevada	Allows a bonus rate of return for energy efficiency investments. This bonus rate of return is 5% higher than the standard rate of return.
Washington	Tariffs include a rider that allows for adjustment of rates to recover energy efficiency costs that may exceed any amounts included in rates.

Regulatory incentives for energy efficiency can not only remove disincentives for utilities to invest in energy efficiency (by addressing cost recovery issues and by addressing the throughput incentive) but may also be structured to provide an impetus for investment in energy efficiency. This fundamental shift in the utility incentive structure could give utilities the financial incentive to support requirements for energy efficiency.

State officials face several challenges and considerations in developing these policies:

- Clear signals need to be sent to give efficiency providers confidence that they will be rewarded for their investments.
- Addressing the throughput incentive (wherein electric utilities have an incentive to sell more electricity, rather than implement efficiency programs that may diminish those sales) is complicated. Some proposals to reform rate structures to address the throughput incentive may have unintended consequences that lead to increased energy use; other approaches may need to be designed to eliminate shifting risk between customer classes and between the utility and consumers.
- The design of performance based incentives should ensure that utilities are not over-compensated for investments in energy efficiency that they should, perhaps, be making for other economic or legal reasons. Incentives are typically structured to give utilities a reward for exceeding mandates.

How each branch of state government can aid in developing rate structures to encourage EE			
Governors	*Legislators*	*Utility Commissions*	*State Energy Offices*
1. Propose and support adoption of rate structures that accommodate energy efficiency.	1. Consider the need to provide legislative authorization to state utility commissions to approve rate designs that accommodate energy efficiency.	1. Consider rate designs, through rate cases or investigative proceedings, to accommodate or promote energy efficiency.	1. Serve as the standard setting, education, compliance and enforcement arm for appliance standards.

7. Monitor and Verify Efficiency Programs

Evaluation, Measurement & Verification or EM&V is the ongoing process by which energy efficiency (EE) programs and projects are assessed to determine their merits. One of the primary barriers for widespread acceptance of energy efficiency by utilities and regulators is maintaining proof that it can be a reliable source of energy savings. This reliability can be proven through consistent and accurate EM&V, which can extend the life of successful programs while reevaluating and improving programs in need of work.
EM&V is traditionally used by regulators and utilities to provide real measurements for energy efficiency projects such as reductions in energy and demand usage measured in kW, kWh, and therms and therms per hour and gallons.[19] Impact Evaluations are commonly used when determining "directly achieved program benefits" such as kWh or therms saved or avoided emissions. Indirect measurement of the energy efficiency program compares energy use before and after the implementation of a new program.[20]

Through the determination and documentation of results, successes, and challenges, evaluation provides accountability for ongoing or completed programs and allows for improvements. Determining the effects of an EE program will disclose its reliability as an energy resource; it will also identify key improvement areas for application to current and future programs.[21] Measurement and Verification (M&V) assess the merits of individual projects through the data collection, monitoring and analysis used to determine gross energy and demand savings.[22] Measurements determine the value of an energy efficiency resource, while verification confirms the value is achieved.[23] States adopt their own EM&V programs, as do Independent System Operators (ISO) and Regional Transmission Organizations (RTO). Proven energy efficiency resources are necessary when using energy efficiency in forward capacity markets and system planning performed by ISO's and RTO's, attaching strong value to EM&V.

[19] National Action Plan for Energy Efficiency (2007). *Model Energy Efficiency Program Impact Evaluation Guide*. Prepared by Steven R. Schiller, Schiller Consulting, Inc. <www.epa.gov/eeactionplan>
[20] National Action Plan for Energy Efficiency (2008). *Overview of EE Program Impact Evaluation Guide.* \
[21] National Action Plan for Energy Efficiency (2007). *Model Energy Efficiency Program Impact Evaluation Guide*. Prepared by Steven R. Schiller, Schiller Consulting, Inc. <www.epa.gov/eeactionplan>
[22] Ibid.
[23] PJM Interconnection (2009). *Energy Efficiency Measurement & Verification.* Prepared by PJM Forward Markets Operations. <http://www.pjm.com/documents/~/media/documents/manuals/m18b.ashx>

Table 5: Sample EM&V programs

State	EM&V Program Description
California[24]	The California Public Utilities Commission is responsible for managing and contracting all EM&V studies, which are used to measure and verify energy and peak load savings, populate data for cost-effectiveness inputs, evaluate the merits and achievements of energy efficiency programs, and determine if goals are met within the program. The CPUC awarded EM&V contracts for 13 energy efficiency program areas in August 2007, including emerging technologies, agricultural, and residential retrofit. The Energy Division staff at CPUC approves program evaluations, performed by evaluation contractors. All evaluations are required to report annual electric and gas savings in a standardized format "Impact Report Table". The CPUC receives input from ad hoc technical committees throughout a programs lifetime.
Delaware[25]	The Sustainable Energy Utility in Delaware has an Energy Efficiency Administrator who manages portfolio level EM&V plans, as well as individual EM&V programs. The Administrator is responsible for selecting evaluation firms consistent with protocols and overseeing the verification of program goals, load impacts, and cost-benefits.
New York[26]	Managed by NYSERDA, EM&V programs are planned based on an 8-page template. An engineering director assigned to each project, along with NYSERDA's impact evaluation manager, reviews the M&V plans. New York includes macroeconomic co-benefits in their evaluations, which tends to increase the value of saved energy and validate increased investment in energy efficiency. The Department of Public Service serves with others on NYSERDA review panels to select evaluation contractors and assists in budget allocation, evaluation activities, and timelines.

Electricity deployment in some states follows a plan established by the utilities years in advance that seeks to identify in advance the most cost-effective resource for meeting predicted demand for electricity. The primary barrier to entry for energy efficiency projects within that utility planning is proving that the investment in energy efficiency is more valuable than building another power plant. This barrier can be overcome through well-managed EM&V programs that are designed to document and prove energy savings and avoided emissions. EM&V can enable improvement for energy efficiency programs, as well as accountability for the use of resources. EM&V can be applied to numerous stakeholder group programs, including utility-operated energy efficiency programs, government-led, ISO forward capacity markets, greenhouse gas mitigation programs, private company-led, and energy service company-led.[27]

Projections for energy savings can be difficult to ascertain. Energy savings can only be determined indirectly by measuring before and after energy usage within energy efficiency programs. This presents a challenge of quantifying data that could never be

[24] California Public Utilities Commission (2009). *Energy Efficiency 2006-2007 Verification Report.* Prepared by Energy Division. < http://www.cpuc.ca.gov/NR/rdonlyres/D0943818-BF3E-4E17-839A-B2802C16217A/0/EE_Verification_Report_Final_020509.pdf>

[25] Sustainable Energy Utility (2009). <http://www.seu-de.org/>

[26] New York Department of Public Service (2008). *Energy Savings from Energy Efficiency Programs*. Prepared by New York Evaluation Advisory Contractor Team: Nick Hall, Pete Jacobs, Paul Horowitz, Rick Ridge, Gil Peach, and Ralph Prahl.
<http://www3.dps.state.ny.us/PSCWeb/PIOWeb.nsf/20b9016ae2129d5c852573db00779ee1/a4756ca0f43b7628852574b9006ffe45/$FILE/NY_Standard_Approach_for_Estimating_Energy_Savings_12-08.pdf>

[27] National Action Plan for Energy Efficiency (2007). *Model Energy Efficiency Program Impact Evaluation Guide*. Prepared by Steven R. Schiller, Schiller Consulting, Inc. <www.epa.gov/eeactionplan>

proved - the amount of energy that would have been consumed without energy efficiency project cannot be quantified.[28] Inevitably, in a program that requires input from many stakeholders, EM&V may face challenges with timely and accurate submission of information for measurement and verification, as well as cooperation from the complex web of all involved parties. Additionally, when designing an EM&V program in a state or region, designating who will manage and operate the program could face jurisdictional issues, particularly as national EM&V standards are being considered currently in the U.S. Senate.

When developing an EM&V program, there is ongoing debate about separating consideration of financial incentives for efficiency from EM&V progress and recommendations. California is one state currently debating this issue, with some claiming that there is a flaw in the administration of their EM&V program and arguing it cannot serve as a tool to simultaneously determine awards or penalties while producing accurate energy savings estimates without stakeholder dispute.

How each branch of state government can encourage EM&V			
Governors	*Legislators*	*Utility Commissions*	*State Energy Offices*
1. Propose and support adoption of EM&V for energy efficiency state programs. 2. Draft RFP's for EM&V for state programs.	1. Consider the need to provide legislative authorization for EM&V programs or to authorize state utility commissions to administer EM&V programs.	2. PUC's can administer or monitor these programs if there is not a state entity to do so.	1. Some SEO's serve as the central database point for all EM&V data, while others are involved as reviewers of EM&V proposals, cost estimates, and final review of EM&V studies.

[28] California Public Utilities Commission (2009). *Proposed Energy Efficiency Risk-Reward Incentive Mechanism and EM&V Activities.* Prepared by The Energy Division. <http://docs.cpuc.ca.gov/efile/RULINGS/99882.pdf>

8. Explore Innovative Approaches to Encourage Energy Efficiency

The first seven items in this Guide described programs that are seeing widespread use across the country. The final approach suggests additional, innovative energy efficiency program designs that states might consider. This section is structured to simply present these options, and will more succinctly, but less explicitly, address questions of the benefits and challenges of these program options than previous sections. This section briefly explores:

- One-bill programs
- Tariff-based efficiency financing
- Property tax-based efficiency financing
- Promoting energy efficiency workforce development.
- Sales tax reductions on energy efficient equipment
- Reduced property taxes for energy efficiency upgrades

These program designs and financing structures are explored in more detail below.

One-bill programs

While numerous states offer energy efficiency loan programs, a few such as Connecticut, Massachusetts and California, now offer energy efficiency financing through the utility bill. Such programs typically offer a subsidized interest rate that might be combined with an energy efficiency rebate to put customers in an immediate cash-positive position—meaning that the energy savings derived from installing an energy efficiency measure exceeds the principal and interest charges for financing that energy efficiency investment.

Utilities administer one-bill programs so that customers pay only one bill for their energy and efficiency financing costs. The fact that utilities must administer such programs is an advantage to customer/borrower because it streamlines the borrowing and bill payment process. Since customers tend to pay their utility bill, one-bill financing programs also tend to have low default rates. On the other hand, utilities often hesitate to take on the administration and risk of a loan program for fear that administering such programs may be beyond their typical expertise, the added liability of a customer defaulting on the loan, and because many utility billing systems are not set up to handle an energy loan program.

Tariff-based Efficiency Financing

Utilities in a few states such as New Hampshire, Kansas and Hawaii have begun to offer financing for energy efficiency through tariff based programs. Tariff based programs require a utility commission to authorize a charge—often called an Energy Service Charge—that customers may voluntarily assume in order to pay for certain qualified efficiency measures on their premises. For example, a municipal customer might install highly efficient streetlights, or a small business might install a new, efficient lighting

system. Instead of paying the utility back through loan payments, the customer pays the utility back through the Energy Service Charge. This tariff-based charge is tied to the electric meter—meaning that if the customer moves, the new occupant takes up the obligation, just as that occupant would assume the obligation to pay the electric bill on the premises. Tariff based programs also typically provide for an immediate cash-positive position for the customer.

The best known of the tariff-based systems is known as Pay-As-You-Save (PAYS®) and has been piloted in New Hampshire and Hawaii.[29] However, numerous variations on the program exist. The idea of the PAYS® program may appear similar to a one bill program, but is distinct in several ways. The key distinction is the fact that payments are tied to the meter. This has the effect of offering extended payment terms that allow for multiple measures to qualify for the program. The disadvantage of such programs is that utilities may have some of the same concerns about these that they have about one-bill programs; they may see drawbacks in a program that puts them in a position of loan program and portfolio administrator (e.g., they face the risk of businesses shutting down before making all payments, and the risk of homeowners moving before the loan period has ended).

Property tax-based financing

Property tax-based financing programs take advantage of the local government's taxing authority to create a mechanism to finance energy efficiency. A local government establishes and operates a loan program to finance its residents' investments in energy efficiency and renewable energy. Residents install the efficiency or renewable energy measures in their home using capital provided by the loan program, and then pay back the loans on their property tax bill. Residents agree to place a lien on their home when they sign up to participate in the loan program, thereby ensuring that the loans are secured.

Such a financing mechanism has the advantage of creating a secure revenue stream for the lenders as payments attached to property taxes are among the most secure revenue streams available. Like tariff-based systems, the property tax-based loan programs also allow for a long term loan since the obligation to pay the property tax transfers to the new homeowner in the case of a sale. In many cases the local government can also take advantage of federal tax free bonds, Private Activity Bonds, to capitalize the loan program.

While this financing mechanism may not be as ubiquitous as others, one pilot program is operating in Berkeley, California, and other local governments in the state are considering similar programs.[30] In 2008, legislation passed in Colorado to enable local governments to operate similar programs.[31] Time will tell if the administrative burdens

[29] PAYS America. April 16, 2009. http://www.paysamerica.org/.
[30] Berkeley FIRST. April 16, 2009. http://www.berkeleyfirst.renewfund.com/.
[31] "Clean Energy Municipal Financing." April 2, 2009. Electric Utility Consultants, Inc. April 16, 2009. http://blog.euci.com/?p=52.

placed on local governments to operate the loan program prove too onerous, or if this mechanism can be successful around the country.

Promote Energy Efficiency Workforce Development

As States and utilities increasingly recognize the benefits of energy efficiency as a resource, a trained and highly-skilled workforce will be required to manage and implement efficiency deployments. Many states already have workforce training programs up and running, and many others are in the development phase. State governments have dedicated billions to clean energy workforce programs in hopes of growing a robust industry in their state that will transfer wealth to its citizens.

Training programs are sprouting up around the country. Private workforce training programs offer intensive training courses, lasting a few days to weeks. One such program, Boots on the Roof, offers installation, sales, and law classes for PV and wind turbine technologies.[32] Some community colleges also offer training programs, such as Mesalands Community College in New Mexico, where wind power technicians are being trained for virtually guaranteed employment at General Electric. Because skilled trades people in wind are in high demand, wind turbine manufacturer GE has promised to hire every graduating technician from Mesalands for the next three years.[33] Many other states are involved in similar training programs aimed to increase the clean energy workforce for "shovel-ready" projects and a future green economy.

Table 6: Examples of State approaches to workforce development

State	Workforce Development Initiatives
Michigan[34]	Department of Labor and Economic Growth invested $6 million for green jobs, part of which is dedicated to workforce training to spur a green economy in Michigan.
North Carolina[35]	The **North Carolina Green Business Fund** (NCGBF), established in 2007, awards competitive grants to N.C. organizations with innovative projects focused on three priority areas, including biofuels, green buildings, and private sector investment in clean technology and business. In 2008, $1.3 million was distributed to grant applicants.
Virginia	The Virginia Sustainable Building Network carries out multiple training classes throughout the year for workforce development in energy efficient buildings.
Iowa	Legislation was passed to appropriate $2.5 million from $100m dedicated from 2008-2011 to the workforce training and economic development funds of community colleges to expand targeted energy industry areas.

[32] http://www.bootsontheroof.com/
[33] Dickerson, Maria. Los Angeles Times. "In Blue Economy, Green Jobs are in Play." 3 January 2009. http://www.dallasnews.com/sharedcontent/dws/bus/stories/010409dnnatgreenjobs.2124064.html
[34] http://www.naruc.org/Publications/Energy%20Efficiency%20Training%20-%20NARUC%20Survey%20Results.pdf
[35] North Carolina Green Business Fund. http://www.ncscienceandtechnology.com/gbf/index.htm

How each branch of state government can encourage innovative approaches to EE			
Governors	*Legislators*	*Utility Commissions*	*State Energy Offices*
1. Propose and support adoption of programs at State agencies and community colleges and higher educational institutions to offer learning opportunities in workforce development.	1. Consider the need to provide legislation authorization for property-tax based efficiency programs 2. Provide sustained funding support to workforce development and job-creation programs relating to the efficiency sector.	1. Encourage exploration of innovative billing and financing through notices of inquiry and dockets exploring efficiency. 2. Support tariff and one-bill financing programs proposed by utilities.	1. Develop and take advantage of emerging financing mechanisms. 2. Leverage connections with workforce and economic development programs to ensure a trained workforce for implementation exists.

Conclusion

Many see energy efficiency as a cost-effective strategy for meeting growing energy demands, reducing strains on the energy grids, increasing energy independence, and reducing greenhouse gas emissions. State policy-makers and energy officials have a number of tools available to promote energy efficiency. The approaches presented above are presented as a menu of options, by no means exclusive, and states can select the policies and programs that are best suited to the individual needs and goals of the state. It may be important that each individual state agency understands the role they play in implementing each energy efficiency approach and work in concert with the other entities responsible for implementation.

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