



**Testimony of Steven Nadel
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**To the Senate Energy and Natural Resources Committee
Subcommittee on Energy**

**Hearing on Lessons for Federal Policy from State Efficiency and
Renewable Programs**

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Summary

States are increasingly taking action to help consumers and businesses reduce their energy use and costs and promote economic development through energy efficiency. In this testimony I describe six areas where states are taking action: utility programs and policies, building benchmarking and disclosure, financing, state lead-by-example efforts, combined heat and power systems, and building codes. Most states have some good energy efficiency policies, and I provide specific examples in each area. States can learn from the practices of other states. The federal government can assist states in a variety of ways including sharing best practices, technical assistance, facilitating coordination among states, and providing challenge funding for innovative efforts. I make specific suggestions in the discussion of each program area. In addition, in light of the current propane crisis in the upper Midwest and Northeast, I briefly discuss how states can use energy efficiency to reduce demand for propane and fuel oil.

I conclude that states are stepping out and leading energy efficiency efforts in the United States. In most cases these have been bipartisan measures. The federal government can learn from specific state efforts, and perhaps also see that energy efficiency enjoys bipartisan support and may be one of the few areas where Congress can make progress this year. The Senate Energy Committee reported out the Shaheen-Portman Energy Savings and Industrial Competitiveness Act (S. 1392) on a strong bipartisan vote. Since then a variety of bipartisan amendments have been added, including several that build on successful state efforts and would help states do more. I hope this spirit of bipartisanship will spread to the full Senate and House and that the Shaheen-Portman bill will be enacted into law.

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 that acts as a catalyst for energy efficiency policies, programs, technologies, investments, and behavior. We were formed in 1980 by energy researchers and now work with an array of researchers, businesses, and national, state, and local policymakers. I have been personally involved in energy efficiency issues since the late 1970s and have testified multiple times before this committee and its subcommittees as well as before the House Energy and Commerce Committee.

ACEEE has been working on state policy for more than a decade. We have assisted officials and organizations in more than half the states with policy and program development and implementation. We have an online database with detailed information on policies in each of the states (<http://aceee.org/sector/state-policy>). We also publish an annual State Energy Efficiency Scorecard that ranks each of the states on 26 variables and assigns an overall score.¹ These rankings have motivated many governors—including those at the top and bottom of the rankings—to take action to improve their state's rank. To provide just one example, at his 2012 Energy Summit, Governor Phil Bryant of Mississippi pledged to improve his state's low ranking, and in 2013 Mississippi was one of the most improved states in our scorecard. A summary map from our 2013 state scorecard is provided on the next page. Details for each of the states can be found at <http://aceee.org/state-policy/scorecard>.

¹ A. Downs et al., *The 2013 State Energy Efficiency Scorecard* (Washington, DC: American Council for an Energy-Efficient Economy, 2013). <http://aceee.org/research-report/e13k>.

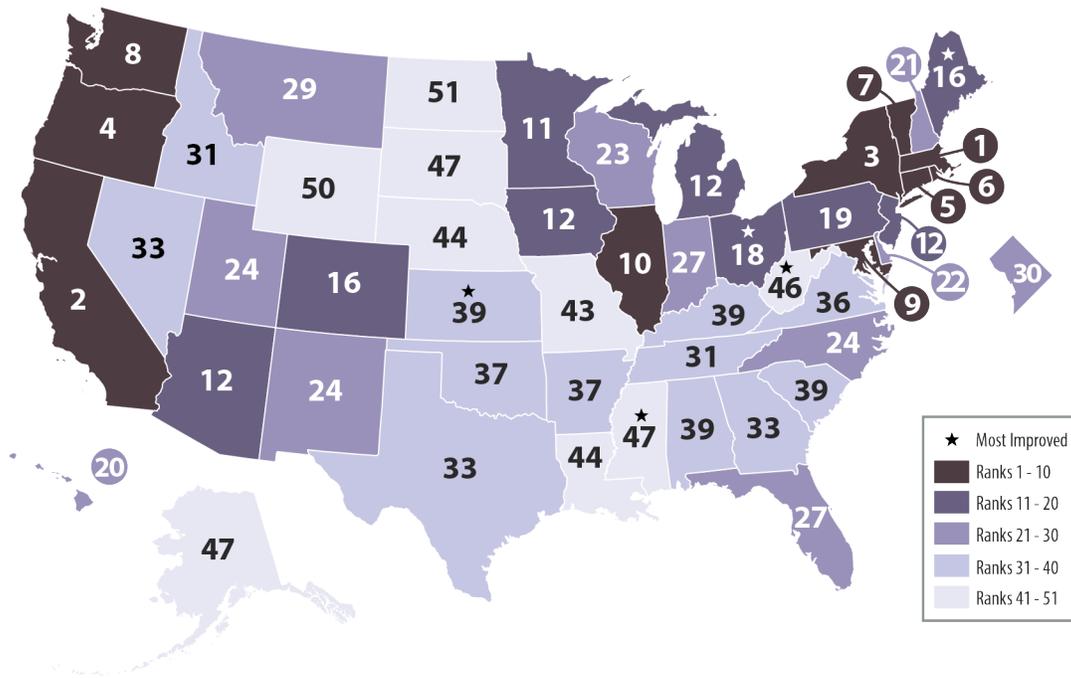


Figure 1. Summary results of ACEEE 2013 State Energy Efficiency Scorecard

Based on our analysis of state policy over the past decade, we are happy to report that the majority of states have taken action to promote energy efficiency as a means of saving energy, lowering consumer bills, and promoting economic development. Furthermore, we find that the number of state energy efficiency programs and policies is increasing each year. State action and leadership on energy efficiency are particularly important given the difficulties Congress has had in reaching consensus on energy policy in recent years.

In this testimony I discuss six areas where states can lead, and have led, on energy efficiency, providing specific examples for each. These areas are:

1. Utility programs and policies
2. Building benchmarking and disclosure
3. Financing
4. State lead-by-example efforts
5. Combined heat and power systems
6. Building codes

In addition, given the propane crisis now facing the upper Midwest, I have been asked to briefly discuss strategies for using energy efficiency to reduce demand for propane and heating oil.

Areas of State Leadership

Utility Programs and Policies

Electric and gas utilities serve nearly every American household. They are generally regulated monopolies with an obligation to provide quality and reliable services to all customers at reasonable rates. Over the past several decades, a substantial majority of states and utilities have recognized that programs that help utility customers to use energy more efficiently are less expensive per kilowatt hour (kWh) saved than the cost of generating a kWh from a new power plant. For example, a forthcoming ACEEE report finds that in recent years energy efficiency programs have cost utilities on average about 3 cents per kWh saved,² which is about one half to one third the cost of power from a new power plant as shown in figure 2 below.

In 2012 (the last year for which data are available), American utilities invested over \$7 billion in energy efficiency programs. Annual incremental savings from these programs totaled about 23 billion kWh per year, or enough energy to power over 2 million average American homes for a year.³ These programs save money for consumers and businesses in two ways. First, participants in the programs receive a direct benefit: lower energy use reduces their energy bills. Second, because energy efficiency programs are less expensive per kWh than new power plants, all customers benefit from a reduced need for rate increases to pay for expensive new plants. In some cases, energy efficiency savings can also defer or eliminate the need for transmission and distribution upgrades, further reducing the need for rate increases.⁴

² M. Molina, *Still the First Fuel: National Review of Energy Efficiency Cost of Saved Energy* (draft title) (Washington, DC: ACEEE, forthcoming April 2014).

³ Downs et al. 2013. See footnote 1.

⁴ Regulatory Assistance Project, *U.S. Experience with Efficiency as a Transmission and Distribution Resource* (Montpelier, VT: Regulatory Assistance Project, 2012). <http://raponline.org/document/download/id/6120>

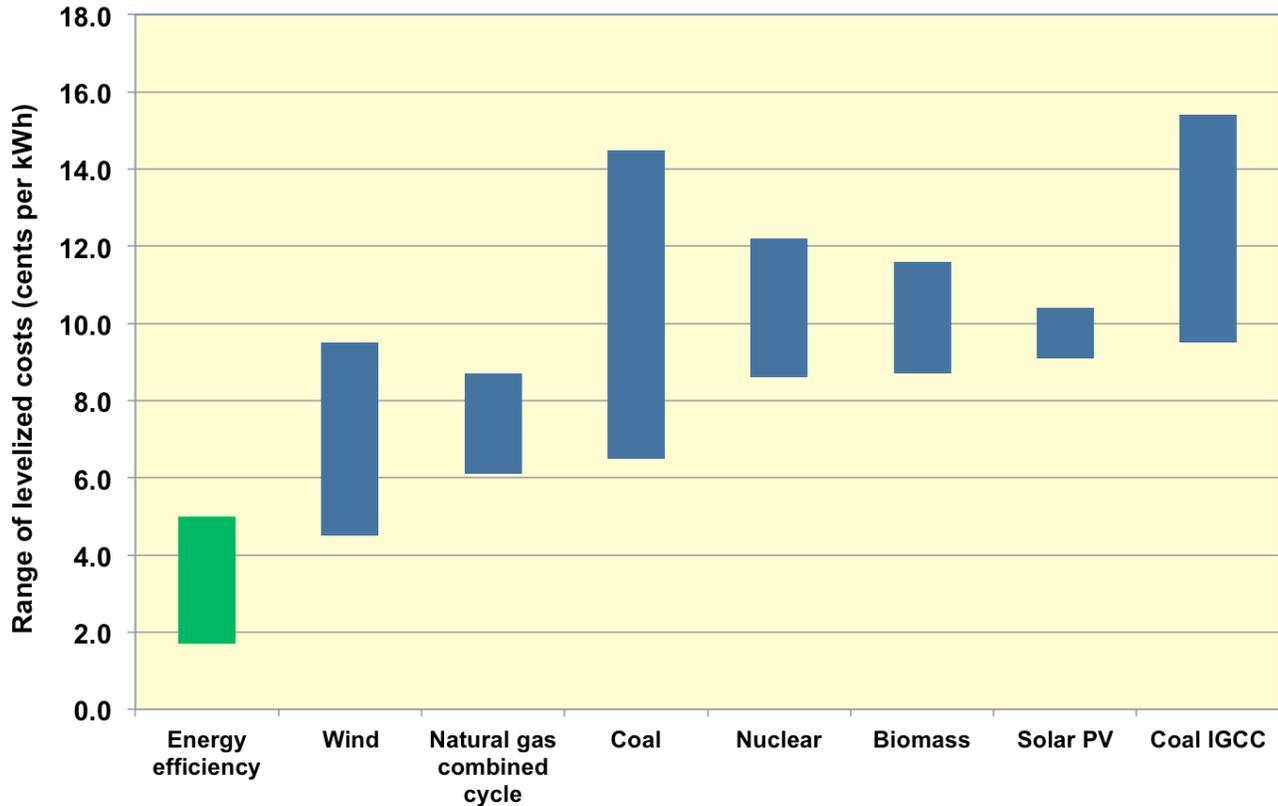


Figure 2. Cost per lifetime kWh of various electric resources. High-end range of coal includes 90% carbon capture and compression. *PV* stands for *photovoltaics*. *IGCC* stands for *integrated gasification combined cycle*, a technology that converts coal into a synthesis gas and produces steam. *Source*: Energy efficiency portfolio data from Molina 2014 (see footnote 2); all other data from Lazard 2013.⁵

Vermont is a leader in utility-sector energy efficiency programs. They have established an energy efficiency utility called Efficiency Vermont which operates energy efficiency programs in most of the state. Over the past decade, Efficiency Vermont’s programs have reduced electricity use by about 12%, a figure that is increasing by about 2% each year. In 2012, according to an Efficiency Vermont estimate that has been verified by the state regulator, the programs provided the state’s consumers and businesses with net economic benefits of \$102 million.⁶ An independent study estimated a net gain of about 1,900 job-years from 2012 investments plus spending of the money saved as a result of efficiency measures

⁵ Lazard, *Levelized Cost of Energy Analysis Version 7.0*. (Washington, DC: Lazard, 2013). http://gallery.mailchimp.com/ce17780900c3d223633ecfa59/files/Lazard_Levelized_Cost_of_Energy_v7.0.1.pdf

⁶ Efficiency Vermont, *2012 Annual Report* (Burlington, VT: Efficiency Vermont, 2013). http://www.efficiencyvermont.com/docs/about_efficiency_vermont/annual_reports/Efficiency-Vermont-Annual-Report-2012.pdf

installed in 2012.⁷ Energy efficiency creates jobs because designing and installing efficiency measures is generally more labor-intensive than building and operating new power plants.

Another recent example of state leadership comes from Arkansas where the Public Service Commission established a series of rules to provide policy guidance regarding energy efficiency programs and how utilities would be paid for this work. Arkansas began with a set of quick-start programs to gain experience and now has expanded to a full set of utility-run programs, with a savings target in 2015 of 0.9% of sales from measures installed in 2015. In 2013, the neighboring states of Mississippi and Louisiana decided to begin utility energy efficiency programs using the Arkansas model.

Utility regulation is primarily the province of states. However, the federal government does provide technical assistance to states through the State and Local Energy Efficiency Action Network (SEE Action), a joint project of DOE and EPA. This program conducts studies on best practices that all states can use and also provides customized assistance when requested by states.

A more aggressive federal strategy would be to establish federal energy-saving targets for utilities. Twenty-six states have set such targets.⁸ A forthcoming ACEEE study finds that most of these states are either exceeding, meeting, or close to meeting their targets.⁹ Based on this record of success, Senator Markey has proposed federal targets in S. 1627.

Building Benchmarking and Disclosure

A variety of states and cities have established policies to require benchmarking buildings' energy performance relative to similar buildings; in some cases they also require the disclosure of this information to potential purchasers or renters. Some policies apply just to public facilities, others to large properties (e.g., buildings with a floor area of 50,000 square feet or more), and others more broadly. Such policies allow building owners to identify inefficient buildings and target them for retrofits. Where disclosure is required, knowledge of building operating costs can inform the decisions of prospective purchasers and renters.

The District of Columbia and Kansas provide examples of what states can do. In the District of Columbia, by later this year all commercial and multifamily buildings over 50,000 square feet will be required to report benchmarking data to the District on a yearly basis. The EPA ENERGY STAR® Portfolio Manager is used to measure a building's energy performance. In the District, 266 buildings, representing 90 million square feet have taken the next step and been certified with the ENERGY STAR label. District buildings of more than 150,000 square feet were required to report their 2012 energy and water use to the District Department of the Environment prior to April 2013. The scope of the policy is set to expand in coming years and will ultimately include all commercial and multifamily buildings of more than 50,000 square feet.

⁷ Optimal Energy and Synapse Resource Economics, *Economic Impacts of Energy Efficiency Investments in Vermont: Final Report* (Rutland, VT: Optimal Energy, 2011). Appendix 5 in http://publicservice.vermont.gov/sites/psd/files/Pubs_Plans_Reports/State_Plans/Comp_Energy_Plan/2011/2011%20CEP_Appendixes%5B1%5D.pdf. A job year is a full-time-equivalent (FTE) job for one year.

⁸ Downs et al. 2013. See footnote 1. This scorecard lists 25 states; Connecticut is a more recent addition.

⁹ A. Downs and C. Cui, *EERS Progress Report* (draft title) (Washington, DC: ACEEE, forthcoming March 2014).

In Kansas, a law was passed in 2003 requiring the disclosure of energy efficiency information for new homes (K.S.A. 66-1228). The state developed a standard reporting format for builders and sellers in which new homes' features are compared to the state's energy code guidelines. The energy rating law was amended in 2007 to move the time of disclosure from the time of closing to the time the house was being shown. A completed energy efficiency checklist must be made available to potential buyers.

The federal government can help state efforts in this area by providing technical assistance and perhaps some funding to help states and other market players get started. S. 1206, introduced by Senator Franken, will encourage and help states to do benchmarking and disclosure by (1) conducting a study on benchmarking and disclosure best practices, (2) combining existing databases of benchmarking data to make it easier to compare and analyze data, and (3) establishing a small competitive grant program for utilities and their partners to make whole-building data available to building owners and help them benchmark the performance of their buildings. My understanding is that Senators Shaheen and Portman will be incorporating this bill into their larger Energy Savings and Industrial Competitiveness Act (S. 1392). We commend Senators Franken, Shaheen, and Portman for their efforts to develop this bill and move it forward.

Financing

Energy efficiency measures generally require an up-front cost but then pay back in terms of lower energy bills over several years. While some consumers and businesses have access to the capital needed to make these investments, consumers who lack the capital need financing to undertake energy-saving projects. Some building owners finance efficiency upgrades when they refinance their mortgages. While some banks are interested in financing specifically for energy efficiency upgrades, most are unfamiliar with such upgrades and so are not involved in this market. To facilitate the flow of private capital into this market, many states have partnered with banks and other lenders in a variety of ways to make financing widely available. Other states have set up their own financing and/or incentive programs. Two strong examples are Pennsylvania and Alaska.

Pennsylvania has offered the Keystone HELP program since 2006. The program is run out of the State Treasurer's office. AFC First Financial, an independent financial institution, originates the loans and completes the work through a network of approved in-state contractors. To date, more than 11,000 loans have been made totaling about \$75 million. Capital was initially provided through the Treasurer. However in 2013 the Treasurer packaged and sold nearly 4,700 loans to investors, raising \$31.3 million to replenish the capital available for new loans.

Alaska uses substantial state appropriations to fund energy efficiency incentive programs. The Home Energy Rebate Program uses \$160 million in state funding appropriated in 2008, a major investment relative to the state's population, but an important one given the state's extreme climate and high heating bills. The program allows rebates of up to \$10,000 based on improved efficiency and eligible receipts. Energy ratings are required before and after the home improvements. The program also provides expert advice on energy efficiency improvements for consumers and tracks their savings.

To take a few more examples, Texas has run a very successful "LoanStar" program for more than two decades. Tennessee has partnered with Pathway Lending, a small-business lending initiative that has grown into a statewide economic development lender, to provide low-interest energy efficiency loans to businesses. Nebraska has a Dollar and Energy Savings Loan program that has financed a range of projects covering all sectors. Connecticut's new "Green Bank" program is off to a good start, particularly

with commercial PACE loans. (PACE is an acronym for Property Accessed Clean Energy, a financing system where the financing charges are included on property tax bills.) Hawaii has also started some interesting on-bill financing programs in the past few years, but I will let the witness on this panel from the Hawaii Energy Office discuss these.

The federal government can help with technical assistance and making capital available. The Federal Housing Administration is offering an Energy Savers loan program that some states are promoting. The federal government should also study the default rate for energy efficiency loans and for mortgages associated with such loans to provide improved information on the relative risk of various types of energy efficiency financing.

In addition, several relevant bills are pending before Congress. Senators Sanders, Wyden, and Murkowski introduced S. 1200 to expand the availability of residential financing. Congress can also make it easier to use home mortgages to improve a home's energy efficiency at the time of purchase. S. 1106 by Senators Bennet and Isakson introduces a variety of reforms in this regard. My understanding is that Senators Shaheen and Portman will incorporate this latter bill into S. 1392.

State Lead-by-Example Efforts

States can make their own buildings, fleets, and other facilities more energy efficient and thereby reduce their operating costs. Such efforts also set a good example that shows in-state businesses what they can do.

To take one instance, over the past decade Minnesota has shown its commitment to sustainable buildings by setting high performance standards and implementing integrated programs that design, manage, and improve building energy performance. The state has set a long-term goal of having a zero-carbon state building stock by 2030, and it offers a complementary benchmarking program to track energy use as well as a program to help implement retrofits. Minnesota also requires on-road vehicles owned by state departments to reduce gasoline consumption by 50% by 2015. Additionally, new on-road vehicles must have a fuel efficiency rating that exceeds 30 mpg for city and 35 mpg for highway.

In Mississippi, the Energy Sustainability and Development Act of 2013 requires all state agencies to report energy consumption or face penalties. Agencies work with the Mississippi Development Authority Energy and Natural Resources Division to develop energy management plans. The state has also set a goal of achieving 20% energy savings in public facilities by 2020 and has upgraded its energy codes for public and private buildings. Mississippi is also working to improve its fleet efficiency, requiring at least 75% of state vehicles to meet fuel economy standards of at least 40 mpg by mid-2014.

Likewise, Hawaii's lead-by-example program offers comprehensive energy efficiency services to state agencies. Aggressive policies underpin the program and include a benchmarking requirement that all state agencies evaluate energy efficiency in existing buildings of qualifying size and energy characteristics. Each agency sets benchmarks for these buildings using ENERGY STAR Portfolio Manager or a similar tool, and buildings must be retro-commissioned every five years.¹⁰ In addition,

¹⁰ When a building is new, its various systems need to be tested and calibrated so they operate as designed, a process called commissioning. But systems get out of calibration and should be periodically retro-commissioned.

new state buildings must meet LEED Silver standards. As a result of Hawaii's lead-by-example program, in 2011 total state agency electricity consumption was 4.6% below that of the 2005 baseline year.

Oklahoma also stands out in this area. Their lead-by-example efforts were a key factor in their being recognized as one of the most improved states in the *ACEEE 2012 State Energy Efficiency Scorecard*.

The federal government has been a leader in developing Energy Savings Performance Contracts (ESPC) that leverage private capital to upgrade federal buildings. While quite a few states have used this mechanism, some have not. The Department of Energy should step up its efforts to help these latter states establish their own ESPC programs.

Combined Heat and Power

Combined heat and power (CHP) systems produce both heat and electricity at the same time. By using the same system to produce both forms of energy, waste is reduced and much higher efficiencies can be obtained. For example, with CHP systems, combined efficiencies of 60% to 80% can be obtained, much better than the 30% efficiency of an average power plant or even the 50% efficiency of a new high-efficiency plant.

The growth of CHP has been slow due to a variety of barriers in some states, including overly stringent requirements to hook up to the electric grid, high backup power charges, and environmental regulations that fail to recognize the higher efficiency of CHP systems.

Some states are leading the way to increase the use of cost-effective CHP systems. For example, in May 2013, Texas House Bill 2049 became law, amending the state Utilities Code to allow owners of CHP units to sell excess electric power at retail prices to more than one purchaser of the CHP unit's thermal output. Owners of CHP units who do this are not subject to regulation as a retail electric utility. This new law should make it simpler for CHP operators to sell excess power and make investment in CHP more attractive.

After New Jersey was particularly hard hit by Hurricane Sandy in October 2012, the state began to look at CHP as protection against future extreme weather events. New Jersey previously had CHP incentive programs and had set a target of 1,500 megawatts (MW) of new CHP facilities by 2020. Following Sandy, the state decided to prioritize facilities such as hospitals, prisons, and wastewater treatment plants that would be most in need of power in the event of another Sandy-like scenario. New Jersey is now establishing new policies and programs to put these plans into effect.¹¹

The federal government can encourage and help states to adopt policies that support cost-effective CHP systems. The joint DOE/EPA SEE Action program is one example. Federal tax incentives are also available for CHP systems meeting efficiency thresholds, a program originally enacted in the Emergency Economic Stabilization Act of 2008.

¹¹ M. Winka, "New Jersey's Clean Energy Program: Opportunities for CHP" (presentation to NGA Policy Academy on Industrial EE and CHP) (Trenton, NJ: New Jersey Board of Public Utilities, 2013).
<http://www.nga.org/files/live/sites/NGA/files/pdf/2013/1303PolicyAcademyWINKA.pdf>.

Building Codes

Most states have building codes that specify construction practices to protect health and safety and reduce building energy use. In the case of energy use, national consensus organizations develop model codes (e.g., the American Society of Heating, Refrigerating and Air-Conditioning Engineers [ASHRAE] and the International Energy Conservation Code [IECC]). States generally adopt these model codes, which are typically updated every three years.

The American Recovery and Reinvestment Act of 2009 (ARRA) encouraged states to adopt the then most recent codes. Forty states plus the District of Columbia have either adopted at least one these codes or were on a clear path to adoption as of October 2013. Moreover, 14 states have adopted a code based on model codes published in 2010 or their equivalent. Of these, ten states updated both residential and commercial codes (California, Connecticut, Illinois, Iowa, Maryland, Massachusetts, New York, Rhode Island, Vermont, and Washington), and four states updated just commercial codes (Mississippi, North Carolina, Oregon, and Utah).

Working to improve compliance with the codes is also important. Idaho is a good example. They have developed a plan to achieve 90% compliance with their code by 2017, and the Idaho Energy Code Compliance Database for tracking compliance has been operational since June 2012. Idaho is working with the Northwest Energy Efficiency Alliance (a regional organization serving four northwestern states) to measure compliance in the residential sector, and the initial results are quite good. Idaho also has an energy code collaborative stakeholder group that trains building officials, builders, and other contractors.

The federal government has been working with the model code organizations and states for many years. DOE could improve these efforts by setting targets for new codes through a public process, providing increased technical assistance to code-setting organizations, and better assisting and encouraging states to adopt the latest codes and implement them well. Such provisions are contained in Title I of the Energy Savings and Industrial Competitiveness Act (S. 1392) which was reported out of the full Energy Committee last year. DOE assistance to states to help with code development and implementation is underfunded; we encourage this committee to work with the Appropriations Committee to rectify this situation.

Policies to Reduce Propane Use

The Energy Information Administration estimates that in 2013, about 0.50 quadrillion Btu (“quads”) of propane were used in the residential sector, 0.15 quads in the commercial sector, and 0.05 quads for transportation. Much more was used in industry, but propane is combined with other fuels and not broken out.¹² Given the current propane shortage and the likelihood that the events that precipitated this shortage could happen again, it makes sense to improve the energy efficiency of propane-fired appliances and propane-heated buildings. Accelerated efficiency efforts for propane will not solve the current crisis, but they can help avert future crises.

¹² Energy Information Administration (EIA), *2014 Annual Energy Review, Early Release* (Washington, DC: EIA, 2013). <http://www.eia.gov/forecasts/aeo/er/>.

In 2006 ACEEE published a study called *Reducing Oil Use through Energy Efficiency: Opportunities Beyond Cars and Light Trucks*.¹³ As most propane comes from oil, this study included many energy efficiency opportunities to reduce propane use, including more efficient propane-fired furnaces and water heaters, and improving the energy efficiency of propane-heated homes. For example, we found opportunities to reduce propane for home heating by about 38%, and opportunities to reduce propane for water heating by about 28%.

Many utilities offer energy efficiency programs for homes and businesses that use electricity and natural gas. But none offers programs for propane and fuel oil, and the fuel dealers are usually too small and undercapitalized to offer energy efficiency services. To address this gap, several states have begun programs to help residents using propane and oil. These programs are most common in the Northeast where a higher proportion of homes use oil and propane than in other regions.

For example, in addition to its electric efficiency program, Efficiency Vermont spends about \$5 million per year on programs to save unregulated fuels including propane, oil, and wood. The funds come from Efficiency Vermont bids into the ISO-New England forward capacity market and from sales of emissions allowances under the regional greenhouse gas program. Most of the funds are used for the Home Performance with ENERGY STAR residential retrofit service, which retrofitted about 1,300 homes using unregulated fuels in 2013. Smaller funding amounts serve the small business and commercial sectors.¹⁴ An alternative funding source is illustrated by New York state, which has a very small tax on fuel oil. States could use a similar mechanism for propane, with the funds benefitting propane users.

The federal government could encourage and assist more states to implement energy efficiency programs for unregulated fuels through technical assistance, competitive grants, and financing.

Conclusion

States are stepping out and leading energy efficiency efforts in the United States as a way to save energy, lower consumer bills, and promote economic development. States can learn from each other to help advance their efforts. The federal government can help with information on best practices, technical assistance, matching grants for innovative efforts, and assistance in setting up financing programs. The federal government can also learn from successful state efforts and pass legislation such as the Shaheen-Portman bill (S. 1392) that builds on what states have done so far to help them do more in the future.

Good programs and policies are found in the majority of states, both blue and red. Energy efficiency has been a bipartisan effort at the state level, as it has been in the Senate Energy Committee. I hope this spirit of bipartisanship can spread to the full Senate and House.

This concludes my testimony. Thank you for the opportunity to present this information.

¹³ R.N. Elliott et al., *Reducing Oil Use through Energy Efficiency: Opportunities Beyond Cars and Light Trucks* (Washington, DC: ACEEE, 2006). <http://aceee.org/research-report/e061> .

¹⁴ Scott Johnstone, Executive Director, Vermont Energy Investment Corp. (which runs Efficiency Vermont), email to Steven Nadel, February 6, 2014.