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Hearing on Energy Efficiency Resource Standards

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Summary

A federal Energy Efficiency Resource Standard (EERS) would set energy savings targets for electric and natural gas distribution utilities throughout the U.S. Currently, 19 states have an EERS in some form. These standards have worked well in practice. A federal EERS would extend these standards to the remaining 31 states, and would also directly affect states where the state EERS is not as strong as the federal EERS. States with a strong state EERS could continue to enforce savings targets that exceed the federal targets, and would also benefit from emissions reductions caused by the EERS in neighboring states, and from the fact that decreased energy demand will modestly reduce electric and natural gas prices in all states (since prices are affected by the supply-demand balance, when demand goes down, prices generally also go down).

Under S. 548, energy savings would be documented from evaluations of energy efficiency programs prepared by evaluation experts and following evaluation guidelines to be set by DOE. There are many state-level evaluation guidelines that DOE can draw from. S. 548 provides that states can have primary responsibility for administering the EERS if they are "willing and able". We expect most states to take on this role, since they know their states and utilities well. DOE's role would be to set the rules and to provide oversite, permitting DOE to administer this program without a large federal bureaucracy.

For many months the Senate Energy Committee has been considering a Renewable Energy Standard (RES) that would allow states to count up to 5% energy efficiency savings towards the 2020 RES target. ACEEE estimates that existing state EERS's will save 5% of electric sales by 2020 and thus the proposal for 5% savings as part of an RES will have little impact. Studies in many states demonstrate that cost-effective electric and natural gas energy efficiency savings of 20% or more are available throughout the country. S. 548 would set savings targets of 15% electric savings and 10% natural gas savings by 2020. Savings from new building codes and equipment efficiency standards count towards these targets as do energy savings from combined heat and power (CHP) plants and recycled energy. Many state targets do not include codes, standards and CHP, and thus a 15% federal electricity saving target is roughly equivalent to state targets of under 10% savings by 2020. Based on state targets and recent state-level accomplishments, we find that the savings levels in S. 548 are reasonable.

According to ACEEE's recent analysis, the energy saved through S. 548 could power almost 48 million households in 2020, accounting for about 36% of the households in the United States. Moreover, this level of energy savings will save American consumers and businesses almost $170 billion, create over 220,000 jobs and reduce greenhouse gas pollution by 262 million metric tons while eliminating the need to build 390 power plants. These impacts are all over and above savings from state EERS's that have already been adopted – our calculations include current EERS's as part of the basecase.

We also see an EERS as a critical cost-containment strategy for future federal climate change legislation. Modeling done by ACEEE, and discussed in the body of my testimony, shows that a national EERS would reduce electricity prices, substantially dampening the upward pressure on prices caused by climate change legislation.

ACEEE has been estimating the energy savings from potential energy legislation since the 1980s. We have conducted detailed analyses on the energy savings from the Energy Policy Act of 2005 (EPAct) and from the Energy Independence and Security Act of 2007 (EISA). The EERS in S. 548 will save more energy in 2020 than *all* of the efficiency provisions in EPAct combined and nearly as much as *all* of the efficiency provisions in EISA combined, and this includes EISA's Corporate Average Fuel Economy Standard. The EERS is the "800 pound gorilla" of energy efficiency policy. These benefits will not occur if energy efficiency is just a safety valve to a renewable energy standard. Energy efficiency is important enough in its own right that the U.S. deserves and needs an EERS with savings targets like those in S. 548. I strongly recommend that the next federal energy bill include such an EERS as a centerpiece.

Introduction

My name is Steven Nadel and I am the Executive Director of the American Council for an Energy-Efficient Economy (ACEEE), a nonprofit organization dedicated to increasing energy efficiency to promote both economic prosperity and environmental protection. I have worked actively on utility energy efficiency programs for more than 20 years and have been working on energy efficiency resource standards since 2000. I have written several reports and papers on the subject[1] and have also worked with multiple states helping them to establish and implement such policies including Connecticut, Maryland, New York, Ohio, Pennsylvania and Virginia.

ACEEE worked with Senator Schumer's office in the development of the S. 548, the Saving American Energy Act and we strongly support this bill. We urge this Committee to incorporate this bill into upcoming energy legislation. From our research, an Energy Efficiency Resource Standard (EERS) along the line of S. 548 will have more impact on promoting energy efficiency than any other provision now pending before this Committee [say something about relative to EISA or CAFÉ]. We thank Senator Schumer for introducing S. 548 and thank Senators Bingaman and Murkowski for scheduling this hearing to discuss this important subject.

In the sections below I:

- describe what an EERS is and how it works;
- discuss how the required energy savings are measured and documented;
- discuss EERS adoption and experience at the state level, including information on the 19 states that have adopted EERS's to date;
- present the results of an ACEEE analysis on the impacts of S. 548;
- discuss the relationship between an EERS and an RES, as well as with potential climate change legislation;
- respond to some concerns I have heard expressed about a federal EERS.

EERS Description

An EERS is a law requiring distribution utilities to meet energy saving targets, generally specifying how much energy needs to be saved each year. A federal EERS as proposed in S. 548 would set a national goal for energy savings, requiring retail electricity and natural gas distributors to reduce their electricity sales by 15% and natural gas sales by 10% (cumulative) by 2020. The proposed savings targets 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

[1] Several of these are listed in the references section at the end of this testimony.

implementing an EERS.

An EERS is similar in concept to a renewable electricity standard (RES). An RES requires utilities to obtain a certain amount of energy from renewable resources (wind, solar, biomass, etc.) while an EERS requires electric utilities and natural gas distributors to attain a required level of efficiency savings. Failure to comply with an EERS law results in penalties, which are based on the level or under- or non-compliance.

The EERS in S. 548 would apply to electric distribution utilities who sell at least 750,000 MWh annually and to natural gas distribution utilities who sell at least 2.5 billion cubic feet of natural gas annually.[2] Based on a review of annual sales by utility compiled by the Energy Information Administration (EIA), the EERS would apply to about 440 electric utilities out of the more than 3200 listed by EIA, and to about 240 natural gas distribution companies out of about 2000 listed by EIA. These covered utilities represent about 89% of U.S. electricity sales and about 96% of U.S. *retail* natural gas sales (and a lower proportion of total natural gas sales as many large industrial customers purchase natural gas at the wholesale level and not from distribution utilities).

EERS Mechanics

Under the legislation, utilities get credit for savings from building codes and appliance standards (including federal standards) and from energy efficiency programs and combined heat and power installations where they "played a significant role in achieving the savings" (i.e. if the utility, the state, and a retailer all play a significant role, the utility gets credit, without having to figure out the size of their role relative to the role of others). In the end, it is a matter of counting kilowatt-hour savings and making a determination that the target has or has not been met. The target for a given year is relative to the average total sales in the prior two years (ie, the base quantity is rolling to reflect increases or decreases in sales from year to year).

On average, based on state-specific analyses in six states, ACEEE estimates that codes and standards will reduce 2020 electricity use by 4.5% and natural gas use by 1.6%. S. 548 and companion bills in the House (H.R. 889 and the Waxman-Markey "Discussion Draft" call for 15% electric and 10% natural gas savings by 2020, leaving 10.5% electric savings and 8.4% natural gas savings to be achieved by utility programs. If standards and codes achieve more savings, the utility targets will be adjusted downward by a corresponding amount, and vice versa.

If a utility's sales go down due to the recession, that decline does not count as efficiency savings. Conversely, if a utility's sales go up, the savings target only increases by a little bit using the percentage savings targets in the legislation (e.g. 1% of the sales increase in 2012). As illustrated in the two tables on the next page, the energy savings required will vary slightly with growth rates as a function of utility sales.

[2] S. 548 lists thresholds of 1.5 million MWh and 5 billion cubic feet of gas, but these apply to sales over two years. The 750,000 MWh and 2.5 billion cubic feet of gas thresholds are *annual* averages.

S. 548 Impacts with 1% per Year Growth Rate
(illustration using a utility selling 100 kWh per year)

Year	Expected Sales	Annual Growth	Sales (adjusted for growth and prior year's savings)	Rolling Average (of prior 2 years' sales)	Cumulative Target (%)	Cumulative Energy Savings (kWh)	Incremental (Annual) Energy Savings (kWh)
2010	99.5		99.5				
2011	100.5	1.00	100.5				
2012	101.5	1.01	100.5	100.00	1.0%	1.00	1.00
2013	102.5	1.02	100.5	100.50	2.0%	2.01	1.01
2014	103.5	1.03	100.3	100.51	3.25%	3.27	1.26
2015	104.6	1.04	100.1	100.39	4.50%	4.52	1.25
2016	105.6	1.05	99.6	100.17	6.0%	6.01	1.49
2017	106.7	1.06	99.2	99.84	7.50%	7.49	1.48
2018	107.7	1.07	97.8	99.41	10.0%	9.94	2.45
2019	108.8	1.08	96.5	98.50	12.50%	12.31	2.37
2020	109.9	1.09	95.3	97.16	15.0%	**14.57**	2.26

S. 548 Impacts with 3% per Year Growth Rate

Year	Expected Sales	Annual Growth	Sales (adjusted for growth and prior year's savings)	Rolling Average (of prior 2 years' sales)	Cumulative Target (%)	Cumulative Energy Savings (kWh)	Incremental (Annual) Energy Savings (kWh)
2010	99.0		99				
2011	102.0	2.97	102.0				
2012	105.0	3.06	104.0	100.49	1.0%	1.00	1.00
2013	108.2	3.15	106.1	103.00	2.0%	2.06	1.06
2014	111.4	3.25	108.0	105.07	3.25%	3.41	1.35
2015	114.8	3.34	110.0	107.07	4.50%	4.82	1.40
2016	118.2	3.44	111.7	108.98	6.0%	6.54	1.72
2017	121.8	3.55	113.4	110.81	7.50%	8.31	1.77
2018	125.4	3.65	114.2	112.56	10.0%	11.26	2.95
2019	129.2	3.76	114.9	113.80	12.50%	14.23	2.97
2020	133.0	3.88	115.9	114.55	15.0%	**17.18**	2.96

The standard is expressed in cumulative terms because efficiency measures installed in early years will continue to save energy for many years. In 2020, the 15% electricity savings is relative to the average sales from 2018 and 2019 because those sales take into account all of the energy savings up to that point. Cumulative savings are the savings achieved in a particular year from measures installed in that year, as well as from measures installed in earlier years that are still in place. For example, an energy-efficient dishwasher installed in 2012 might achieve savings of 100 kWh in 2012. That same dishwasher will save 100 kWh per year for its useful life. These savings achieved post-2012 may also be claimed by the utility, until the dishwasher is taken out of service.

Although the savings are cumulative, because the targets increase slowly over the compliance period, additional measures will be needed each year to meet the growing annual targets. However, each year's target only increases by an incremental amount, eventually reaching a maximum of 2.5% additional savings required per year.

Illustrative Example: Prototypical Electric Utility Company

	2009	2010	2011	2012	2013
Electricity Sales (million kWh)					
Estimated Electricity Sales (kWh)	11,000,000	11,055,000	11,110,275	11,128,906	11,147,248
Base Quantity for 2011 (average of 2 prior years' sales)	**11,027,500**				
Base Quantity for 2012 (average of 2 prior years' sales)		**11,082,638**			
Base Quantity for 2013 (average of 2 prior years' sales)			**11,119,591**		
Savings from Programs* (million kWh)					
Existing Residential and Small Commercial			6,500	13,100	19,500
Residential New Construction			390	786	1,170
Commercial and Industrial			18,850	37,990	56,550
Efficient Products Program			8,320	16,768	24,960
Low-Income Retrofits			2,860	5,764	8,580
Total Energy Savings from Programs			**36,920**	**74,408**	**110,760**
Savings (million kWh)					
Incremental Annual Savings (as a % of base quantity)			**0.33%**	**0.67%**	**1.00%**
Total Cumulative Energy Savings ** (including savings from measures installed in previous years)			**36,920**	**111,328**	**222,088**
Total Cumulative Energy Savings (as a % of base quantity)			**0.33%**	**1.00%**	**2.00%**

* "New" savings that need to be achieved in the given year to reach the required electricity savings targets.
** Includes "new" savings plus savings from measures installed in earlier years that are still in place.

Measurement and Documentation

The EERS specifies the amount of energy savings utilities need to achieve. A utility will need to document achieved savings through evaluation reports. What kind of savings count towards the goal and how those savings are counted will be detailed in evaluation, measurement and verification regulations promulgated by the DOE. However, it is anticipated that the federal procedures will reflect procedures currently implemented in states with an EERS.

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 combined heat and power 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

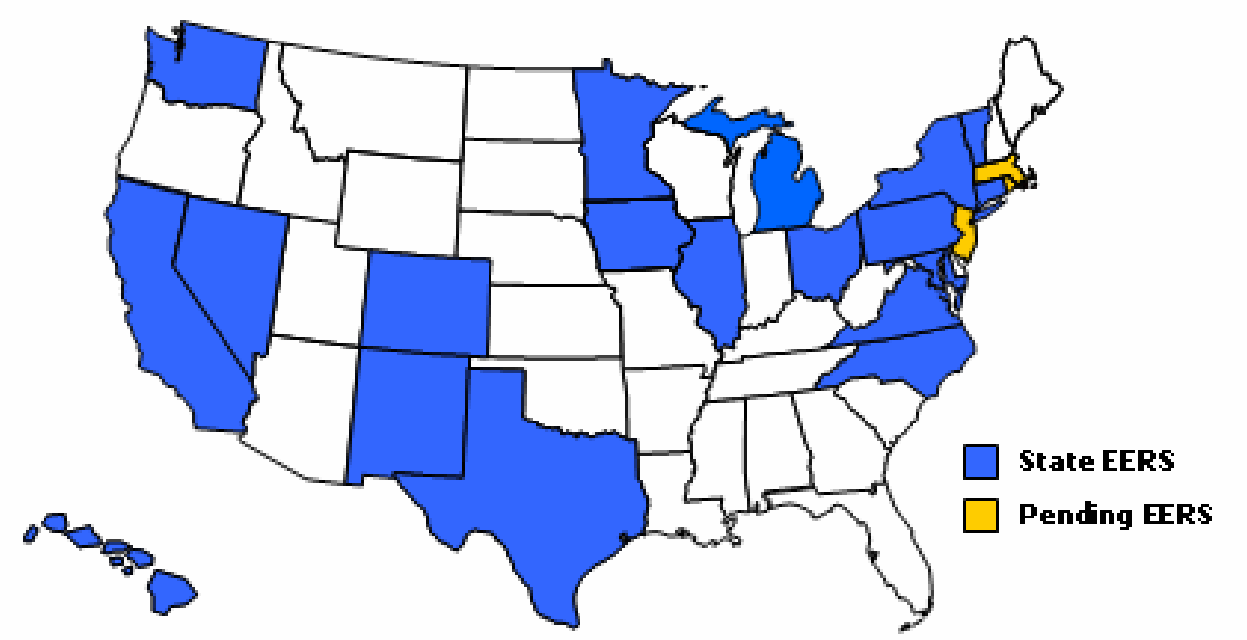
utility. For programs aimed at commercial and residential customers, savings can be estimated by taking a sampling of participants, determining the energy savings that are attributed to a certain program through billing analysis, extrapolating those estimated savings to all participants and then comparing 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 Public Utilities Commission, which reviews the reported savings and makes revisions if deemed necessary.

EERS Adoption and Implementation

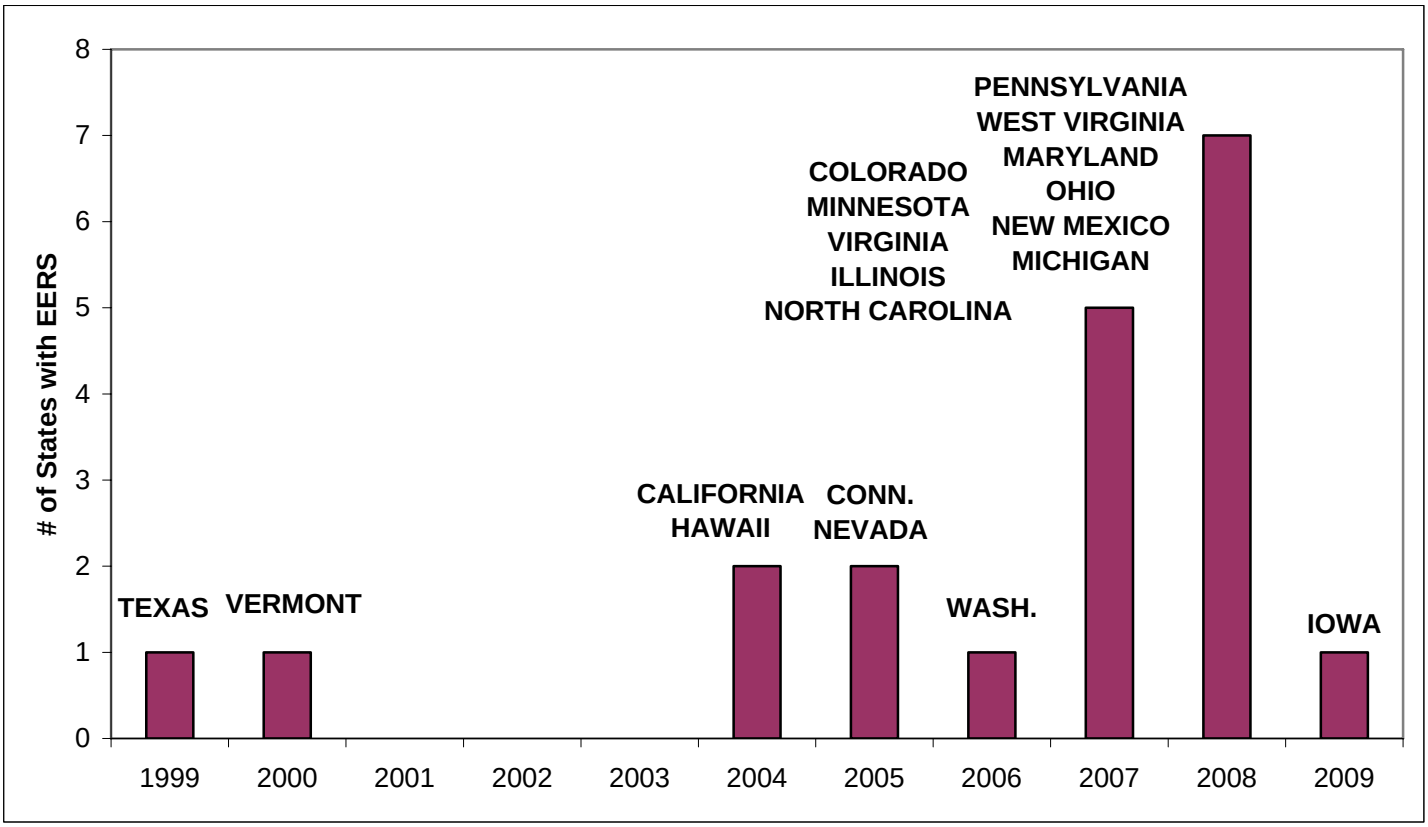
EERS's have been adopted to date in 19 states. These are shown in the map below.

States with an EERS



Texas was the first state to adopt an EERS, with their EERS adopted in a 1999 restructuring law signed by then-Governor George W. Bush. Iowa is the most recent state, with targets for their largest utility set in a final decision earlier this year by the Iowa Utilities Board. State EERS adoption dates are summarized in the figure on the next page.

States Adopting an EERS by Year of Adoption



[Change so New York is listed for 2008, not WV] *Source: ACEEE.*

The 19 states that are implementing an EERS are positioned to achieve a little over 5% electricity savings by 2020. California, Connecticut, Hawaii, Nevada, Texas and Vermont have had the most experience with implementation of an EERS and, as such, are considered some of the most successful states in operating energy efficiency programs. Many of these states have consistently increased their annual energy savings goals over time and all have been achieving or are on track to achieving their stated energy savings goals. The savings targets for states with an EERS in place are detailed on the next page. As noted previously, many of these state targets do not include savings from building codes, equipment efficiency standards, or combined heat and power plants. Adding these mechanisms to state targets should increase the 2020 electric savings by at least 5% and the 2020 natural gas savings by at least 3%. .

State Energy Efficiency Electricity Savings Targets by Year

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
California	0.9%	0.9%	0.8%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Colorado	0.42%	0.44%	0.47%	0.49%	0.52%	0.55%	0.58%	0.61%	0.64%	0.67%	0.67%
Connecticut	1.00%	1.00%	1.00%	1.25%	1.50%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%
Hawaii	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%
Illinois	0.60%	0.80%	1.00%	1.40%	1.80%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Iowa	1.00%	1.00%	1.20%	1.40%							
Maryland	1.25%	1.75%	2.25%	2.75%	2.75%	3.25%					
Massachusetts	1.25%	1.50%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%
Michigan	0.50%	0.75%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Minnesota	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Nevada	0.50%	0.38%	0.38%	0.38%	0.38%	0.50%					
New Mexico	0.50%	0.50%	0.75%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
New York	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%					
North Carolina	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.50%	0.75%	0.75%
Ohio	0.5%	0.7%	0.8%	0.9%	1.0%	1.0%	1.0%	1.0%	1.0%	2.0%	2.0%
Pennsylvania	0.5%	0.5%	1.0%	1.0%							
Rhode Island	1.25%	1.50%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%
Texas	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%
Vermont	2.0%	2.0%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
Virginia	0.25%	0.50%	0.50%	0.50%	0.50%	0.75%	0.75%	0.75%	1.00%	1.00%	1.00%
Washington	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	

Note: Some of these figures are not yet final since state commissions still need to decide on final targets. In other cases targets have not yet been set yet for some years and we assume that earlier targets will be continued.

Source: ACEEE estimates based on a review of state laws, regulations and pertinent data.

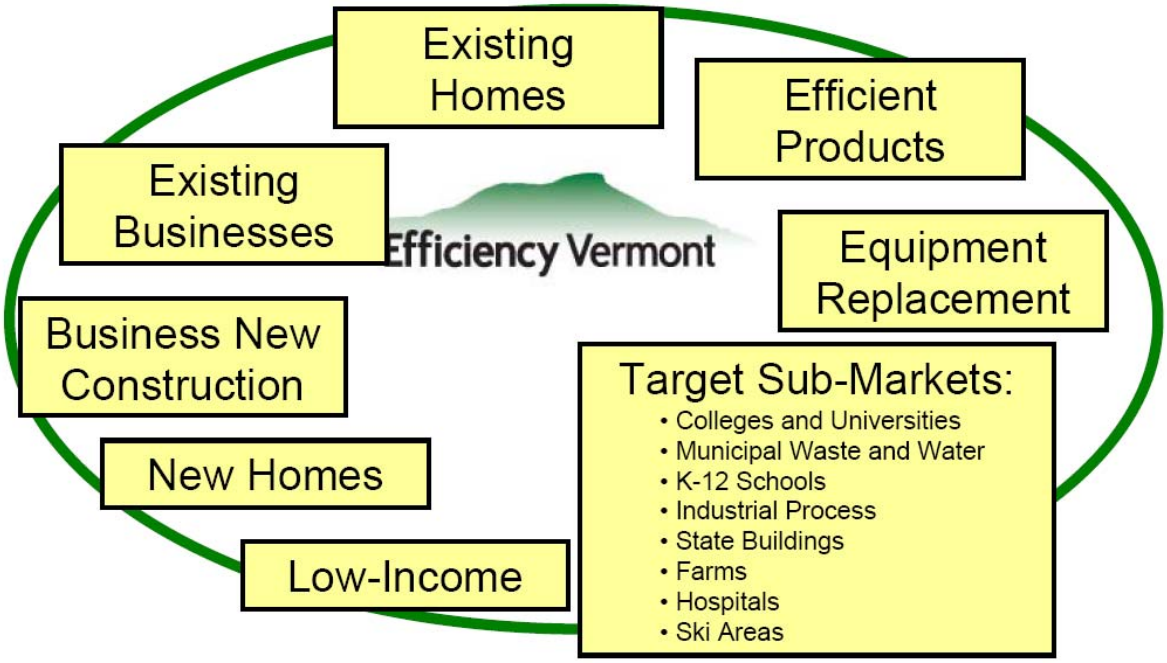
Texas established an EERS in 1999, requiring electric utilities to offset 10% of load growth through end-use energy efficiency. After several years of meeting or exceeding this goal, in 2007 the legislature increased the standard to 15% of load growth by 2009, 20% of load growth by 2010 and directed that higher targets be investigated. A recent report commissioned by the PUCT found that raising the goal to 50% of load growth is feasible.

All of Texas' larger investor-owned utilities utilize standard offer programs to provide incentives to energy service companies to offset a portion of the upfront cost associated with energy efficiency measures. Additionally, many of the utilities operate programs to train and educate air conditioning installers and building owners and managers on building operations. There are also programs which encourage the sale of higher-efficiency equipment.

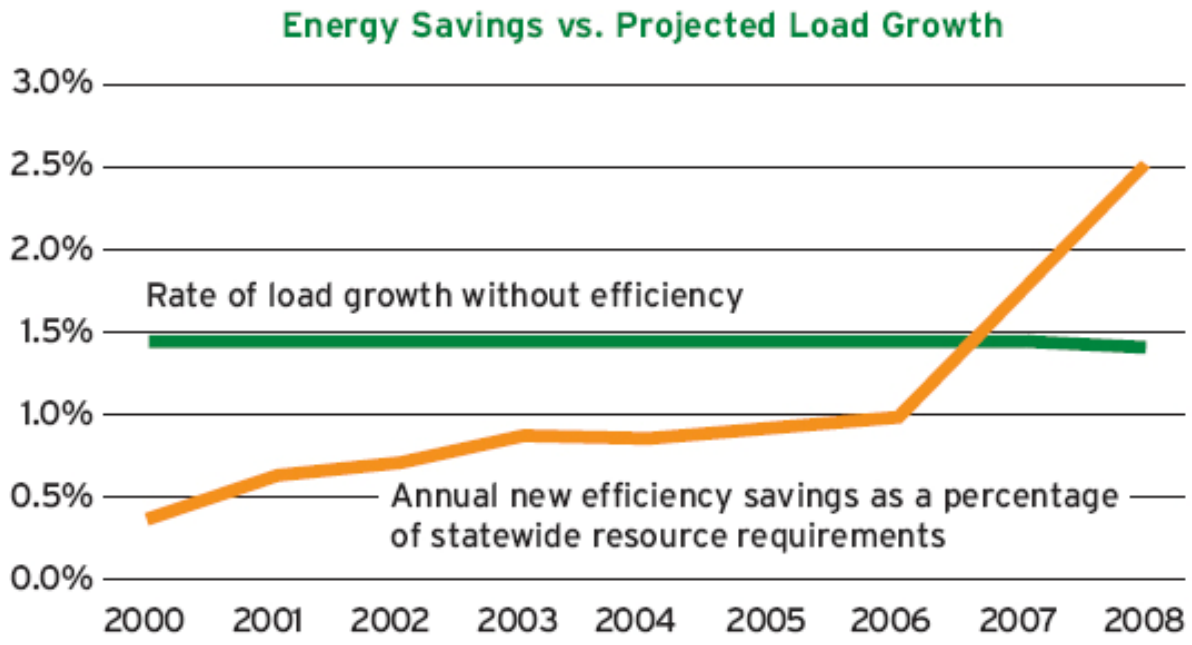
Efficiency Vermont is the nation's first statewide provider of energy efficiency services. Efficiency Vermont is operated by an independent, non-profit organization under contract with the Vermont Public Service Board and funded by an energy efficiency charge on customers' electric bills. Technical assistance and financial incentives are provided to Vermont households and businesses, helping reduce their energy costs with energy-efficient equipment and lighting and with energy-efficient approaches to

construction and renovation. The array of markets served by programs offered in Vermont is summarized in the figure below.

Markets Served by Vermont Energy Efficiency Programs



Since its inception in 2000, Efficiency Vermont has helped Vermonters reduce annual energy costs in their businesses and homes by more than $31 million, which is more than Efficiency Vermont's annual budget. Between 2000 and 2006, Vermont businesses and homeowners who worked with Efficiency Vermont have saved more than 307 million kilowatt hours (kWh) in annual electric energy. Households and businesses are expected to see these savings continue for an average of 13 years. Moreover, the cumulative lifetime economic value of efficiency investments in Vermont totals more than $313 million. Preliminary results are that 2008 efficiency programs in Vermont reduced statewide electricity sales by 2.5%. When combined with savings from measures installed in earlier years that are still in place, total savings in 2008 totaled aout 9% of sales with savings in the past two years exceeding Vermon't 1.5% per year historic load growth (see figure on the next page).



Source: Efficiency Vermont

Reaching continually increasing energy savings targets requires more than simply providing customers with incentives and rebates, as these states have shown. Outreach, training and education, customized programs, and increasing access to all customer classes have helped California, Connecticut, Hawaii, Nevada, Texas, and Vermont become the leaders in EERS implementation at the state level. These states have employed combinations of a variety of energy efficiency programs to achieve their success.

Impacts of S. 548

According to ACEEE's recent analysis[3], the energy saved through S. 548 could power almost 48 million households in 2020, accounting for about 36% of the households in the United States. Moreover, this level of energy savings will save American consumers and businesses almost $170 billion, create over 220,000 jobs and reduce greenhouse gas pollution by 262 million metric tons while eliminating the need to build 390 power plants. These and other impacts are summarized in the table on the next page. These impacts are all over and above savings from state EERS's that have already been adopted – our calculations include current EERS's as part of the basecase.

[3] Furrey, Nadel, and Laitner. 2009. *Laying the Foundation for Implementing a Federal Energy Efficiency Resource Standard*. Report E091. Washington, D.C.: American Council for an Energy-Efficient Economy.

Summary of Benefits of S. 548

Energy Savings	**2020**	**Equivalent to:**
Annual electricity savings	364 billion kWh	
Estimated peak demand savings	117,000 MW	390 power plants, 300 MW each
Annual direct gas savings	794 TBtu	
Program Costs and Benefits (2007$, 4.5% real discount rate)		
Cumulative Benefits	$ 247.1 billion	
Cumulative Costs (investments through 2020)	$ 78.5 billion	
Total Net Savings	**$ 168.6 billion**	
Macroeconomic Impacts		
CO2 Emissions Savings (MMT)	262	48 million automobiles
Net Jobs Created	222,000	976 manufacturing plants

According to the study, customers will have invested $78.5 billion in energy efficiency upgrades by 2020 through the help of utility or state-run energy efficiency programs. As a result of such measures, consumers will save $247 billion gross, or a net savings of about $169 billion on their utility bills.

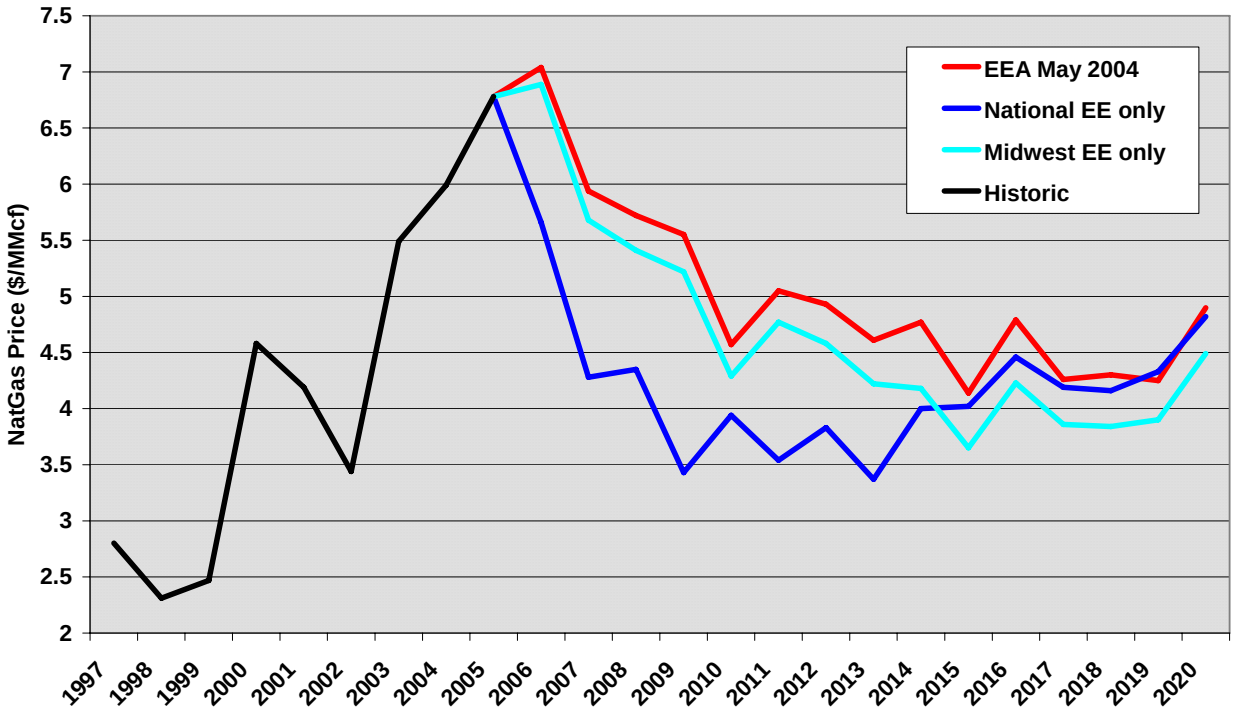
As a result of the energy savings under S. 548 about 17 jobs are gained per $1 million spent, while 7 jobs are lost per $1 million in lost revenue in the electricity and natural gas sectors. At the national level, ACEEE estimates that an EERS will create over 220,000 net jobs by 2020. Moreover, unlike other resources such as renewable energy and coal, which are geographically limited, significant energy-saving opportunities are available in all 50 states. As such, local jobs supporting energy efficiency – jobs that cannot be outsourced – are available in all 50 states.

Implementation of S. 548 can also significantly reduce carbon dioxide emissions. Energy efficiency measures reduce energy consumption so that less fossil fuel is burned for energy generation. As fossil fuel use decreases, carbon dioxide emissions are avoided. ACEEE estimates that the proposed EERS stands to reduce carbon dioxide emissions by 262 million metric tons in 2020 – the equivalent of removing 48 million automobiles from the road for that year. This represents over a 4% reduction in projected annual carbon dioxide emissions for 2020.

About 90 percent of electricity in the United States is generated by coal, natural gas, and nuclear power. If the United States meets increased energy needs with power from new power plants, at a cost of up to 13 cents per kilowatt-hour, U.S. consumers could expect significant increases in their utility bills. At about one-fourth of that cost, or 3 cents per kilowatt-hour, energy efficiency measures are a more cost-effective option for meeting and ultimately reducing U.S. energy needs. In addition to being cheaper than conventional energy resources, energy efficiency is the only resource that can actually reduce a customer's overall energy usage, thereby reducing their energy bills for years to come. As the targets slowly increase over the compliance period, consumers will be investing in more energy efficiency each year, leading to greater savings and reduced energy bills.

The EERS will also place downward pressure on natural gas prices. Since natural gas prices are determined by the interactions of supply and demand, as demand is reduced, natural gas prices will decline somewhat. The general trends are illustrated in the figure below from a 2005 ACEEE study on the effect of energy efficiency on natural gas prices. In this study, electricity and natural gas savings varied by state depending on the then-current status of energy-efficiency programs in each state, but across the U.S. averaged 10.7% electricity savings and 9.8% natural gas savings in 2020. The impacts on natural gas markets vary from year to year depending on how tight world markets are so the data in the graph below are only indicative of general trends and not a prediction of the exact impact on natural gas prices in the future.

Impact of Energy Efficiency on Natural Gas Prices



Note: Midwest EE only means efficiency programs only operated in Midwest states.
Source: EEA 2004 and ACEEE 2005.

Relationship of an EERS to an RES

An EERS and a Renewable Energy Standard (RES) are fully complementary to each other. An EERS reduces electricity use through use of energy efficiency measures. An RES then helps meet a portion of remaining load with renewable resources.

The EERS and RES are much more effective as independent mechanisms working in tandem, rather than combined as an RES that can partially be met with energy efficiency, as passed the House in 2007. Adding efficiency as an option for meeting an RES is usually done as a "safety valve" for utilities by weakening requirements for renewable energy. But such an approach results in much less efficiency investment

than is cost-effective, leaving substantial unharvested benefits. As shown in the table below, a 2007 analysis by ACEEE found that combining an RES and EERS would not take full advantage of the emissions reductions, electricity savings, job creation, and consumer savings potential that could result from having a separate RES and EERS.

Comparison of RES and RES+EERS Results in 2030
Relative to Business-as-Usual

	CO_2 emission reductions (million metric tons)	Electricity usage saved (billion kWh)	Average net annual jobs	Net consumer savings, cumulative (million $)
2007 House RES (15% by 2020, though 4 of the 15 can be met with efficiency)	100	22	27,891	60,541
15% RES + 15% EERS by 2025	**588**	**507**	**142,068**	**590,723**

Source: ACEEE 2007

In addition, energy efficiency and renewables are unique resources with unique characteristics. An RES would apply to the entity supplying power – often a competitive load serving entity – which in some cases is not the local distribution company that would be regulated under an EERS; attempting to merge an RES and EERS could create unnecessary regulatory complications.

Furthermore, having both a stand-alone RES and EERS as opposed to either one alone (or just pursuing business as usual) provides lower electricity prices by 2025 even in the Midwest and the South, regions that are more heavily dependent on coal. This is illustrated in the figures on the next page, which shows what regional wholesale prices would be under business-as-usual compared to what they would be under the 2007 House RES (15% by 2020, though 4 of the 15 can be met with efficiency), a stand-alone EERS (10% reduction in electricity usage and 5% in natural gas usage by 2020), or a combination of a 15% RES (with no efficiency option) and a 15% EERS by 2025.

An EERS actually makes achieving an RES easier and less expensive, since an RES requires a percentage of total electricity sold to be from renewables, and energy efficiency reduces the total amount of electricity sold.

Figure 2 – Midwest Regional Wholesale Prices

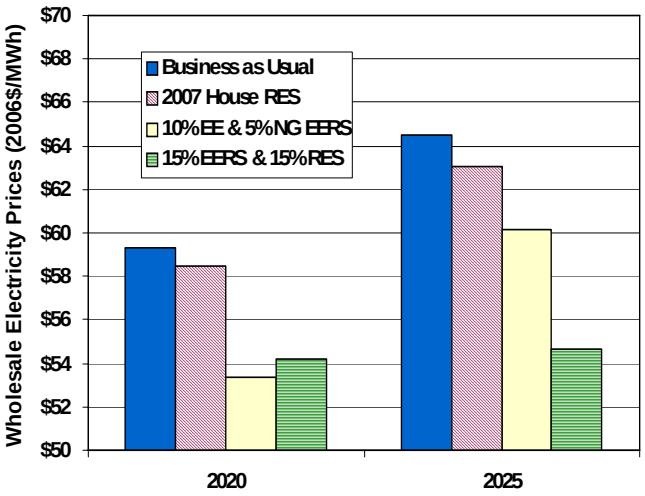
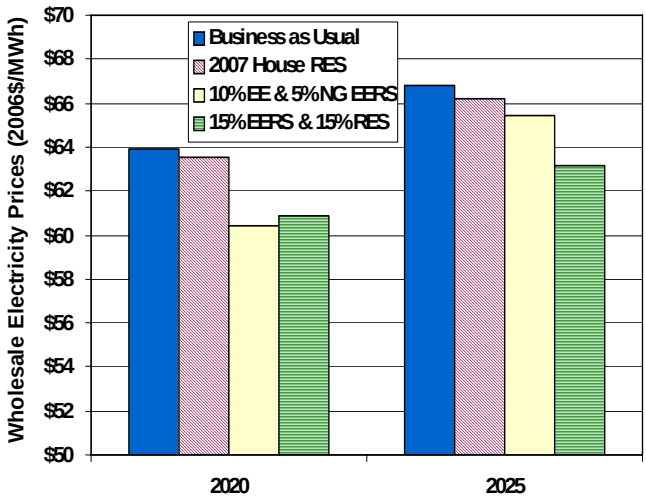


Figure 3 – Southeast Regional Wholesale Prices

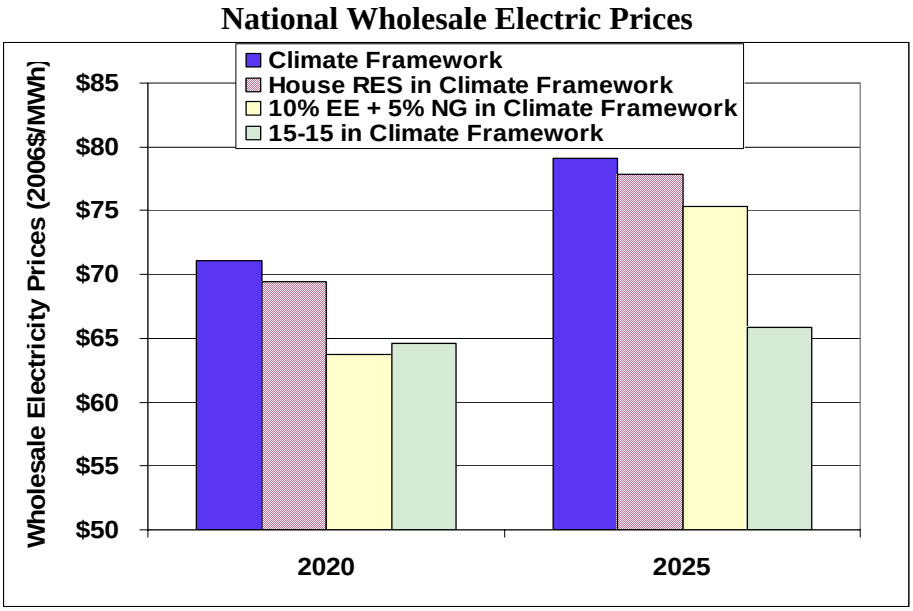


Source: ACEEE 2007

Relationship of an EERS to Climate Legislation

Energy efficiency is an essential ingredient of a cap and trade program as efficiency investments help to keep the costs of carbon regulation down. An EERS reduces the costs of a cap because it guarantees minimum investments in efficiency, which reduces energy demand and bills. When demand is down, money is saved because less new power plants need to be built and fewer existing power plants need to be upgraded. Energy efficiency is the least-cost (often no-cost or negative-cost) means of reducing heat-trapping emissions, and the potential reductions from efficiency are immense.

Explicitly promoting efficiency and renewables through an EERS and an RES in conjunction with a carbon cap makes the cap more affordable. The figure on the next page shows what wholesale electricity prices would be with just a climate framework, as compared to a combined climate-RES framework, a combined climate-EERS framework (with the EERS requiring a 10% reduction in electricity usage and 5% in natural gas usage by 2020), and a "Three Pillars" climate-RES-EERS framework. The "Three Pillars" approach yields lower prices by 2025 than any other combination.



Source: ACEEE 2007

Responses to Questions and Concerns About a Federal EERS

Can't we just rely on the market?

Some have argued that we should rely strictly on the market to adopt efficiency measures and do not need regulation. Related to this argument, others suggest that a carbon price alone will spur sufficient investment in energy efficiency and no further regulation is needed. However, these arguments ignore the substantial market barriers that impede energy efficiency investments including limited information on and stocking of efficient equipment, lack of capital to finance up-front efficiency investments, and third-party decision makers such as builders and landlords who purchase inexpensive equipment, since they do not pay equipment operating costs. Much higher energy prices will eventually spur efficiency investments, but with the economic dislocations that much higher energy prices can bring. With an EERS and other efficiency policies, efficiency investments are made without having to first drive energy prices sky-high.

Why not just leave to states to decide?

Currently, nineteen states are implementing a state-based EERS. Policy actions at the federal level are necessary to strengthen the continued development and implementation of energy efficiency at the state level and expand this policy to all 50 states. In some of the states that currently have an EERS, little to no direct electricity savings would be realized under the federal proposals. This is because the state EERS calls for greater energy savings than the federal 15% electricity savings target. Nearly all of these states do, however, stand to achieve increased natural gas savings as a result of the federal EERS. These states further benefit because the federal EERS will promote savings in nearby states, helping to reduce demand and energy prices

throughout the region. On a regional basis, a federal EERS stands to reduce energy bills, increase jobs, and reduce carbon emissions far beyond what any individual state can achieve on its own. Furthermore, even in states with an EERS, businesses will benefit from a federal EERS, through increased business for energy-saving equipment and services as companies in one state provide efficient goods and services in neighboring states.

Is cap & trade, an RES and an EERS together too much?

Energy efficiency and renewable energy investments can help lower the cost of electricity under cap and trade legislation, saving consumers money. In tandem, the benefits of both an efficiency and renewable energy standard are magnified because they help reduce the cost to consumers of cutting emissions. Energy efficiency helps reduce energy demand while cleaner, renewable energy replaces other, higher carbon-emitting sources, further reducing carbon dioxide emissions. Energy efficiency reduces the cost of cap-and-trade because less new energy facilities are needed and also because a smaller portion of existing facilities need to be upgraded to help meet emissions ceilings. As such, electricity prices under cap-and-trade legislation will be approximately 15 percent less if an EERS and RES are also in place.

Are the targets in S. 548 achievable?

The proposed savings targets 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. A summary of the results of state-level studies is provided on the next page and shows a median achievable energy efficiency potential of 18% electric savings, which is higher than the targets in S. 548. And utilities and states are showing these can be achieved in practice. Also on the next page is a chart showing energy efficiency achievements and targets in leading states, indicating quite a few states achieving or targeting more than 1% per year efficiency savings, putting them on a clear path to reach the S. 548 targets.

Meta-Analysis of Electricity Energy-Efficiency Potential Results

Region of Study	Total Efficiency Potential over Study Time Period (%)			Study Time Period (years)	Average Annual Efficiency Potential (%)		
	Technical	Economic	Achievable		Technical	Economic	Achievable
U.S. (Interlaboratory Working Group 2000)	NA	NA	24%	20	NA	NA	1.2%
Massachusetts (RLW 2001)	NA	24%	NA	5	NA	4.8%	NA
California (XenergyEF 2002)	18%	13%	10%	10	1.8%	1.3%	1.0%
Southwest (SWEEP 2002)	NA	NA	33%	17	NA	NA	1.9%
New York (NYSERDA/OE 2003)	36%	27%	NA	20	1.8%	1.4%	NA
Oregon (Ecotope 2003)	31%	NA	NA	10	3.1%	NA	NA
Puget (2003)	35%	19%	11%	20	1.8%	1.0%	0.6%
Vermont (Optimal 2003)	NA	NA	31%	10	NA	NA	3.1%
Quebec (Optimal 2004)	NA	NA	32%	8	NA	NA	4.0%
New Jersey (Kema 2004)	23%	17%	11%	16	1.4%	1.1%	0.7%
Connecticut (GDS 2004)	24%	13%	NA	10	2.4%	1.3%	NA
New England (Optimal 2005)	NA	NA	23%	10	NA	NA	2.3%
Northwest (NW Council 2005)	25%	17%	13%	20	1.3%	0.9%	0.6%
Georgia (ICF 2005)	29%	20%	9%	10	2.9%	2.0%	0.9%
Wisconsin (ECW 2005)	NA	NA	4%	5	NA	NA	0.7%
California (Itron 2006)	21%	17%	8%	13	1.6%	1.3%	0.6%
North Carolina (GDS 2006)	33%	20%	14%	10	3.3%	2.0%	1.4%
Florida (ACEEE 2007)	NA	25%	20%	15	NA	1.7%	1.3%
Texas (ACEEE 2007)	NA	30%	18%	15	NA	2.0%	1.2%
Utah (SWEEP 2007)	NA	NA	26%	15	NA	NA	1.7%
Vermont (GDS 2007)	35%	22%	19%	10	3.5%	2.2%	1.9%
Average	NA	NA	NA	12.8	2.3%	1.8%	1.5%
Median	29%	20%	18%				

Note: "Technical potential" are measures that are technologically possible to implement without regard to cost effectiveness. "Economic potential" is a subset of technical potential and is limited to measures that are cost effective (although the definition of "cost effective" varies from study to study.) "Achievable potential" is what can actually be achieved as a result of specific programs, policies, and implementation rates.

Source: DOE Electricity Advisory Committee, 2009, Keeping the Lights on in a New World, citing a 2008 ACEEE paper.

Energy Efficiency Savings and Targets in Leading States

State	Target	Notes
California	**6%**	**Actual savings in 2001 (2/3 behavioral)**
Vermont	**2.5%**	**Preliminary results for installations in 2008; achieved 1.75% in 2007; targets for 2009-2011 >2%**
Massachusetts	**2%+**	**Plan to ramp up to 1.5% by 2010, 2-3%/yr over following decade**
Illinois	**2.0%**	**After 7 year ramp-up; subject to cost caps**
Ohio	**2.0%**	**After a 10 year ramp-up; PUCO can find not feasible**
Maryland	**1.88%**	**15% by 2015; includes standards & codes**
New York	**1.88%**	**15% by 2015; includes standards & codes**
Connecticut	**~1.6%**	**Average derived from utility plan for 2008-2018**
New Jersey	**1.54%**	**Legislation authorizes target of 20% in 2020**
Minnesota	**1.5%**	**2007 legislation for electric and natural gas; includes standards & codes**
Rhode Island	**1.2%**	**2006 achievement**
California	**1.0%**	**10 year target is 10% savings**
Michigan, N.M., Public Service Colorado	**~1%**	**Targets ramp up to this level after a few years**

Source: ACEEE, based on a wide-array of sources.

Is the federal EERS administrable? Will it create a large federal bureaucracy?

We believe the EERS will not be difficult to administer and will not require a large federal bureaucracy. DOE will have to develop initial implementing rules, but it has experienced contractors who can help, and can build on existing state implementation rules. In terms of regulatory oversite, the proposed federal EERS has been set up similar to the proposed RES, with administration to happen at the state level if states are "willing and able". We expect most states to administer the program at the local level, preferring not to "trust the bureaucrats in Washington." The requirements in the law for utility reports on savings achieved is designed to mimic standard practice in many states, so that current procedures can largely be followed. The federal proposal has DOE reviewing state implementation every four years, with half the states to be reviewed every two years. This will require some DOE staff and contractors, but not a large bureaucracy.

Will an EERS penalize utilities who promote use of electric and natural gas vehicles and cost-effective fuel switching?

The Energy Information Administration projects electric transportation to grow from 0.2% of electric sales in 2006 to 0.3% of electric sales in 2030. In the event this growth speeds up, DOE should factor it into decisions setting post-2020 standards. This slight increase in electric sales due to electric plug-in hybrids should not affect a utilities ability to meet the EERS targets. We support an amendment to S. 548 making clear that DOE should factor in growth in electric and natural vehicle sales when setting post-2020 savings targets. Suggested wording is attached to my testimony.

Regarding switching from one fuel to another to the extent such switching saves consumers money, this is something that both the electric and natural gas industries seek (e.g. switching to some industrial electro-technologies or switching to natural gas use for space and water heating). However, we are not aware of instances yet where fuel switching has occurred to a degree that this would have a significant impact on sales and savings targets. If fuel-switching were to become more common in the future, DOE can and should factor this in when setting future targets.

Should we provide credit for early action?

Some progressive utilities that have run efficiency programs for decades are worried that the proposed federal EERS target will be much more difficult and costly for them to meet since they have already picked the "low-hanging fruit" that remains available to other utilities that have yet to act on efficiency.

States that have been implementing energy efficiency programs for a long time have the experience of knowing what types of programs work for their customers. Additionally, it has been a good business model for these early players, saving them money. In some cases though, it is true that the next kWh saved will be more costly, as the availability of "low-hanging fruit" decreases (although our research shows energy efficiency programs

continue to cost, on average, 3 cents per kWh)[4]. When we look at plans from such utilities as Massachusetts Electric, Narragansett Electric, Seattle City Light, and Austin Energy, it appears to that they should be able to meet the S. 548 targets by following their current plans, plus factoring in codes and standards. We will continue to research these issues further.

At the same time, those states that have a lot of potential energy savings (since they haven't reaped the low-hanging fruit) stand to achieve the easier savings at low cost but they do not have the experience of operating programs. This lack of experience at the utility as well as the regulatory level may act as a hurdle to getting successful programs running. For these states it's like going from 0 to 60 mph while the experienced states are already going 55 mph. To address these states and utilities, the savings targets in S. 548 start slowly, with significant savings delayed to the latter years. Also, S. 548 has a provision permitting a utility to miss the initial targets and make up the lost savings during the second reporting period.

Should an EERS and an RES be combined?

We prefer a separate EERS and RES because energy efficiency is too important to just leave it as a safety valve for an RES, a safety valve that would save far less energy than a separate EERS. But if the proposed EERS targets in S. 548 were added to whatever RES target Congress proposes, this objection goes away. Still, such legislation would need to include an EERS on natural gas utilities. One other consideration is that the proposed EERS and RES apply to slightly different entities. The EERS applies to distribution utilities, the RES to load serving entities. While these two are often the same, in the case of retail sales by independent power providers, the independent power provider is subject to the RES, while the electric distributor is subject to the EERS. This means that the distribution utility would likely offer the primary energy efficiency programs in a region, but independent power providers would either need to operate separate programs for their customers, or would need to contract with the distribution utility for efficiency services. Either option could work, but both are more complicated than just putting the obligation on the distribution utility.

Conclusion

ACEEE has been estimating the energy savings from potential energy legislation since the 1980s. We've conducted detailed analyses on the energy savings from the Energy Policy Act of 2005 (EPAct) and from the Energy Independence and Security Act of 2007 (EISA). We have done similar analyses for the pending provisions in 2009 energy legislation in both the House and Senate. The EERS in S. 548 will save more energy in 2020 than *all* of the efficiency provisions in EPAct combined [confirm] and nearly as much as *all* of the efficiency provisions in EISA combined (e.g. 4.5 quadrillion Btu's of energy from the EERS, 4.7 "quads" from all of EISA. The EERS is the "800 pound

[4] [Cite Five Years In]. ACEEE is now collecting updated data on the cost of efficiency programs and preliminary findings are that costs per lifetime kWh saved are about 3 cents.

gorilla" of energy efficiency policy. It is time to move federal energy efficiency policy into the big leagues by adopting a federal EERS.

A federal EERS along the lines of S. 548 will substantially reduce U.S. electricity and natural gas use, save consumers and businesses billions of dollars (nearly $170 from investments made through 2020), create more than 220,000 new jobs, and serve as a key policy for moderating the cost of federal climate change legislation. These benefits will not occur if energy efficiency is just a safety valve to a renewable energy standard. Energy efficiency is important enough in its own right that the U.S. deserves and needs an EERS with savings targets like those in S. 548. I strongly recommend that the next federal energy bill include such an EERS as a centerpiece.

This concludes my testimony. I am happy to answer any questions you may have.

References

Furrey, Nadel, and Laitner. 2009. *Laying the Foundation for Implementing a Federal Energy Efficiency Resource Standard*. Report E091. Washington, D.C.: American Council for an Energy-Efficient Economy.

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Nadel, Steven. 2006. *Energy Efficiency Resource Standards: Experience and Recommendations.* ACEEE Report E063. Washington, D.C.: American Council for an Energy-Efficient Economy.

Recommended Edits S. 548

[references need to be revised for S. 548]

To allow for electric vehicles, we recommend the following edits:

p. 301, line 12: Delete “and”.

p. 301, line 13: After “potential” insert “growth in market share of electric and natural gas vehicles, and opportunities to reduce vehicle electricity and natural gas use through vehicle efficiency improvements.”