S. HRG. 111–28

ENERGY EFFICIENCY RESOURCE STANDARDS

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

TO

RECEIVE TESTIMONY ON ENERGY EFFICIENCY RESOURCE STANDARDS, INCLUDING BILL S. 548, A BILL TO AMEND THE PUBLIC UTILITY REGULATORY POLICIES ACT OF 1978 TO ESTABLISH A FEDERAL ENERGY EFFICIENCY RESOURCE STANDARD FOR RETAIL ELECTRICITY AND NATURAL GAS DISTRIBUTORS, AND FOR OTHER PURPOSES

APRIL 22, 2009

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ENERGY EFFICIENCY RESOURCE STANDARDS

WEDNESDAY, APRIL 22, 2009

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 10:00 a.m. in room SD–366, Dirksen Senate Building, Hon. Jeff Bingaman, chairman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. Before we go ahead and get started here, I am told that Senator Murkowski may not be able to be here or if she is, she will have to be late, so let me give a short statement and then call on Senator Schumer for his statement.

The purpose of this hearing is to discuss proposals for establishing Federal Energy Efficiency Resource Standard for retail electricity and natural gas distributors and related issues, which Senator Schumer has introduced as S. 548, The Save America Energy Act sponsored by him here in the House and in the Senate, by Congressman Markey in the House.

Both bills would create a Federal energy efficiency resource standard that would be independent of the Renewable Electricity Standard.

A special draft of this renewable electricity standard will be considered by our committee and when we have our next business meeting, we hope, this next week, and it will allow any States that the renewable electricity standard which I am referring to, will allow the States to meet 20 percent of that requirement through energy efficiency measures.

The committee has invited witnesses who represent diverse interests and opinions on a Federal EERS. We hope to learn more about the current efforts at the State level, where the EERS provisions have been enacted, and how a Federal EERS would work or whether efficiency standards will be combined with or linked to a Federal renewable electricity standard.

So the other topics that we hope to cover include energy savings that we can hope to achieve through these programs, whether an EERS will reduce the cost of wholesale electric prices under a carbon cap, whether retail gas and electric distributors would have difficulties meeting the EERS, and what impact a Federal EERS would have on the level of efficiency investments across the board.

So I will start with Senator Schumer and we are glad to have him and hear his remarks about the bill that he has introduced, and then following that, we will go through the other witnesses.

Senator SCHUMER.

STATEMENT OF HON. CHARLES E. SCHUMER, U.S. SENATOR FROM NEW YORK

Senator SCHUMER. Thank you, Mr. Chairman. It's very good to be here. I want to first thank you, and Ranking Member Murkowski, Senator Menendez, all of the members of the committee of the very good work you are doing on such a vital topic in our country today, which is how do we both clean and reduce our energy consumption.

The bill I have introduced with Senator Sanders would set a national goal for energy savings for retail electricity and natural gas distributors between 2012 and 2020. This goal, the energy efficiency resource standard is similar in structure to the Renewal Energy Standard that you folks will deal with later this week.

The legislation I introduced, has been introduced on the House side by Congressman Markey and Waxman, and it included in their discussion draft of their energy bill released last month.

Specifically it would require a 15 percent retail electricity savings and a 10 percent natural gas savings through the adoption of simple, currently available energy efficiency measures for a total 8 year savings to consumers of $170 billion and an estimated job creation of 222,000.

An easy way of thinking about this approach is while Renewal Energy Standard (RES)focuses on what you burn, the Save America Energy Act is concerned with how much you burn. Until we address the demand side of the energy equation in a meaningful way, we are not going to be able to put our Nation on the right path toward a new energy economy.

America is at a critical juncture in its history. We all know that we face an economic crisis like none we have experienced since the Depression, and at the same time we have tremendous opportunity to generate innovative energy industries to replenish job loss, as well as putting America on the path toward independence from foreign oil.

A lot of talk in Washington is focused on the RES, the Renewable Energy Technology and Jobs, and we need to put similar focus on developing technologies and jobs that can be put into energy efficiency.

Mr. Chairman, you will be one of the first to recognize all of these conservation measures in the legislation we voted on last year, and subsequently I applaud the committee for your efforts.

So about the EERS proposal. Energy efficiency is easy. It is cheap. It is clean and may be just as important for our body, it's non-ideological. You don't get into any of the ideological fights.

Energy efficiency is indeed, a low hanging fruit of energy policy. The Save America Energy Act would be implemented and enforced at the State level. It would compliment 19 existing State standards. My State of New York has one, which are already saving energy—and sparing consumer pocketbooks—across the country.

It would allow States to tailor their programs to their specific needs, because the bill leaves it to the States to determine specific efficiency programs and rate structures of utilities to pursue, to achieve a National Standard, and thereby allow States to attain equal or higher efficiency standards should they so wish, and the ability of flexibility for utilities, too. They can comply with the bill through a variety of mechanisms. Among them, not exclusively, but just a sample: building codes, offering discounts and rebates for energy star appliances, installing programmable thermostats, energy efficiency lighting, better installation, and retrofitting and weatherizing homes.

So the policy is not a "one-size-fits-all." The Federal Government sets the minimum goals and lets the State decide how to reach them.

Second, the EERS is cheap. It's going to save consumers, as I mentioned, 170 billion over 8 years on their energy bills, freeing up dollars that can be spent elsewhere in the economy.

According to a study by the American Council for Energy-Efficient Economy, the bill will create 220,000 jobs by 2020, and reduce the cost of comprehensive cap-and-trade policy, which I know this committee is concerned about, by removing the need to build new power plants, shrinking the number of existing facilities that need to be upgraded, and driving consumer electricity prices lower as demand falls.

So the bill is a down payment on the type of major global warming legislation that Congress plans to proceed down the road. It compliments it, it doesn't replace it, I would add that.

Third, EERS is clean. The legislation would lead to an overall reduction of greenhouse gas emissions, resulting in carbon dioxide reductions totaling about 260 metric million tons in 2020. That's the same as taking 43 million automobiles off the road for a year.

Finally it's practical, non-ideological and could be implemented quickly.

So Mr. Chairman, we know that the climate change debate has been contentious one that is going to take some time. But we also know that in these challenging times we can't afford politics as usual. This is something that in circumstance may bridge politics, hopefully even transcendent it a little bit, and move forward.

It is technology neutral. It's not about coal or natural gas or electricity, hydro, solar, wind or any other type of energy. Whichever type of energy the utility uses, they have to use it more efficiently and distribute it more efficiently. The bill is about implementing an energy standard that will benefit States.

By the way, we know this approach works. It has worked in many States: California, New York, Texas, Connecticut, Vermont and Nevada are very successful.

So I hope that the committee will include this proposal, S. 548, in comprehensive energy legislation in your plans because of its advantages.

I want to thank you for the opportunity to testify.

[The prepared statement of Senator Schumer follows:]

PREPARED STATEMENT OF HON. CHARLES E. SCHUMER, U.S. SENATOR FROM NEW YORK

Good morning, Mr. Chairman, Senator Murkowski and distinguished members of the Committee. I appreciate the opportunity to appear before you today to discuss S. 548, The Save American Energy Act.

This bill, which I have introduced with Senator Sanders, would set a national goal for energy savings from retail electricity and natural gas distributors between 2012 through 2020. This goal, the energy efficiency resource standard (EERS), is similar in structure to the Renewable Energy Standard (RES). The legislation has been introduced on the House side by Congressmen Markey and Waxman, who have included it in the discussion draft of their energy bill released last month.

Specifically, it would require 15% retail electricity savings and 10% natural gas savings through the adoption of simple, currently available energy efficiency measures, for a total 8-year savings to consumers of $170 billion and estimated job creation of 222,000.

An easy way of thinking about this approach is—while a renewable energy standard focuses on what you burn, the Save America Energy Act is concerned with how much you burn. And until we address the demand side of the energy equation in a meaningful way, we will be unable to put our nation on the right path towards a new energy economy.

America is at a critical juncture in its history. We face an economic crisis not experienced since the Great Depression—a crisis that is resulting in the loss of hundreds of thousands of American jobs a month.

At the same time, we have a tremendous opportunity to generate new innovative energy industries to replenish these job losses while putting America on the path towards independence from foreign oil.

A lot of talk in Washington has focused on renewable energy technologies and jobs. We need to put just as much focus on developing technologies and jobs to implement energy efficiency.

Mr. Chairman, you have recognized the potential for a new energy policy in America to turn our economic ship around—and I applaud your efforts.

Today, I am here to talk about an approach that I firmly believe deserves this panel's consideration as part of a comprehensive overall energy policy. Energy efficiency is easy. It is cheap. It is clean. And importantly, it is non-ideological.

First, it is easy. Energy efficiency is indeed the "low-hanging fruit" of energy policy.

The Save American Energy Act would be implemented and enforced at the state level and would complement 19 existing state standards, including New York's, which are already saving energy—and sparing consumers' pocket books—across the country.

This legislation would allow states to tailor their programs to their specific needs. The bill leaves it to states to determine the specific efficiency programs and rate structure that utilities could pursue to achieve the national standard, and allows the states to set or retain equal or higher efficiency standards.

And the bill leaves flexibility for utilities, too. They can comply with the bill through a variety of mechanisms, including building codes, offering discounts and rebates for energy star appliances, installing programmable thermostats, energy efficient lighting, installing better installation, and retrofitting and weatherizing homes.

This policy is not "one-size-fits-all." The federal government sets the minimum goals and lets the states decide how to reach them.

Second, the EERS is cheap. The energy savings under The Save American Energy Act will save consumers $170 billion over the course of 8 years on their energy bills, freeing up dollars that can be spent elsewhere in the economy, giving consumer spending a much needed shot in the arm and creating a demand for green jobs, such as energy auditors, engineers, and installers of energy efficient equipment.

According to a study by the American Council for an Energy-Efficient Economy, the bill would create an estimated 222,000 American jobs by 2020.

The bill would also reduce the cost of a comprehensive cap-and-trade policy by removing the need to build new power plants, shrinking the number of existing facilities that need to be upgraded, and driving consumer electricity prices lower as demand falls. This bill is a down payment on the type of major global warming legislation that Congress plans to pursue down the road.

Third, it is clean. My legislation would lead to an overall reduction in greenhouse gas emissions, resulting in carbon dioxide emissions reductions totaling approximately 260 million metric tons in 2020—equivalent to taking 43 million automobiles off the road for a year.

Finally, it is a practical, non-ideological policy that could be implemented quickly. We all know that the climate change debate has been a contentious one, and will take some time to work out a cap and trade policy that will accommodate the diverse range of energy sources across our nation.

But we also know, in these challenging times, this country cannot afford politics as usual. The Save America Energy Act is a non-ideological, common sense way to prepare the nation for the potential benefits of a climate change policy while creating new jobs.

This bill is technology neutral. It is not about coal, natural gas, electricity, hydro, solar, wind or any other type of energy, be it renewable or otherwise. This bill is about implementing an energy standard that will benefit all states by saving them energy, money, and creating jobs.

And most importantly, we know this approach works. We've seen successful energy efficiency resource standards already implemented in states like California, New York, Texas, Connecticut, Vermont, and Nevada.

In conclusion, I urge the Committee to include The Save America Energy Act in the comprehensive energy legislation that you are planning. It is an easy, cheap, clean and non-ideological way of fast-tracking a new energy economy at a time when we need it most.

Thank you again for the opportunity to testify today.

The CHAIRMAN. Thank you very much. Thanks for your leadership in putting this bill forward.

Senator Menendez, do you have any questions of our colleague?

Senator MENENDEZ. No. I just want to compliment Senator Schumer for putting forth a very good idea and one that I hope we will move forward with.

The CHAIRMAN. Thank you very much. We appreciate it.

Senator SCHUMER. I very much appreciate the opportunity to testify.

The CHAIRMAN. No problem. Let me call Panel Two forward and I will introduce folks as they come to take their chairs at the table.

Ms. Patricia Hoffman is the Acting Deputy Assistant Secretary for the Office of Electricity Delivery and Energy Reliability in the Department of Energy, and we are glad to have her here.

Mr. David Manning is Executive Vice President for External Affairs for the National Grid in Brooklyn, New York.

Mr. Centolella is Commissioner with the Utility Commission of Ohio, in Columbus. We thank you for being here.

Mr. Thomas Skains is the Chairman of the American Gas Association, and we thank you for being here.

Mr. Steve Nadel is Executive Director of the ACEEE, here in Washington. He's a frequent testifier before our committee.

Mr. Rich Wells is the Vice President for Energy with Dow Chemical Company in Michigan.

Why don't we just ask each of you to take 5 or 6 minutes and summarize the main points you would like us to understand. We will hear from all 6 of you, and then we will ask some questions.

So Ms. Hoffman, why don't you start off?

STATEMENT OF MS. PATRICIA HOFFMAN, ACTING DEPUTY ASSISTANT SECRETARY, OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY, DEPARTMENT OF ENERGY

Ms. HOFFMAN. Mr. Chairman and members of the committee, thank you for this opportunity to testify before you on S. 548, which seeks to amend the Policy Utilities Regulatory Policy Act of 1978 and establish a Federal Energy Efficiency Resource Standard for the retail electric and natural gas distributors.

President Obama is committed to a comprehensive energy plan that reduces our greenhouse gas emissions and increases our energy security.

We are already putting Americans to work making homes and buildings more energy efficient through the significant investment of the American Recovery and Reinvestment Act, which will grow our economy while cutting energy bills for American families.

Over the last several decades the experiences of leading electric and gas utilities, third party program administrators and State agencies administering energy efficiency programs have shown that it can be a more reliable way to deliver energy services to electric and gas ratepayers.

Electric and gas utilities are increasingly addressing energy efficiency in their resource planning and investment decisions. For example, the Department of Energy funded a 2008 analysis by Lawrence Berkeley National Laboratory for the Western Interstate Energy Board, which found that 16 utilities in the western United States are planning on meeting 31 percent of their projected customer load growth by improvements in energy efficiency.

The bill would set a national requirement for energy savings between 2012 and 2020 for retail distributors of both electricity and natural gas. These utilities would then be required to use cost effective energy efficiency measures in their resource and planning decisions.

The saving requirement would begin in 2012 and then increase as energy efficiency investments accumulate over the next decade.

In addition to the contribution of utility energy efficiency programs to the achievement of these requirements, there is also flexibility in the provisions that would count gains from more stringent building codes and equipment standards, as well as combined heat and power.

Electric utility efficiency savings on their distribution networks are also included. Further, non-utility efficiency providers, including States, that instead administer efficiency programs using utility ratepayers funds, can participate through bilateral contracts.

Cumulative rather than annual reduction targets are used, presumably since efficiency measures installed in the early years continue to save energy during the compliance period.

A cumulative savings approach also encourages utilities to install energy efficiency measures with long economic lifetimes as they will continue to contribute to the savings requirements for many years.

The administration has not completed its analysis of S. 548, and therefore the administration does not have a position on it at this time. The Department does have some technical comments to make on the bill, particularly on its role in implementing the legislation if enacted.

First, reliably delivering energy efficiency is not without its challenges. Experience with efficiency programs at the State level indicate that good evaluation, measurement and verification (EM&V) protocols are required to assure that savings from energy efficiency measures and programs are verified and actually achieved and maintained.

EM&V is particularly important when energy efficiency is relied upon by electric and gas utilities as a resource.

The bill requires the Department of Energy to set a national EM&V protocol within 1 year. Such a timeframe for the Department appears ambitious, especially given the extensive public review such a protocol will require. However the Department does have considerable expertise on the subject, including assistance to States on the design of their own EM&V protocols.

Currently the Department with its partner agency, United States Environmental Protection Agency, is supporting a group of State and utility companies under the National Action Plan For Energy Efficiency to identify common practices and emerging issues on EM&V that would need to be addressed as part of any voluntary national or regional EM&V protocol.

Second, the bill requires the Department to administer the national Energy Efficiency Resource Standard, or EERS. The Department notes that while the proposal will likely impose sizeable demands on the Department initially, this work load may decline over time since it's quite possible that many States, particularly those with existing efficiency requirements will choose to ask the Department for permission to administer the Federal standards for their State.

Finally, the lack of any provisions to recognize the savings that have already achieved by "early action" States and utilities may warrant further analysis and considerations.

This concludes my statement, Mr. Chairman, and I look forward to answering any questions that you and your colleagues may have.

[The prepared statement of Ms. Hoffman follows:]

PREPARED STATEMENT OF PATRICIA HOFFMAN, ACTING DEPUTY ASSISTANT SECRETARY, OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY, DEPARTMENT OF ENERGY

Mr. Chairman and Members of the Committee, thank you for this opportunity to testify before you on S. 548, which seeks to amend the Public Utilities Regulatory Policy Act of 1978 to establish a Federal energy efficiency resource standard for retail electricity and natural gas distributors, and for other purposes.

President Obama is committed to a comprehensive energy plan that creates jobs, reduces our greenhouse gas emissions, and increases our energy security. An important part of that plan is to deploy the cheapest, cleanest, fastest energy source—energy efficiency.

We are already putting Americans to work making homes and buildings more energy efficient through the significant investments of the American Recovery and Reinvestment Act, which will grow our economy while cutting energy bills for American families.

But we need to do more.

We also need to continue to develop more energy efficient technologies and find new ways of accelerating their adoption, to take the investments that leading States and electric and gas utilities are also making on energy efficiency, and to make all of these steps permanently part of the way we live and do business.

Over the last several decades, the experiences of leading electric and gas utilities, third party program administrators, and state agencies administering energy efficiency show that it can be a reliable way to deliver energy services to electric and gas ratepayer. Electric and gas utilities increasingly address energy efficiency in their resource planning and investment decisions. For example, a DOE-funded 2008 analysis by the Lawrence Berkeley National Laboratory for the Western Interstate Energy Board found that 16 utilities in the western United States (representing 65 percent of the load in the 12 western states) are planning on meeting 31 percent of their projected customer load growth by improvements in energy efficiency; savings from individual utilities' proposed efficiency activities ranged from 12 percent to over 70 percent of load growth after ten years.

As a strategy for delivering energy services by electric and gas utilities, energy efficiency offers the advantages of low cost (typical cost of an energy efficiency portfolio is 3 cents/kwh for saved energy); zero emissions including carbon; no siting and permitting challenges endemic for generation, transmission, or pipelines; and quick, incremental implementation. However, measuring the effectiveness of energy efficiency improvements has its challenges, such as in the selection of the baselines from which reductions are taken.

S. 548 appears to build on state experience in establishing efficiency goals for utilities and other measures to accelerate energy efficiency. It would set national requirements for energy savings between 2012 and 2020 for retail distributors of both electricity and natural gas. These utilities would thus be required to use cost-effective energy efficiency in their resource procurement and planning decisions.

Retail electric and natural gas distribution utilities, limited to those that exceed a certain level of retail sales, would need to achieve a total of 15 percent cumulative electricity savings and 10 percent cumulative natural gas savings by 2020. The savings requirements begin in 2012 and then increase as efficiency investments accumulate over the next decade. In addition to counting the contribution of utility energy efficiency programs to the achievement of these requirements, there are also flexibility provisions that would count the gains from more stringent building codes and equipment standards, as well as combined heat and power. Electric utility efficiency savings in their distribution networks are included. Further, non-utility efficiency providers, including states that instead administer efficiency programs using utility ratepayer funds, can participate through bilateral contracts.

Cumulative rather than annual reduction targets are used, presumably since efficiency measures installed in early years continue to save energy during the compliance period. A cumulative savings approach also encourages utilities to install energy efficiency measures with long economic lifetimes as they will continue to contribute to the savings requirements for many years.

S. 548 includes provisions for the Department to set implementing regulations, accept and review compliance reports, establish evaluation, measurement and verification (EM&V) protocols, and periodically revisit the standards if needed, among others. Alternative compliance payments and penalties for non-compliance are included.

The Administration has not completed its analysis of S. 548 and thus the Administration does not have a position on it at this time.

The Department has some technical comments to make on the bill, particularly on its role in implementing S. 548, if enacted. These include:

First, reliably delivering energy efficiency is not without its challenges, just as any energy resource has its specific challenges. Experience with efficiency programs at the state level indicates that good evaluation measurement and verification (EM&V) protocols are required to assure that savings from energy efficiency measures and programs are verified, and are actually achieved and maintained. EM&V is particularly important when energy efficiency is relied upon by electric and gas utilities as a resource (that is deferring or avoiding supply-side resources), which can affect system reliability.

The bill requires the Department to set a national EM&V protocol within one year. Such a timeframe for the Department appears ambitious, especially given the extensive public review such a protocol will require. However, the Department and its national labs do have considerable expertise on the subject, including the provision of assistance to states on design of their own EM&V protocols. Currently the Department, with its partner agency the U.S. Environmental Protection Agency (EPA), is supporting a group of state and utility members of their National Action Plan for Energy Efficiency to identify current practices and emerging issues in EM&V that would need to be addressed as part of voluntary national or regional EM&V protocol.

Second, S. 548 requires the Department to administer the national EERS. The Department notes that while the proposal would likely impose sizable demands on the Department initially, this workload may decline over time since it is quite possible that many states, particularly those with existing efficiency requirements, will chose to ask the Department for permission to administer the Federal standard for their state.

Finally, the lack of any provisions to recognize the savings already achieved by "early action" states and utilities may warrant further analysis and consideration.

This concludes my statement, Mr. Chairman. I look forward to answering any questions you and your colleagues may have.

The CHAIRMAN. Thank you very much.

Mr. Centolella, go right ahead.

STATEMENT OF PAUL A. CENTOLELLA, COMMISSIONER, PUBLIC UTILITIES COMMISSION OF OHIO, COLUMBUS, OH

Mr. CENTOLELLA. Thank you. Mr. Chairman and members of the committee, on behalf of the Ohio Public Utilities Commission, thank you for this opportunity on Earth Day to address how to best improve United States energy efficiency.

Ohio has passed bipartisan legislations requiring electric users to achieve energy-savings in excess of 22 percent of use by 2025. Today I will briefly describe the foundations of regulatory policy on energy efficiency, Ohio Standard and modifications to S. 548 to develop an effective State-Federal partnership, turning first to policy foundations.

Policies that promote cost-effective efficiency improvements lower cost for consumers, reduce environmental impact, and promote national security.

Studies have documented the large, unrealized potential to make cost-effective efficiency improvements. This is a case in which markets have not produced the economically efficient result. Most consumer decisions which impact energy occur within a context where energy efficiency is not the center consideration. Consumers are seeking a warmer house, light by which to read a book, or a new production line to expand production. For the consumer, natural gas and electricity use are often incidental to obtain these services. Building codes, appliance standards and utility programs have realized, and future Smart Grid applications could reduce significant savings.

Ohio Standard is aggressive. By 2025, the standard to reduce annual electricity use to a level that is 13.8 million megawatt hours below 2007 consumption. The total energy savings could exceed that produced by any other States' efficiency standard.

Our commission's rules allow aggressive program implementation by allowing utilities to bank early surplus energy savings. Ohio Standard is grounded in the review process covering assessment of potential program design and compliance.

This public process is at least as important as the standards themselves. Successful programs require the support of stakeholders, trade allies, such as contractors and retailers and consumers.

The commissions has flexibility to address conditions. A utility may file an application to amend a benchmark that is unable to meet due to the fact that it is beyond its control after exhausting all reasonable compliance options.

Ohio Standard is also part of the broader set of policies. Energy savings in excess of efficiency benchmarks can be applied to Ohio's advanced energy standard, however, energy savings do not count in the State's renewable energy standard and can not be double counted in meeting multiple requirements.

Turning to S. 548. A national standard will lead each utilities, which would not otherwise have done so, to implement cost effective energy efficiency programs. Given the benefits of energy efficiency, including energy efficiency only as a component of a renew-

able standard is not unlike asking LeBron James to play while on the bench in a championship game.

S. 548 will fundamentally change the role of the Federal Government. What is needed is an expanded State-Federal partnership, which will require more than State implementation and the administration of a Federal standard.

The States regulate gas and electric distribution rates and the recovery of energy efficiency program costs, accrued utility energy-efficiency and integrated resource plans, balance the expense expenditures and costs to consumers with the development of the Smart Grid, States will be laboratories for innovative approaches that could transform how consumers use energy.

So I would encourage the committee to modify S. 548, to first exempt States from the Federal standards when the State has clearly defined energy efficiency benchmarks.

Utilities or the State periodically access the maximum achievable cost-effective level of energy efficiency, and that assessment is subject to a public review.

The State certifies that it has implemented energy-efficiency standards and the policies designed to achieve all such energy-efficiency improvements and the State periodically reports its progress. The Federal statue may define ways that are cost-effective based on a total resource cost or societal test.

Second, authorize States administering the Federal standard to modify benchmarks that cannot lead to factors beyond its control after exhausting all reasonable compliance options.

Third, authorize banking of surplus energy savings.

Finally, clarify that the State may consider energy-efficiency would be a resource or a reduction to forecast load. The resource metaphor has become a barrier to appropriate recognition of crisis response on demand, an RPO advocacy requirement.

With these modifications, S. 548 could provide a catalyst for State and utility action, while preserving the essential role of the States in regulating the delivery and retail sale of electricity and natural gas. These are the modifications which will engage States and utilities in achieving the maximum benefit from this legislation.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Centolella follows:]

PREPARED STATEMENT OF PAUL A. CENTOLELLA, COMMISSIONER, PUBLIC UTILITIES COMMISSION OF OHIO, COLUMBUS, OH

Mr. Chairman and Members of the Committee, thank you for the opportunity to speak with you on this Earth Day about how best to improve U.S. energy efficiency.[1]

Last year, the Ohio General Assembly passed bipartisan legislation establishing efficiency standards that will require Ohio electric utility energy efficiency programs to achieve energy savings in excess of 22% of annual energy consumption by 2025[2] and produce more megawatt-hours of energy savings than are required under any other State's energy efficiency standard.[3] Last week, the Ohio Commission adopted final rules implementing the efficiency standard, as well as a separate peak demand

[1] This testimony reflects my views regarding general policy issues and does not reflect an opinion regarding any case currently pending before the Public Utilities Commission of Ohio.

[2] Section 4928.66, Ohio Revised Code.

[3] A description of different state standards is contained in: L. Furrey, S. Nadel, and J. Laitner. 2009. Laying the Foundation for Implementing a Federal Energy Efficiency Resource Standard. Appendix B. Washington, D.C.: American Council for an Energy Efficient Economy.

reduction standard, renewable and advanced energy standards, and greenhouse gas reporting and planning requirements.[4]

I was appointed by Governor Strickland to the Ohio Commission in April 2007. During the twenty-five years preceding my appointment, I was a consultant advising utilities and regional transmission organizations on operational and regulatory issues and in the development of regional electricity markets, served as one of the principal policy consultants to the U.S. Department of Energy during the early years of electric industry restructuring, and worked as a Senior Attorney and the Senior Energy Policy Advisor for Ohio's residential utility consumer advocate.

Today, I will briefly address the foundations of economic and regulatory policy related to energy efficiency, describe Ohio's energy efficiency standard, and address how to develop an effective State—Federal partnership, in which Federal efficiency legislation could provide a catalyst for needed efficiency improvements, while preserving the essential role of the States in regulating the delivery and retail sale of electricity and natural gas.

I. ENERGY EFFICIENCY: A POLICY FRAMEWORK

In the last few years, markets for natural gas and for the skills, materials, and fuel needed by our electric power system have become global. In the next few decades, demand will increase significantly for the services—light, heat, and drive power—that energy provides, at a time when we will need greater infrastructure investment and may be making sharp reductions in greenhouse gas emissions. These changes present major challenges to our ability to provide American consumers and businesses reliable and affordable energy services.

Our power system will need to become both more efficient and more resilient, with an overlay of information and communications systems that are both secure and open, to foster third party innovation. This "smart grid" will become the platform for more efficient pricing, applications that manage and reduce energy consumption, reliability improvements, distributed generation and storage, and plug-in vehicles. The electric utility of the future may look very different from today's power companies.

Policies will need to both address key challenges and adapt to major changes in the utility industry.

Policies that promote cost-effective energy efficiency improvements are an essential means of lowering energy costs for consumers, reducing environmental impacts, and protecting our national security. The Ohio Commission has long recognized that improving energy efficiency is an integral part of natural gas policy. Ohio's electric efficiency standard represents the minimum efficiency savings required by statute. The Commission's rules are designed to require electric utilities to deploy all cost-effective energy efficiency measures.[5]

Many studies have documented a large, unrealized potential to make additional cost-effective efficiency improvements. This potential represents a case in which markets by themselves have not produced the economically efficient result. Most consumer decisions which impact energy use occur in a context where energy efficiency is not the central consideration. Consumers are seeking a warm house, light by which to read a book, or a new assembly line to expand production. Natural gas and electricity are used only as a means to obtain these services. Well designed utility energy efficiency programs can address market failures.[6]

Historically, building codes and appliance efficiency standards, which set a floor for efficient energy use, and utility programs that pull more efficient technologies into the market have been among the most effective means to encourage improvements in energy efficiency. In the future, near real time feedback to consumers regarding their energy use and other non-utility applications, which may ride on a smart grid platform, could transform the efficiency with which consumers use energy. Our policies should be sufficiently flexible to adapt to such change, as it occurs on a state-by-state basis.

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[4] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Opinion and Order (April 15, 2009). Under Section 4903.10, Ohio Revised Code, parties have thirty days to file applications for rehearing. Final rules are subject to review by the General Assembly's Joint Committee on Agency Rules.

[5] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Opinion and Order (April 15, 2009) at 6.

[6] For a more detailed discussion, see: In the Matter of the Application of Vectren Energy Delivery of Ohio, Inc., Public Utilities Commission of Ohio Case No. 05-1444-GA-UNC, Supplemental Opinion and Order, Concurring Opinion of Commissioners Centolella and Lemmie, (June 27, 2007).

II. OHIO'S ENERGY EFFICIENCY STANDARD

On May 1, 2008, Ohio Governor Ted Strickland signed into law Senate Bill 221 to maintain "predictable and affordable electricity rates" and "aggressively attract renewable and advanced energy investment in Ohio in order to create jobs and recognize the influence of global climate change."[7] Ohio's new electricity law contains an energy efficiency standard and a separate peak demand reduction standard that significantly alter the trajectory of changes in annual electricity consumption, measured in megawatt-hours per year, and peak demand, the highest quantity of megawatts delivered at any point during the year.

Ohio law requires the Commission to promote and encourage energy conservation.[8] Our new electricity law also makes it state policy to "encourage innovation . . . demand-side management, time-differentiated pricing, and implementation of advanced metering infrastructure" and requires the Commission to effectuate this policy.[9]

Ohio's efficiency standard requires each electric utility to implement energy efficiency programs that achieve energy savings that meet or exceed annual benchmarks. Beginning in 2009, each utility is required to implement energy efficiency programs that achieve energy savings equal to three-tenths of one percent of energy delivered during a rolling three year baseline. The savings requirement is an additional five-tenths of a percent in 2010, seven-tenths of one per cent in 2011, eight-tenths of one per cent in 2012, nine-tenths of one per cent in 2013, one per cent from 2014 to 2018, and two per cent each year thereafter, achieving a cumulative, annual energy savings in excess of twenty-two per cent by the end of 2025.[10] The baseline is the rolling average of total, annual, and normalized kilowatt-hour sales of distribution service during the three calendar years preceding the compliance year.[11]

Based on the Commission's 2008 forecast of expected load growth and assuming no further improvements in appliance standards or building codes, meeting these efficiency standards could reduce Ohio's total annual electricity use by 2025 to a level that is below 2007 electricity consumption by more than 13.8 million megawatt-hours.

In addition to the energy efficiency standard, each utility must implement peak demand reduction programs designed to achieve a one per cent reduction in peak demand in 2009 and an additional seventy-five hundredths of one per cent reduction each year through 2018.[12]

In addition to traditional utility efficiency programs, such as information, financing, and rebate programs, utilities may meet these standards based on energy savings (or in the case of the peak demand reduction standard, demand reductions) from:

- The commitment of mercantile customer energy savings to utility programs: Large commercial and industrial customers can enter into arrangements with a utility allowing the utility to count savings in excess of what could have been achieved by adopting industry standard new equipment or practices.[13]
- Transmission and distribution investments that reduce line losses: The utility may count the net impact on losses of such improvements.
- Demand response programs: Demand response involves a change in customer demand as a result of price signals or other incentives.

An electric utility may not count toward meeting its benchmarks measures that must be adopted to comply with appliance or equipment standards or an applicable building code.[14]

The Commission's rules allow utilities to bank surplus energy savings and apply those savings toward meeting a subsequent year's energy efficiency benchmark. Banking encourages aggressive implementation of efficiency programs and elimi-

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[7] Gov. Ted Strickland, Press Release (April 22, 2008).
[8] Section 4905.70, Ohio Revised Code.
[9] Sections 4928.02(D) and 4928.06(A), Ohio Revised Code.
[10] Section 4928.66(A)(1)(a), Ohio Revised Code.
[11] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Final Rules at Chapter 4901:1-39.
[12] Section 4928.66(A)(1)(b), Ohio Revised Code.
[13] Given that these customer initiated investments are outside of planned utility programs, our rules do not attempt to quantify savings from what might be claimed to be acceleration in the purchase of new equipment, prior to the end of the useful life of existing equipment.
[14] Additionally, behind-the-meter generation is not counted towards meeting Ohio's peak demand reduction or energy efficiency standards.

nates any incentive for utilities to interrupt programs when annual benchmarks have been met or to pursue only minimal compliance.[15]

Ohio law gives the Commission flexibility to address changing and unanticipated conditions that may emerge during the implementation of the standard. For example, a utility may file an application to amend its benchmark, if it is unable to meet the benchmark due to regulatory, economic, or technological reasons beyond its reasonable control.[16] In any such application, the utility must demonstrate that it has exhausted all reasonable compliance options.[17] The law allows the Commission to reduce a utility's baseline to account for new economic growth.[18] However, the Commission has said that, "We expect that any baseline adjustments made to account for economic growth typically will be temporary, and will address circumstances in which unanticipated increases in the overall rate of growth have made full compliance infeasible. We also expect that any adjustments will account not only for positive economic growth, but also negative economic growth."[19] Additionally, baseline sales will be normalized for weather and for other impacts on numbers of customers, sales, and peak demand that are outside of the utility's control.

The standards are embedded within a public process that provides for Commission review of utility program planning and compliance. This review process is as important as the standards themselves. The success of efficiency programs is measured by their ability to influence consumer behavior. Successful utility programs require the support of stakeholders, trade allies such as building contractors and retailers, and the public. Commission review provides an opportunity for public input and a transparent process for assessing what works in a specific local environment.

Utilities must complete an assessment of the technical, economic, and achievable potential for reducing energy usage and peak demand through cost-effective measures and programs. Every three years, each utility must file a comprehensive program portfolio which meets or exceeds its efficiency benchmarks and includes programs for all customer classes that encourage innovation and market access for all cost-effective energy efficiency.[20] The Commission will hold hearings to review these assessments and program portfolio plans.

Cost-effectiveness is measured under a "total resource cost test" which compares avoided supply costs to demand-side measure and program costs borne by the utility and participants.[21] And, the utility may propose additional programs that provide substantial non-energy benefits, including low income customer participation, emission reductions not fully reflected in cost savings, or enhanced system reliability.[22]

Each utility is required to file an annual status report that includes a measurement and verification report by an independent program evaluator.[23] The public may comment on these reports. The Commission's Staff will review the status reports and comments and publish its findings and recommendations regarding program implementation and compliance. The Commission may hold public hearings on a utility's status report. And, the Commission will file an annual verification report regarding benchmark compliance as required by statute.[24]

To summarize, Ohio's energy efficiency standard requires a comparable or greater annual percentage of electric efficiency savings and more total megawatt-hours of

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[15] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Final Rules at Section 4901:1-39-05(E).

[16] Section 4928.66(A)(2)(b), Ohio Revised Code.

[17] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Final Rules at Section 4901:1-39-05(F).

[18] Section 4928.66(A)(2)(a), Ohio Revised Code.

[19] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Opinion and Order (April 15, 2009) at 18.

[20] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Final Rules at Sections 4901:1-39-03 and 39-04.

[21] For a complete definition, see: In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Final Rules at Section 4901:1-39-01 (W).

[22] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Final Rules at Sections 4901:1-39-04(B) and 39-01 (O).

[23] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Final Rules at Section 4901:1-39-05.

[24] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Final Rules at Section 4901:1-39-06.

energy savings than any other State efficiency standard. The maximum additional annual savings under the Ohio standard is two-percent per year. Although it considers improvements in the compliance year attributable to appliance and building standards, S. 548 requires at least two-and-one-half percent savings in years 2018 through 2020. Unlike Ohio's rules, S. 548 does not appear to authorize banking of surplus energy savings.[25] And, S. 548 covers gas as well as electric utilities.

Ohio's efficiency standard is grounded in a public review process at the Commission covering the assessment of efficiency potential, program planning, and compliance. Our statute gives the Commission flexibility to respond to unforeseen and changing local conditions.

Finally, Ohio's energy efficiency standard is part of a broader set of State and Commission policies. It complements standards for peak demand reduction, renewable and advanced energy resources. Demand-side management and energy efficiency improvements in excess of what are required to meet Ohio's efficiency standard can be applied to Ohio's advanced energy requirement.[26] However, energy savings are not counted toward meeting the renewable energy standard and cannot be double counted to meet multiple requirements.[27]

The Commission has approved smart grid proposals and utility scale Advanced Metering Infrastructure (AMI) deployments for Duke Energy Ohio and American Electric Power.[28] These investments will provide capabilities needed to implement efficient retail pricing and support applications giving consumers real-time feedback regarding their energy use. The challenges we face require us to pursue a range of policies in different regulatory and policy frameworks.

Our Commission has avoided treating energy efficiency only "as a resource in utility planning." Treating energy efficiency as a resource provided a useful way of talking about utility efficiency programs in the context of Integrated Resource Planning, as it was widely practiced in the 1980s and continues to be used in more limited contexts today. However, the metaphor that demand-side measures are resources, just like generation, has been a barrier to the recognition of price responsive demand in Regional Transmission Organization (RTO) resource adequacy rules and could threaten investments in AMI and smart grid. "Price responsive demand" is the predictable response of consumers on dynamic retail rates that reflect increases in wholesale prices. While the demand of these consumers falls when spot prices increase, these predictable demand reductions are not dispatched by an RTO system operator and may not qualify as an RTO "resource." The Ohio Commission is working closely with the PJM Interconnection, L.L.C., and the Midwest Independent Transmission System Operator to reform RTO tariffs to treat price responsive demand as a component of the demand forecast, rather than as a resource.[29]

III. PRINCIPLES FOR EVALUATING FEDERAL ENERGY EFFICIENCY RESOURCE STANDARDS

A national standard for utility energy efficiency program savings will lead utilities, which might not otherwise have done so, to implement cost-effective energy efficiency programs. Many utilities do not see running significant efficiency programs for their customers as part of their core business. And, utilities with generation affiliates selling power at market-based prices have an additional disincentive to undertaking efficiency programs. Efficiency improvements, at least in the short run,

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[25]1A In certain circumstances, S. 548 permits limited bilateral transfers of savings among utilities in a single state or electric utilities in a single power pool. The Oho Commission has considered authorizing a more flexible trading system using energy efficiency credits. However, we are not aware of an available and suitable energy efficiency credit tracking program. We will reconsider the issue should such a program be created. In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Opinion and Order (April 15, 2009) at 23.

[26] Section 4928.01(34)(g), Ohio Revised Code.

[27] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Final Rules at Sections 4901:1-40-01(M) and 4901:1-40-04(D)(4)

[28] In the Matter of the Application of Duke Energy Ohio, Inc., for Approval of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 08-920-EL-SSO, Opinion and Order (December 17, 2008); In the Matter of the Applications of Columbus Southern Power Company and Ohio Power Company for Approval of an Electric Security Plan, Public Utilities Commission of Ohio Cases No. 08-917-EL-SSo and 08-918-EL-SSO, Opinion and Order and Concurring Opinion of Chairman Alan R. Schriber and Commissioner Paul A. Centolella (March 18, 2009).

[29] For a detailed discussion of these reforms, see: P. Centolella and A. Ott. March 9, 2009. The Integration of Price Responsive Demand into PJM Wholesale Power Markets and System Operations. (Available at: http://www.hks.harvard.edu/hepg/). See also: P. Centolella. November 13, 2008. Tariff Proposal on Price Responsive Demand. (Available at: http://www.midwestiso.org/publish/Document/45e84c__11cdc615aa1__-7ad10a48324a?rev=1).

will tend to place downward pressure on generation prices. Ratemaking reforms that decouple retail distribution rates from sales volumes do nothing to address this disincentive.

I strongly support expanding utility energy efficiency programs. Any energy efficiency standard should be separate from Renewable Energy Portfolio Standards.

However, the Committee must consider whether S. 548 will advance energy efficiency in a cost-effective and administratively efficient manner. The uniform Federal standard created by S. 548 fundamentally changes the role of the Federal government with respect to the distribution and retail sale of electricity and natural gas. This results in three fundamental inconsistencies that could limit the proposal's effectiveness and lead to delays and unnecessary litigation.

First, the bill would set a single uniform standard for programs at all utilities. This standard will "reflect the maximum achievable level of cost-effective energy efficiency potential."[30] The bill effectively requires the Secretary to set the floor for the minimum savings that utility programs must achieve, at his best estimate of the maximum achievable cost-effective savings. Prices, resource requirements, load growth, climate, the utilities' customer bases, consumer attitudes, existing equipment and buildings, building codes, the rate of adoption of new technology, and current levels of efficiency vary significantly from utility to utility. A uniform standard set at maximum achievable levels is likely to mean that many utilities will be unable to comply.

Second, the fundamental objective is to improve energy efficiency. However, the proposed standard is based on only efficiency improvements resulting from utility programs, codes, and standards. If an efficiency improvement is not among the specified "types of energy efficiency and energy conservation measures that can be counted"[31] or, except in the case of codes and standards, the utility cannot demonstrate that it "played a significant role in achieving the savings,"[32] savings would not be counted toward meeting the standard. This could have the perverse effect of discouraging continuing efficiency improvements without the direct involvement of the utility.

Third, the bill would set a high standard for savings yet any flexibility in compliance is limited to opportunities for bilateral transactions and alternative compliance payments in jurisdictions where State administration has been approved. Experience with similar approaches in environmental regulation suggests the result could be delay and extended litigation. This risk could be minimized with state regulatory oversight and expanded opportunities for banking and trading surplus savings.

These inconsistencies can be resolved through an expanded State—Federal energy efficiency partnership. The states are committed to building such a relationship.

The involvement and support of state regulators is essential to the success of utility efficiency programs. States regulate gas and electric distribution rates and the recovery of energy efficiency program costs; determine rate design and mitigate utility disincentives to achieving energy savings; review and approve utility energy efficiency and integrated resource plans; and balance utility expenditures with their impact on the costs paid by consumers and businesses. State commission proceedings foster public involvement and stakeholder support for efficiency programs. And, state commissions are in a position to act on their unique knowledge of local and utility-specific conditions.

Moreover, the electric power industry is beginning a period in which significant changes are likely to occur. With the development of a smart grid, there will be new opportunities to enhance energy efficiency. And, the prospect of greenhouse gas regulation will focus significant attention on improving energy efficiency. This is a time to encourage innovative approaches to efficiency improvement. States are the natural laboratory for such experimentation.

An expanded State—Federal efficiency partnership requires more than delegation to the states of the administration of a Federal standard. Decisions regarding what is maximum achievable cost-effective potential and how to pursue it, if at all possible, should be made first at the State level.

Specifically, I would encourage the Committee to modify to S. 548 to:

- Exempt states from the Federal standard and authorize them to implement state requirements where:

  —The State has set, in any form, clearly defined energy efficiency benchmarks;

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[30] While the initial standards are fixed, the bill would require the Secretary to review and the maximum achievable level in 2014, 2018, and at subsequent ten year intervals. S. 548 at Sections 610 (c)(3)(C) and 610 (c)(4)(A).

[31] S. 548 at Section 610 (e)(1)(A).

[32] S. 548 at Section 610 (e)(1)(I).

—Utilities or the State periodically assess the maximum achievable cost-effective level of energy efficiency improvements and that assessment is subject to public review;
—The State certifies to the Secretary of Energy that the State has implemented energy efficiency standards and policies designed to achieve maximum achievable cost effective energy efficiency improvements; and
—The state periodically reports progress toward achieving its benchmarks.

For purposes of the exemption, cost effective measures and programs may be defined by Federal statute as based on a total resource cost or societal test.

- To the extent that a State does not develop its own benchmarks, but adopts and administers the proposed Federal standard, authorize the State commission to modify a utility's benchmarks where the utility is unable to meet the benchmark due to regulatory, economic, or technological reasons beyond its reasonable control and has exhausted all reasonable compliance options.
- Authorize banking of surplus energy savings for use in meeting any subsequent year's benchmark.
- Clarify that States may consider energy efficiency to be a resource or a reduction to forecast load for purposes of utility planning and procurement.

Modified in this manner, a national standard could provide a catalyst for state and utility actions to expand cost-effective energy efficiency programs, while preserving the essential role of the states in regulating the delivery and retail sale of electricity and natural gas.

The CHAIRMAN. Thank you very much.

Mr. Manning, go right ahead, please.

STATEMENT OF DAVID J. MANNING, EXECUTIVE VICE PRESIDENT, EXTERNAL AFFAIRS, NATIONAL GRID, BROOKLYN, NY

Mr. MANNING. Mr. Chairman and members of the committee, thank you very much for including us in this very important panel on Earth Day. I want to point out that the National Grid is a large supplier of electric and gas in the Northeast. We serve approximately 15 million people, with customers everywhere from New York to New Hampshire. So we're very focused on these issues. We also have about a 30-year track record in doing energy-efficiency programming. Also Governor Shaheen was helpful in her Governorship in terms of advancing that cause, so I want to thank her through the committee.

We also want to thank our own Senator Schumer for shedding the light and putting a spotlight on the energy-efficiency issue. There has been a lot great deal said about renewals. There is a great discussion about climate change, about cap-and-trade, and we appreciate the opportunity to focus on energy efficiency. It is those two things which provide the most cost effective and immediate opportunity.

That said, we do believe, sir, that all options must be on the table. We need a more expansive, robust energy-efficiency program, coupled with renewable energy, including wind, solar, biomass and thermal, but most importantly the American public has been captured by a great term, Smart Grid. It is not always understood, but my hat is off to whoever came up with that name because it has captured the attention of the public.

Smart Grid is necessary to connect renewables, which will not always be near the load center and to facilitate the type of technologies we talk about today in terms of energy-efficiency.

So we need a more robust transmission system which is smarter, self diagnosis, power goes both ways. We need energy-efficiency technology, and that of course, is the essence of our conversation

today. We also need clean, or low-emitting base-load power generation, such as nuclear, hydroelectric, natural gas and emerging clean coal technologies will lower emissions, lower bills, and of course, reduce our dependency on foreign sources of energy.

Today climate change has captured the attention. We think energy-efficiency is, for us, most effective because it is cost-effective, it avoids new power plants, it lowers greenhouse gases and it insures consumers longer term savings in our energy policy.

To that end, a number of years ago, in an economic forum, this debate was raging in terms of whether or not you could do that with efficiency without bankrupting the country, and we didn't have this standard data at that time. So we partnered with DTE, PG&E from California, we partnered with the Environment Case Fund. We partnered with NRDC, Honeywell, Shell; companies with real expertise, and retained McKinsey & Co, who spent over a year doing a thorough study of energy-efficiency which was released in 2007, and you'll find what I call the Mackenzie Curve, at the back of my testimony.

This is a very important report because it was vetted by academics at Texas A&M, California Davis, MIT, Princeton. So I want to just draw your attention for a moment. What it does, was it demonstrated that we can take—it was focused on abatement. The focus of the study was focused on energy-efficiency technology, demonstrated we could take a tremendous amount of energy consumption and CO_2 emissions out of the economy without changing our lifestyle. There was not significant change of lifestyle. What you can see on the left is computers, commercial electronics, lighting, those have an immediate payback, which is substantial.

So that lower curve showed that they have a negative cost. They saved themselves immediately. Over 40 percent of the technologies listed pay for themselves in their life time.

On the right side are the more aggressive or more difficult, where we actually have to spend some money. But almost half of the technologies enumerated are cost-effective and pay for themselves.

What we've been able to do ourselves is take approximately 48,000 cars off the road through energy-efficiency program, both gas and electric, that we've been engaged in over the last 30 years as a company.

Now admittedly, there are more needs because the entire energy prices that belong in the pipe. The market is aware of that, but we've also had the opportunity with good programs, and of course, that brings us to the utility.

Decoupling is a rate program which is helpful in getting the utilities not only on the way to these kinds of improvements, but supportive of energy-efficiency improvement. So that kind of rate structure work is important to make sure everybody is focused on getting this done.

We also want to point out that there is an opportunity to submit an expansion, and again, my friend to my left from the AGA will address this, I am sure, that there is a great opportunity for natural gas in terms of energy-efficiency through technologies, including generation and provides power technology, distributive generation, providing power.

Also in terms of fuel searching, I raise that because National Grid, we are the power and energy company of the Northeast. We still have a lot of oil heat. Of course, in the Northeast, that oil is almost entirely sourced from the Middle East, and we, last year alone, converted over 60,000 homes and businesses from oil to gas. Each time that happens, there is a 40 percent reduction in nox-ox and SO_2.

So that's an important issue. We shouldn't lose that opportunity, but I am going to leave that to the AGA.

So Mr. Chairman, thank you very much for your attention. We are anxious to answer your questions and we appreciate this opportunity.

[The prepared statement of Mr. Manning follows:]

PREPARED STATEMENT OF DAVID J. MANNING, EXECUTIVE VICE PRESIDENT, EXTERNAL AFFAIRS, NATIONAL GRID, BROOKLYN NY

Chairman Bingaman, Ranking Member Murkowski, and Members of the Committee, thank you for including National Grid in this very important hearing on energy efficiency resource standards.

National Grid is an international energy delivery company. In the U.S., National Grid delivers electricity to approximately 3.3 million customers in Massachusetts, New Hampshire, New York and Rhode Island, and operates the electricity transmission and distribution network on Long Island, serving an additional 1.1 million customers. We are the largest distributor of natural gas in the northeastern U.S., serving approximately 3.4 million customers in Massachusetts, New Hampshire, New York and Rhode Island. National Grid also owns and operates over 4,000 megawatts of electricity generation under contract with the Long Island Power Authority.

May I first congratulate you and your Congressional colleagues for your focus and success with important initiatives on energy efficiency, renewable energy, infrastructure such as smart grid, and other critical energy support in the American Recovery and Reinvestment Act (ARRA). The $3.1 billion in state matching grants for energy efficiency, the funding for weatherization assistance, and the funding for efficiency improvements at affordable housing units are critical steps towards moving energy efficiency to the forefront of a comprehensive national energy policy.

Over $1 billion of efficiency funding is available to the four states we serve through the ARRA. Senator Shaheen was especially helpful in shaping the ARRA weatherization and state energy program provisions. Just a few weeks ago, Senator Shaheen announced that New Hampshire will receive $23 million for weatherization assistance and $26 million for its state energy program. We at National Grid are proud to be working with New Hampshire state and local officials as well as their counterparts in New York, Massachusetts and Rhode Island on this vital effort to create jobs and help residents and businesses save money through energy efficiency.

Mr. Chairman, we also appreciate the directional approach outlined in your draft Renewable Electricity Standard (RES) bill, which creates incentives for energy efficiency and renewable energy. We have always said that we need a balanced approach to energy overall—all options must be on the table. We need more expansive, robust energy efficiency programs. We need significant new sources of renewable energy: wind, solar, biomass and geothermal. We need a comprehensive strategy to address our transmission infrastructure, including policies that will enable us to bring renewable energy resources, which are often isolated, to dense urban areas and other load centers. We need smart grid technology and smart meters to maximize the potential of current and future energy efficiency technologies to automate the most efficient use of energy and to remotely turn demand off during peak use and pricing periods. These actions, combined with clean, no-or low-emitting base-load power generation such as nuclear, hydroelectric, natural gas and emerging clean coal technologies, will lower emissions, lower customers' bills and play an important role in an effective national energy policy.

While a national energy strategy must be multifaceted, my comments today will focus on energy efficiency. National Grid stands with many other energy providers, particularly those who belong to the Clean Energy Group, and the environmental community in recognizing that energy efficiency uniquely addresses many of our nation's core energy issues—it is more cost-effective than building new power plants,

has the potential to dramatically lower greenhouse gas emissions and provides consumers with long-term savings on their energy bills.

We thank this panel and the efforts of Senator Schumer with his introduction of S. 548 to shine the spotlight directly on energy efficiency. While renewable energy and an RES have rightly captured the attention and expectation of the American public, energy efficiency also deserves our focused attention. The American Council for an Energy Efficient Economy (ACEEE) estimates that Senator Schumer's EERS bill would save Americans $168 billion, create over 220,000 jobs, and reduce global warming pollution by the equivalent of removing 48 million cars from the road. In National Grid's service area alone, ACEEE projects that customers would save an additional $5.3 billion and create nearly 7,000 jobs by 2020.

National Grid's experience throughout the Northeast demonstrates that cost-effective energy efficiency measures are ready to be deployed today with the right mix of policies and incentives. We have decades of experience in delivering low-cost energy savings, which we believe can be replicated throughout the country. The certainty available from federal legislation, a state regulatory compact that encourages energy efficiency, the ability to rate base energy efficiency technologies in order to expedite and expand their market penetration and a tax and grant structure designed to stimulate investment will all assure the success of a concerted effort to use energy more efficiently.

Let me begin with the simple facts on the cost-effectiveness of energy efficiency. Energy efficiency can cost as little as 3 cents per kWh saved, while electricity costs 6 to 12 cents per kilowatt hour. Thus, energy efficiency measures are often the most effective way to avoid unnecessary energy supply investments and lower customers' energy bills on a sustainable basis. Despite the obvious advantages of energy efficiency, we spend about $215 billion annually in the United States on the production of electricity, but invest only $3.2 billion in securing electricity savings through efficiency programs. The savings are similar for natural gas, where efficiency measures cost $1 to $2 per thousand cubic feet (Mcf), compared to a typical market cost ranging from $6 to $8 per Mcf. Yet we spend approximately $91 billion annually on natural gas supplies and only $530 million annually on natural gas efficiency.

A recent study by the Electric Power and Research Institute shows the potential for realizing energy efficiency savings. By analyzing the impact of codes and standards, as well as market driven efficiency, the study shows measurable reductions in energy consumption. Opportunities in the EPRI study range from commercial lighting to massive reductions in consumption through residential appliances and standby wattage. The full EPRI study can be found at http://my.epri.com/portal/server.pt?Abstract__id=000000000001016987.

Energy efficiency is also a critical tool for addressing climate change. National Grid, in partnership with other leading energy companies such as PG&E, DTE, Honeywell and Shell, and environmental groups such as the Natural Resources Defense Council and Environmental Defense, worked with McKinsey & Co to evaluate the potential for energy efficiency in the U.S. The landmark study "Reducing U.S. Greenhouse Gases: How Much, At What Cost?" found that the U.S. can make substantial emission reductions by 2030 without damaging the economy with the help of energy efficiency. A chart* summarizing the study is attached, and the report itself is available via www.mckinsey.com/mgi/publications/Curbing__Global__Energy/executive__summary.asp.

National Grid knows first hand that the benefits of energy efficiency are real. For example, National Grid has efficiency programs in place that are saving customers over $300 million annually, after an expenditure of more than $1.5 billion on efficiency technologies—an excellent investment with a rapid 5-year payback. As a result of these programs, more than 4.7 million National Grid customer projects have been completed to date, often with a payback period of five years or less, and saving more than $3.6 billion in energy costs. This includes converting almost all of Boston's public schools from oil to natural gas, helping cash strapped schools focus their limited resources on education, and residential boiler conversions that reduce CO_2 and other emissions by up to 40%. In 2007 alone, our gas programs saved 4.6 million therms and avoided 27,000 tons of CO_2 and our electricity program saved 380,000 megawatt-hours, avoiding 218,000 tons of CO_2. The total carbon emissions equate to 48,000 cars off the road for a year.

We expect National Grid's efficiency programs to enjoy significant growth during the next several years as we expand our New England and downstate New York programs and develop new programs in Upstate New York. Our spending on efficiency is forecast to more than double over the next five years, reaching approximately $700 million in 2014. This increase reflects our commitment to energy effi-

*Graphic has been retained in committee files.

ciency, as well as the supportive regulatory environment in the states we serve. The Regional Greenhouse Gas Initiative signals the commitment of the northeastern states to address climate change and pursuing energy efficiency is a major component of meeting the new requirements. State legislation is also driving energy efficiency investment, with New York, Rhode Island, and Massachusetts all adopting groundbreaking energy efficiency policies and programs over the last few years, and New Hampshire continuing to build upon the efficiency goals of its comprehensive energy plan. These changes have enabled us to pursue new approaches, such as partnering in solar initiatives and offering efficiency programs which integrate the delivery of electric and gas efficiency for the first time.

While spending on energy efficiency is increasing, it remains but a small fraction of what the total country spends on energy requirements, effectively leaving billions of dollars in potential savings on the table. This country must take better advantage of this opportunity and prioritize energy efficiency. National Grid supports the concept of federal energy efficiency resource standard legislation as one of the strategies that will pave the way towards a more energy efficient future.

All four states in which National Grid operates have adopted energy efficiency standards or requirements and our experience to date has been positive. For example, New York adopted its Energy Efficiency Portfolio Standard (EEPS) in June 2008. The EEPS will reduce electricity consumption 15 percent below projected levels by 2015, equivalent to a 7.5 percent reduction from current levels. National Grid has responded by launching a new electricity efficiency program in Upstate New York. Based on our extremely successful Upstate gas programs, we expect our electricity programs to be similarly effective in helping New York achieve the EEPS requirements.

Rhode Island has adopted a least cost procurement requirement that requires investment in energy efficiency before investing in higher-cost supply increases. These requirements, which may effectively reduce energy use by up to 20%, push costeffective energy efficiency investment to the forefront and drive additional investment. In Rhode Island National Grid has saved over 12 billion kilowatt-hours of electricity and 2.2 million therms of natural gas, saving consumers over $1.3 billion and we look forward to increasing our energy efficiency programs in the state.

In New Hampshire our energy efficiency efforts have benefited enormously from Senator Shaheen's work as governor to create programs that have saved New Hampshire families and businesses over $400 million and we look forward to significantly increasing our energy efficiency investments in the state.

As you consider EERS approaches, we would like to share some of the lessons that we have learned and some of the potential issues we see in moving to a national program. First, creating the right baseline for measuring energy savings can often raise difficult design issues. Certainty over the baseline used in calculating a company's energy savings is critical to planning and the overall success of the program. "Business as usual" (BAU) forecasts can be difficult to define when you are projecting into an uncertain future. EERS legislation should contain a careful and clear definition of BAU, including what factors are to be included, the data that will be used, the period of time for the projection and scope of coverage (e.g. national, state, or utility).

A national policy should recognize that many utilities, like National Grid, have already invested heavily in energy efficiency and no longer have the low-hanging fruit available in other parts of the country. A one-size fits all approach could unfairly penalize early actors and we urge you to consider ways to equitably credit early actors.

An EERS should also be combined with appropriate rate-setting mechanisms, such as decoupling, to address the inherent tension between utility companies' financial interest in encouraging their customers to use more energy and those customers' own interest in lowering their utility bills through energy efficiency actions. Decoupling benefits customers by alleviating this tension and it works in combination with energy efficiency programs to help consumers lower their monthly utility bills.

Finally, we want to make sure that the benefits of natural gas are fairly perceived within the efficiency debate. While it is a carbon fuel, natural gas has a substantially lower emission intensity than either coal or oil and is broadly available domestically. A significant expansion of combined heat and power technology utilizing natural gas would offer a leading opportunity to generate electricity more efficiently and reduce our carbon footprint. Similarly, climate change policy will push the country away from petroleum transportation fuels and towards electricity, resulting in growing demand for electric vehicles. Shifts towards combined heat and power, electric vehicles and other beneficial switches should be consistently encouraged in our nation's energy policy, including an EERS.

Mr. Chairman and Members of the Committee, we do not believe that any of these issues are insurmountable and we look forward to working with the committee to address them. We believe the current economic downturn provides a real opportunity to respond to a multitude of challenges in our economy. Driving economic activity in the energy sector can create significant employment, all here at home, while reducing our dependence on foreign fuels and the release of harmful emissions into our atmosphere. Energy efficiency should act as a foundation of our national energy policy as we take other key steps to develop and implement innovative investments to ensure a reliable low carbon and efficient energy strategy for America. Importantly, these programs can be quickly expanded to provide much needed jobs and energy savings in the near term. The existing programs are not nearly sufficient and we look forward to working with you on developing an EERS and other energy efficiency policies that will help us to reorder our economy for a greener future.

We commend your work and we thank you for the opportunity to answer your questions.

The CHAIRMAN. Thank you very much.

Mr. Skains, go right ahead.

STATEMENT OF THOMAS E. SKAINS, CHAIRMAN, CHIEF EXECUTIVE OFFICER AND PRESIDENT, PIEDMONT NATURAL GAS COMPANY, CHARLOTTE, NC

Mr. SKAINS. Thank you to the committee for this opportunity to participate in your hearing. I am Thomas Skains, CEO of Piedmont Natural Gas, a Natural Gas distribution company serving approximately one million customers in the Carolinas and Tennessee.

I am here today on behalf of Piedmont and more than 202 local utility company members of the American Gas Association (AGA), which I currently serve as chairman. We deliver natural gas to 170 million Americans, who rely on it for their heat, hot water and cooking, all essential human needs.

AGA members strongly support energy-efficiency and carbon reduction measures. In fact, natural gas utilities and their customers are leaders in this area. With that said, we are troubled by aspects of this legislation.

Any legislation that seeks to mandate energy-efficiency, we believe should be based on in-put from all affected parties, including natural gas utilities. It should be done in concert with our climate change goals, be clear and predictable and rely on carrots and program funding, rather than sticks and penalties. Importantly, it must focus on the results of the program and not force a tremendous expenditure of resources in trying to determine precisely how the results were achieved.

Natural gas utilities have two great resources to draw on: our fuel and our customers. Our fuel is a clean, efficient, abundant and domestic energy source.

Our customers lead the Nation in energy-efficiency.

Since 1970, the number of residential natural gas customers has increased from 38 million to more than 65 million, a 70 percent increase; their energy consumption and carbon emissions have remained flat. This results from a trend of declining use per customer, 30 percent since 1980. This dramatic reduction is attributable primarily to tighter homes, more efficient appliances and energy-efficiency measures, many of which were implemented by natural gas utilities.

Natural gas utilities have been leaders in working with regulators across the country to implement rate designs that allow utili-

ties to promote efficiency by breaking the link between utility revenues and the natural gas consumed, commonly referred to as decoupling.

Spending on natural gas efficiency programs reached a half a billion dollars in 2007. So let me be clear. We support reducing the Nation's energy and carbon intensity, but what is not clear is how the legislation before you will support that goal.

Here are some of the problems that we see. First, the focus is on huge, after the fact penalties rather than incentives. It is tied to consumer behavior and the utility can neither control nor dictate. Utilities have limited control or knowledge of what goes on behind the meter. This is especially true for industrial customers.

In addition, utilities can only engage in energy-efficiency activities with the approval and regulating oversight of their State regulatory commissions.

Second, the imposition of the penalties could be a barrier to economic growth and development by raising the cost of energy to both new and existing customers.

Third, the legislation could have the unintended consequence of increasing the Nation's carbon intensity, as my good friend, Mr. Manning said, increasing the direct use of natural gas in more homes and businesses across America can help reduce overall energy consumption and greenhouse gas emissions. This can be done in the near term with existing technology and at a relatively low-cost.

The carbon footprint of the typical natural gas home is 40 percent smaller than an electric home. It appears that this legislation could discourage an increase in consumption of natural gas relative to electricity or other higher carbon emitting energy sources, such as fuel oil.

Finally, we are still not sure as to what reductions our customers would have to achieve and what actions utilities would have to take in order to avoid the penalties in this bill.

It is not clear what is mean by the terms, "business as usual" or "significant role" when forecasting implementing and measuring energy saving.

Certainty is absolutely essential to proper planning and measuring results. We believe it would be unnecessary and wasteful for us to spend tremendous resources in trying to prepare the required annual submissions and to set up Federal and State bureaucracies to validate our efforts.

In conclusion, natural gas utilities are committed to partner with consumers and policymakers to develop and implement viable energy-efficient programs.

We are also committed to making the investments needed to continue to increase the efficiency of energy use by America's homes and businesses.

We see a legislative and regulatory construct that would provide investment incentives and economic certainty, rather than potential civil penalties and regulatory confusion.

We appreciate the opportunity to share our experience with you today, and look forward to working with you and your staffs to achieve our common goals.

Thank you, sir.

[The prepared of Mr. Skains follows:]

TESTIMONY OF THOMAS E. SKAINS, CHAIRMAN, CHIEF EXECUTIVE OFFICER AND PRESIDENT, PIEDMONT NATURAL GAS COMPANY, CHARLOTTE, NC

EXECUTIVE SUMMARY

- Natural gas is America's clean, secure, efficient, and abundant fossil fuel
- Residential natural gas consumers, who use the fuel for essential human needs, have a 30-year record of reducing consumption and greenhouse gas emissions
- History demonstrates that programmatic measures, such as appliance efficiency standards and building codes and standards, will lead to more certain emissions reductions than a cap-and-trade system
- Natural gas, because it has the smallest carbon footprint of any fossil fuel is part of the energy efficiency and climate change solution
- EERS seeks to reach a laudable goal, but the mechanism is less than perfect Utilities do not control their customers' consumption
- EERS does not take into account economic growth
- EERS does not take into account carbon-driven fuel switching
- The mechanism of EERS is potentially troublesome

INTRODUCTION

Thank you for the opportunity to testify before the committee. My name is Thomas E. Skains, and I am the Chairman, Chief Executive Officer, and President of Piedmont Natural Gas Company, located in Charlotte, North Carolina. Piedmont provides natural gas service to more than 1 million residential, commercial, industrial, and power generation customers as well as municipalities in North Carolina, South Carolina, and Tennessee.

I am testifying today on behalf of the American Gas Association (AGA), which represents 202 local energy utility companies that deliver natural gas to more than 65 million homes, small businesses, and industries throughout the United States. AGA member companies deliver gas to approximately 170 million Americans in all fifty states. Natural gas meets one-fourth of the United States' energy needs. I am the 2009 Chairman of AGA.

I am pleased to provide the views of AGA on the Energy Efficiency Resource Standard (EERS) concept. This concept is included in S. 548 offered by Senator Schumer, H.R. 889 offered by Chairman Markey, and the March 30, 2009 House Energy and Commerce Committee discussion draft offered by Chairmen Waxman and Markey.

In order for the committee to understand our views on the EERS we would like to provide a bit of background about natural gas, energy efficiency, and climate change. These provide the predicate for our views on EERS at the moment. It appears that the EERS concept may yet be in its infancy, and AGA's views will undoubtedly change as the concept matures. Moreover, the EERS concept seems to be interwoven with the issue of carbon-regulation policy.

NATURAL GAS IS AMERICA'S CLEAN, SECURE, EFFICIENT, AND ABUNDANT FOSSIL FUEL

Natural gas is America's cleanest and most secure fossil fuel. Natural gas is essentially methane, a naturally-occurring substance that contains only one carbon atom. When burned, natural gas is the most environmentally-friendly fossil fuel because it produces low levels of unwanted byproducts (SO_X, particulate matter, and NO_X) and less carbon dioxide (CO_2) than other fuels. Upon combustion natural gas produces 43% less CO_2 than coal and 28% less than fuel oil. Moreover, almost all of the natural gas that is consumed in America is produced in North America, either in the United States or Canada, with the vast majority of that being produced in the United States. Only a small portion—1 to 2%—is imported from abroad as liquefied natural gas.

Natural gas is also the most efficient of the fossil fuels. Approximately 90% of the energy value of natural gas is delivered to consumers. In contrast less than 30% of the primary energy involved in producing electricity reaches the consumer. Additionally, natural gas is an abundant fuel. Recent prodigious discoveries of shale gas have significantly added to this abundant resource base. Changes in economics and technology will continue to increase our resource base estimates in the future, as they have consistently done in the past.

Natural gas is used to meet essential human needs for small-volume customers. The majority of the homes in this country use natural gas, and in this sector 98% of all gas is used for space heating, water heating and cooking, while the remaining

2% is used for clothes drying and other purposes. This fuel is, therefore, used for essential human needs rather than for luxuries. Natural gas is, therefore, an essential fuel for America.

There are two important facts about natural gas that are either little known or often overlooked:

- America's residential natural gas customers have led the nation in reducing their consumption of natural gas over the last 30 years and can continue, with appropriate policies, to reduce consumption further. It takes less natural gas to serve 65 million homes today than it took to serve 38 million homes in 1970.
- Natural gas is not part of the climate change problem; rather, it is part of the climate change solution because it offers an immediate answer with existing technology and has the smallest carbon footprint of all fossil fuels.

RESIDENTIAL GAS CONSUMERS HAVE AN UNRIVALED RECORD IN REDUCING CONSUMPTION LEVELS AND GREENHOUSE GAS EMISSIONS

Residential natural gas customers have consistently reduced their per-household consumption of this fuel—and the carbon emissions resulting from its use—for more than 30 years. On a national basis, residential customers have reduced their average natural gas consumption by approximately 30% since 1980. The success of residential and commercial natural gas consumers is illustrated by the fact that they have reduced their per-household consumption so dramatically that there has been virtually no growth in sectoral emissions in nearly four decades despite an increase in natural gas households of over 70%. Stated another way, total annual residential natural gas consumption is lower today than it was in the 1970s, despite the fact that the number of natural gas households has increased more than 70% from 38 million to 65 million. Consumption of natural gas in the residential sector, on a national average basis, is shown in the following graph:*

Unlike electricity, where there are a number of options for reducing consumption in the relatively near term, almost all natural gas in the home is consumed by furnaces, water heaters, and stoves—durable appliances with relatively long lives. While "dialing down" is certainly an option, it has its limits, and consumers have already dialed down dramatically with the natural gas price increases of this decade.

AGA and its members believe, of course, that both natural gas utilities and their customers should contribute to improving the nation's energy efficiency in order to meet the nation's goals of optimizing our resources, maximizing our energy independence, and reducing carbon emissions.. Our collective experience with energy efficiency, however, informs our view that natural gas residential and commercial customers can improve their performance through an array of programmatic measures.

The reductions in consumption per household experienced over the past three decades are largely attributable to tighter homes and more efficient natural gas appliances. These factors will undoubtedly provide the foundation for continued future reductions in consumption. Moreover, natural gas utilities are aggressively promoting decoupled rate structures that allow them to promote conservation and efficiency consistent with shareholder interests. Nearly 40% of all residential natural gas customers are served by gas utilities that have decoupled rates or that are engaged in state proceedings that are presently considering decoupled rates. Rate decoupling is important to energy efficiency because it breaks the link between utility revenue recovery and customers' energy consumption.

USING NATURAL GAS IN HOMES AND BUSINESSES IS PART OF THE ENERGY EFFICIENCY AND CLIMATE CHANGE SOLUTION

Many misguidedly believe that because natural gas is a fossil fuel it is one of the causes of greenhouse gas emissions and, as result, a contributing factor to climate change. In fact, however, natural gas is part of the climate change solution. As mentioned previously, natural gas is a fuel that emits low levels of traditional pollutants such as NOx and SOx. With regard to greenhouse gas emissions, natural gas, because it has only one carbon atom, emits less carbon when consumed than any other fossil fuel. As a result, natural gas has the potential to be a vehicle to move the nation toward its greenhouse gas reduction goals. For the same reasons, natural gas is an essential element in the push for optimizing our natural resources and increasing our energy efficiency.

There are significant differences in efficiency between natural gas and electricity. Approximately 90 percent of the energy value in natural gas is delivered to the

*Graph has been retained in committee files.

home. With electricity less than 30 percent of the primary energy value reaches the customer. The largest difference in efficiency for electricity is lost as waste heat at the generating station, as well as line losses in transmission and distribution. These radically different efficiencies produce the significant differences in both efficiency and carbon emissions between electric and natural gas appliances.

The full potential for natural gas efficiencies is demonstrated most dramatically by the carbon footprint of the natural gas water heater. The average natural gas water heater emits approximately 1.7 tons of CO_2 per year. In contrast, the average electric water heater results in more than twice as much—3.8 tons per year. The difference between the two could not be more dramatic, and it becomes a multiple of three when the comparison is made between a high-efficiency natural gas water heater and a high-efficiency electric water heater. These numbers are based on national averages, and, as a result, actual differences will vary from area to area.

The same differences in efficiency and emissions follow when comparing an all-electric home with a natural gas home. A typical all-electric home on average produces 10.8 tons of CO_2 per year, while an all-natural-gas home produces 7.2 tons of CO_2 per year. Again, these numbers reflect national averages, and actual experience will necessarily differ, but the order of magnitude of difference remains.

The plain consequence is that the nation can improve its overall energy efficiency as well as reduce its carbon footprint by opting for appliances that use natural gas in direct applications (i.e., where the natural gas is used to heat air, water, or food). There is the opportunity, on a national basis, to improve efficiency dramatically and reduce carbon emissions by millions upon millions of tons if we utilize more natural gas directly in homes and businesses as the fuel for the future.

Converting small-volume customers to high-efficiency natural gas applications is one of the best ways available today to leap forward in efficiency and reduce greenhouse gas emissions. As the example above demonstrates, converting electric resistance water heaters to natural gas can increase efficiency and reduce greenhouse gas emissions by one-half to two-thirds. Doing so would have the benefit of reducing overall energy consumption, costs, and the need to construct new electricity generating plants—a critical problem in a carbon-constrained environment—and electric transmission lines.

THE ENERGY EFFICIENCY RESOURCE STANDARD PROVISION SEEKS TO REACH A LAUDABLE GOAL BUT BY A VERY IMPERFECT ROUTE

These two critical facts—the record of increasing efficiency and the inherent efficiency of natural gas—provide the prism through we must necessarily view a proposal such as EERS.

AGA and its member companies are committed to continuing to press for energy efficiency, in order to save our customers money, to maximize the utility of our natural resources, and to reduce the carbon emissions of our nation. As noted above, there is a growing, and accelerating, trend toward decoupled natural gas utility rates. Such approaches, by breaking the link between customer energy consumption and utility revenues, help utilities become full partners in the quest for energy efficiency. Moreover, most natural gas utilities today participate in, or even operate, energy efficiency programs. On a national scale they collectively deployed $500 million in 2007 for this purpose—an amount that we expect to double in the next several years.

Furthermore, as discussed above, natural gas residential and commercial customers have led the way in efficiency and carbon-reduction over the last thirty years. These customers have reduced their annual consumption by 1% or more annually from 1980 to 2000 and about 2% annually since 2000. AGA member companies will continue to work with their customers to ensure a continuation of this trend, although it will become increasingly difficult to do so as the least costly measures have, in many cases, already been taken. We believe that the goals of a program such as EERS would be best met through universally applied building codes and appliance standards, supplemented by a variety of education and incentive programs.

In contrast to the preferred programmatic approach discussed, the EERS proposals would establish an "energy efficiency resource standard" for both electric utilities and natural gas utilities. As it would apply to natural gas utilities, the EERS would, in the most basic terms, require the customers of a natural gas utility to reduce their consumption of natural gas by 10% between 2012 and 2020 or the utility will be required to pay a penalty (of either $5 or $10 per MMBtu) for each MMBtu by which they fall short of the target.

While the energy efficiency goal is laudable, the construct of the proposed EERS is fraught with problems. Unfortunately the conversation on this topic has, to this

point, largely occurred among proponents of the idea. A serious and thorough vetting of such a dramatic proposal will be necessary by all parties interested in advancing energy efficiency. Such a program can only be workable, if at all, with significant input from the natural gas utilities involved. If adequate federal and state funding is available, local gas utilities are positioned to work with the states and their customers to develop and implement effective energy saving programs. However, for this approach to be successful, utilities must be allowed to earn a return for their contributions, not merely be subject to penalties.

AGA suggests that the proposed means (as outlined in the current EERS proposals) to the desired end is a minefield for both utilities and their customers. While we will not enumerate all the difficulties, we will outline below a few that should suffice to illustrate that this concept still needs further in-depth analysis before becoming a policy pillar that can be relied upon in the quest to increase energy efficiency and reduce carbon emissions. Additionally, the discussion above should make clear that, from 30 years of experience, we have a wealth of knowledge as to the programmatic measures that can be employed to reach the desired end of increased energy efficiency.

UTILITIES CAN INFLUENCE, BUT DO NOT CONTROL, THE CONSUMPTION LEVELS OF THEIR CUSTOMERS

The fundamental scheme of the EERS is that customers must reduce their consumption, and natural gas utilities must pay the penalty if they do not. Without question there are many actions that natural gas utilities can take—and do take—to encourage energy efficiency. But they cannot adjust customers' thermostats, close open windows, or unilaterally install additional insulation or new appliances in their homes. While utilities can influence the conduct of their customers through education and publicity campaigns, appliance rebate and weatherization programs, incentives for efficient appliances, and the like (all of which is subject to approval or oversight by the state public utility commissions having jurisdiction over the utilities), they cannot control the actions of their customers, which is what is ultimately measured by the EERS mechanism. AGA believes that sound policy argues instead for a program that provides carrots, not sticks, for the entities whose behavior is to be influenced. If the goal is to reduce energy consumption, the policy mechanisms to be employed should focus on the efficiency drivers that have proven successful in the past and are likely to be so in the future. This lack of control is further exacerbated in the industrial market, where most customers are sophisticated energy consumers who do not purchase their gas supplies from the utility and are thus transport-only customers.

THE EERS FAILS TO ACCOUNT FOR THE NEEDS OF ECONOMIC GROWTH AND DEVELOPMENT

One of our national goals is certainly to facilitate a growing and vibrant economy and the jobs that necessarily follow from that. A growing economy requires that America's energy industries expand to meet the needs of that growing economy—both businesses and citizens. Moreover, as a matter of national policy we should be seeking to attract new industry to the United States, both for the jobs it provides as well as the stimulative effect on the economy as a whole. The concept of the EERS, as well as the construct used for it here, runs contrary to these overarching national goals. Energy efficiency standards should ensure that each consumer uses energy wisely but should not restrict economic development and growth in our country. Any EERS should accommodate energy demand by new homes, businesses and manufacturers.

As drafted, the EERS provision calls for a 10% decrease in consumption by natural gas utility customers by the year 2020 that is above business as usual and that has a causal relationship to the utility's actions. The reduction is to be achieved by all customers taken as a group (although excluding electric generation customers). In a number of areas of the United States, population is growing and the economy has been expanding over the last decade or so. As now framed the EERS provision would appear to place these utilities in a very difficult position in terms of achieving the goal of the 10% reduction.

AGA recognizes that the EERS mechanism attempts to utilize some sort of comparative mechanism, analyzing a base case against actual experience. This is troublesome in its own right, but even if it were to be employed, the practical difficulty is that a utility will be faced with ensuring the accuracy of its base case as to projected customer growth or face else an ex post facto penalty. This hardly seems fair, and it does not appear to be a wise grounding for what will ultimately be an important efficiency policy.

THE EERS FAILS TO ACCOUNT FOR CARBON-DRIVEN FUEL SWITCHING

Some proposals, such as that by Chairmen Waxman and Markey in the House, would overlay EERS on a cap-and-trade scheme. This is something of a two-fisted approach with a definite potential for conflict and unintended consequences. AGA urges the Congress to give careful thought to whether an EERS together with a cap-and-trade scheme will result in conflicting goals.

One particular instance greatly concerns AGA. If we assume that the nation adopts a cap-and-trade (or some other) carbon regulation system in the near future, the result, when implemented, will be to place a price on carbon. When carbon markets are functioning efficiently, at least in the relatively near term, residential customers will begin to recognize that by shifting their water heating, space heating, and cooking to natural gas (where such service is available) they will save money and reduce CO_2 emissions. This will result from the fact that natural gas will have a lower carbon output and price than electricity in most areas. Moreover, we expect that states, for a variety of reasons (state carbon footprint, the job development aspects of reasonable energy prices, and the need to minimize new, expensive electric capacity), will encourage customers to migrate toward direct natural gas appliances. In any event, for whatever reason undertaken, we believe that these trends are likely and that the result will be a good one: lower overall energy consumption, energy costs, and carbon emissions for the United States.

Under the EERS, however, the natural gas utility would pay the financial penalty because its customers will have increased their usage of natural gas instead of reducing it, all in order to achieve greater overall energy efficiency, lower energy bills, and reduced carbon emissions. This hardly seems like the outcome we should be seeking to achieve. It is, moreover, plausible—indeed likely—that where the goals of a cap-and-trade system and EERS overlap they will produce conflicting results. Given the complexity of the two regulatory schemes, we do not think that this is the only scenario in which the two systems may collide.

THE MECHANICS OF THE EERS ARE PROBLEMATIC

The EERS seems to be grounded, to one extent or another, in a concept of energy savings that are the "result" of, or "caused" by, specific actions of one kind or another. This approach is problematic in that it is unduly vague and susceptible to widely differing interpretation and application. For example, assume a home owner reduces consumption of natural gas. Was this caused by a utility program for weatherization or the fact that children grew up and left home for school? These types of imponderables are numerous within the scheme of these provisions. It must be understood and appreciated that natural gas utilities have limited knowledge about what goes on "behind the meter"—we do not have the ability or the right to obtain perfect information inside the home or business.

Some of the EERS constructs involve a comparison between a "business-as-usual" projection and measures implemented after the bill becomes law that "cause" natural gas savings. Projecting a "business-as-usual" scenario into the future (especially if a new scheme of carbon regulation has been implemented) could be dicey to say the least. Will DOE issue regulations providing detailed guidance as to how this should be done? How will projections of economic growth and development be factored into this "business-as-usual" scenario? How will natural gas utilities predict the degree of fuel switching to natural gas resulting from pricing the externality of carbon? What will be the factors to determine whether "savings" resulted from utility actions?

At its core, these aspects of this proposed mechanism are troublesome and, frankly, strike fear in the hearts of AGA member companies when the risk of error, misjudgment, or interpretation is a penalty (or stick) of a per-MMBtu penalty. In the end, predictions can only be correct as a matter of accident. Given this truism, it is fundamentally unfair to have the Damocles sword of this penalty provision hanging overhead, perhaps with the penalty determination ultimately made, long after the fact, by an individual in the depths of a federal agency. Again, we think sounder policy is to identify the goal and provide incentives to reach it rather than ex post facto penalties for failing to achieve it.

For years after 2020 DOE may set future years standards that turn on "cost-effective energy efficiency potential." Yet "cost-effective" is defined so broadly as to be nearly meaningless.

We could go on in enumerating concerns with the EERS methodology employed in the bills that we have reviewed. The examples given above, however, amply demonstrate that this is a thicket into which we should not wander. As AGA has stated in many forums, if the ultimate goal is to increase energy efficiency and achieve

greenhouse gas reductions—and surely it is—then we have an ample record on how to reach that end.

The goals of the EERS provisions are laudable ones; with the correct complementary market incentive policies, they are in all likelihood achievable without the need to resort to punitive penalties. AGA commits to work with Congress to develop a suite of policies that can achieve this result.

AGA and its members appreciate the opportunity to present their views on these important subjects. We look forward to working with the committee and its staff to be a constructive voice in this important national conversation.

The CHAIRMAN. Thank you very much.

Mr. Nadel, go right ahead.

STATEMENT OF STEVEN NADEL, EXECUTIVE DIRECTOR, AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY

Mr. NADEL. Thank you, Chairman Bingaman, and the other Senators. I appreciate the opportunity to talk here today.

A Federal Energy Efficient Resource Standard, often called an EERS, would set energy saving targets for electric and natural gas distribution utilities throughout the United States. As detailed in my written testimony, currently 19 States have an EERS in some form. These standards have worked well in practice in those States that have been implemented for multiple years. The Federal EERS would extend these standards to the remaining 31 States, but also increase States that currently have an EERS. However, States with a strong EERS can continue to enforce their savings targets. There are several States that already have savings targets, more aggressive, such as Ohio, than this bill.

These States would also benefit from the fact that local power pools, prices would come down, also emissions would come down. So even if they have a strong State standard already, by having neighboring States participate in this Federal EERS, they would benefit.

My organization, ACEEE, supports S. 548 and we thank Senator Schumer for introducing the bill. One thing I wanted to make clear is that this bill does not require absolute reductions in energy use relative to current demand. So instead, it uses a 2-year rolling baseline, so that economic growth can be accommodated. So in rapidly growing States, electricity use, natural gas use will continue to go up. It will just go up at a slower rate. It's not a fixed baseline, it's a rolling baseline.

Savings would be documented from evaluations of energy-efficiency program prepared by an evaluation expert, and ideally, we talked about the number of evaluation experts that they have under contract with National Labs and elsewhere, and we can really build upon that expertise upon the evaluation protocols that States have already adopted to help set these national guidelines.

S. 548 provides that States can have primary responsibility for administering the EERS if the States so request. We do expect the majority of the States to take on this role, since they know that our States and their utilities went on it. They will track regulations and provide oversight, permitting TAV to administer this program and in our view that is not a large bureaucracy. Yes, they need staff and consultant help, but they don't need a large bureaucracy.

For many months this Senate Energy Committee has been considering a Renewal Energy Standard, often called an RES, that

would allow States to count up to 5 percent energy efficiency savings toward the RES target. ACEEE estimates that the existing State EERS will save about 5 percent of electric sales by 2020, therefore, it's already going to happen anyway, I will just give credit in the RES, just giving credit for "business as usual" and won't result in any additional efficiency savings.

Studies in many States demonstrate that cost-effective electric and natural gas energy-efficiency savings of 20 percent or more are available around the country.

This bill would set targets at 15 percent for electric, 10 percent for natural gas, so there is much more cost-effective savings available. This bill makes a major progress toward that target and then lets States go further, if they want.

The savings targets are accumulative, meaning that targets each year can be met with measures installed in back years as well as installed in early years that are still in place. So in 2020, you will have many measures in place that were installed, then in 2019 and all the way back to 2010 or even 2009.

Savings from new building codes and equipment efficiency standards count toward these targets, as do energy savings by combined power plants and recycled energy.

So I know Mr. Skains was talking about opportunities to reduce carbon emissions through the use of natural gas, use of combined heat and power is one of those that may get credit for electrical savings under this.

Many of the existing State programs do not include savings from codes, standards or combining power plants. So roughly speaking, the 15 percent Federal program may fulfill many of the 10 percent State targets, targets in States such as Michigan and New Mexico that were adopted just last year.

Based on the targets that the States have set, based on analysis of more than 20 States on cost-effective potential, based on the achievements of many of these States, we find that the savings levels is S. 548 are very reasonable and should be achievable at all States. It's not like renewable energy, there is a debate, "Gee, is there enough in all States?" We don't hear anybody arguing that, gee, there is not enough efficiency in their State to meet these targets.

I would point out that these savings will not happen without an EERS. Just yesterday, EPA released an analysis on the Waxman-Markey discussion draft. At the most, efficiency savings that would generated as a result of cap-and-trade, it was one of the many things they looked at, it concluded that the efficiency savings would total about 6 percent in 2020, 9 percent by 2030, and 13 percent by 2050. While these are significant, they are far less than what is contained in the targets in S. 548.

We need an EERS to go much farther than just the affects of cap-and-trade alone.

As Senator Schumer noted earlier, ACEEE, just last month, released an analysis on the S. 548. We concluded that it would save enough power to power 48 million households for a year, an annual savings that would save the consumers about $170 billion in net savings, generate over 220,000 jobs, and displace the need for 390 new medium-sized power plants.

As Senator Schumer noted, and we discussed in detail in the written testimony, this EERS would also be a critical cost-containment strategy for future Federal climate legislations. We've done detailed modeling and with cap-and-trade and an EERS, electricity prices are lower than with cap-and-trade alone. EERS helped reduce our electricity prices.

Now some may complain that the cumulative impact of cap-and-trade and RES and EERS. But our analysis finds that this three-pronged approach actually is less expensive than just doing cap-and-trade alone.

ACEEE has been working on energy policy for many years. We've done detailed analysis of all of past major energy bills, including the 2005 and 2007 bills that this committee and ultimately this Congress, or previous Congress have passed. What we find is just as S. 548 alone will save more energy in 2020 than all of the efficiency provisions in the Energy Policy Act of 2005, and will save as much energy as all of the efficiency provisions in EISA 2009, that includes the corporate average fuel economy standards.

The Energy Efficiency Resource Data recalled the 800 pound gorilla, the Energy Efficiency Policy. This is a really big deal. These benefits will not occur if energy-efficiency is just a safety valve for renewable energy standard. We think efficiency is important enough in its own right, that it deserves its own separate provision, the savings targets in S. 548.

I would recommend that this committee include this bill as part of comprehensive energy legislation.

Thank you very much for your attention and I look forward to your questions.

[The prepared statement of Mr. Nadel follows:]

PREPARED STATEMENT OF STEVEN NADEL, EXECUTIVE DIRECTOR, AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY

Summary

A federal Energy Efficiency Resource Standard (EERS) would set energy savings targets for electric and natural gas distribution utilities throughout the United States. 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 increase efficiency savings in 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, the Save American Energy Act, 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 to establish these national guidelines. S. 548 provides that states can have primary responsibility for administering the EERS if the state requests and the Secretary approves such request. We expect most states to take on this role, since they know their states and utilities well. DOE's role would be to draft regulations and provide oversight, 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 savings, 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 carbon dioxide emissions 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 base case.

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 in 2020 as all of the efficiency provisions in EISA combined, including 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. ACEEE strongly recommends that such an EERS be included as a centerpiece in the next federal energy bill.

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 Maryland, New York, Ohio, Pennsylvania, Vermont and Virginia.

ACEEE worked with Senator Schumer's office in the development of 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 lines of S. 548 will have more impact on promoting energy efficiency than any other provision now pending before this Committee. 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 an EERS 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 questions and 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

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

as proposed in S. 548 would set a national goal for energy savings, requiring retail electricity and natural gas distributors to cumulatively reduce their electricity sales by 15% and natural gas sales by 10% 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 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 energy savings through energy efficiency. Failure to comply with an EERS law results in penalties, which are based on the level of 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 utility energy sales 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 (i.e., 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 and two figures* below, 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.

* All figures have been retained in committee files.

S. 548 Impacts with 1% per Year Growth Rate

(illustration using a utility selling 100 kWh per year)

Year	Expected Sales (kWh)	Annual Growth (kWh)	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

(illustration using a utility selling 100 kWh per year)

Year	Expected Sales (kWh)	Annual Growth (kWh)	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	2.37
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, or other governing body, which reviews the reported savings and makes revisions if deemed necessary.

EERS Adoption and Implementation

EERS's have been adopted in 19 states, to date, as shown on the map below.*

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 below.

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 of these states 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 2%.

*Maps have been retained in committee files.

State Electric Energy Efficiency Resource Standards

State	2009	2010	2010 (total)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 (total)
California	1.0%	0.9%	1.87%	0.9%	0.8%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	8.45%
Colorado	0.29%	0.42%	0.71%	0.44%	0.47%	0.49%	0.52%	0.55%	0.58%	0.61%	0.64%	0.67%	0.67%	6.36%
Connecticut	1.00%	1.00%	2.00%	1.00%	1.00%	1.25%	1.50%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	17.25%
Hawaii	0.60%	0.60%	1.20%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	0.60%	7.20%
Illinois	0.40%	0.60%	1.00%	0.80%	1.00%	1.40%	1.80%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	18.00%
Iowa	0.80%	1.00%	1.80%	1.00%	1.20%	1.40%								5.40%
Maryland	1.00%	1.25%	2.25%	1.75%	2.25%	2.75%	2.75%	3.25%						15.00%
Mass.	1.00%	1.25%	2.25%	1.50%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	19.50%
Michigan	0.30%	0.50%	0.80%	0.75%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	10.55%
Minnesota	0.55%	1.50%	2.05%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	17.05%
Nevada	0.25%	0.50%	3.00%	0.38%	0.38%	0.38%	0.38%	0.50%						5.00%
New Mexico	0.25%	0.50%	0.75%	0.50%	0.75%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	10.00%
New York	2.00%	2.00%	4.00%	2.00%	2.00%	2.00%	2.00%	2.00%						14.00%
North Carolina	0.00%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.50%	0.75%	0.75%	4.00%
Ohio	0.30%	0.5%	0.80%	0.7%	0.8%	0.9%	1.0%	1.0%	1.0%	1.0%	1.0%	2.0%	2.0%	12.20%
Pennsylvania	0.00%	0.5%	0.50%	0.5%	1.0%	1.0%								3.00%
Rhode Island	1.00%	1.25%	2.25%	1.50%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	19.50%
Texas	0.40%	0.40%	0.80%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	4.80%
Vermont	2.0%	2.0%	4.00%	2.0%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	22.20%
Virginia	0.25%	0.25%	0.50%	0.50%	0.50%	0.50%	0.50%	0.75%	0.75%	0.75%	1.00%	1.00%	1.00%	7.75%
Washington	0.74%	0.74%	1.48%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%		8.14%

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.[3]

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.

[3] Itron, Inc. 2008. *Assessment of the Feasible and Achievable Levels of Electricity Savings from Investor Owned Utilities in Texas: 2009-2018.* Oakland, CA: Itron, Inc. Available at http://www.puc.state.tx.us/electric/reports/misc/Electricity_Saving_2009-2018_122308.pdf.

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.

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 2008, Vermont businesses and homeowners who worked with Efficiency Vermont have saved more than 550 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 $445 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 were about 9% of sales with savings in the past two years exceeding Vermont's 1.5% per year historic load growth (see figure on the next page).

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 (Furrey, Nadel and Laitner), 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 below. 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 base case.

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 more than 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 through energy efficiency programs 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.

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.

	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: Prindle et al. 2007

In addition, energy efficiency and renewables are unique resources with unique characteristics. An RES would apply to the entity supplying power—sometimes 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 below, 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. If sales go down 15% in 2020 due to an EERS, a utility will need to generate 15% fewer renewable kilowatt-hours.

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 be-

cause 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.

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 (refer to National Wholesale Electric Prices graph on page 17).

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.

Furthermore, these studies rarely include new energy-saving technologies such as LED lighting and advanced microprocessor controls. As new efficiency technologies

and practices are invented and brought to market, the amount of cost-effective efficiency savings available will increase.

Utilities and states are showing that these targets can be achieved in practice. 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 (Xenergy/EF 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 oversight, the proposed federal EERS has been set up similar to the proposed RES, with administration to happen at the state

level if the Secretary approves a state's request. We expect most states to administer the program at the local level, preferring not to "trust the bureaucrats in Washington." The utility reporting requirements for achieved savings, as specified in the law, are 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 electricity use for 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.

Switching from one fuel to another, to the extent such switching saves consumers money, 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 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 efficiency savings 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 is 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 as a safety valve for an RES, a safety valve that would save far less energy than a separate EERS. 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

[4] Kushler, York, and Witte. 2004. Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies. Report U042. Washington, D.C.: American Council for an Energy-Efficient Economy. ACEEE is now collecting updated data on the cost of efficiency programs and preliminary findings are that costs per lifetime kWh saved are still about 3 cents.

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 and nearly as much in 2020 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 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. ACEEE strongly recommends 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.

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The CHAIRMAN. Thank you very much.

Mr. Wells.

STATEMENT OF RICH WELLS, VICE PRESIDENT, ENERGY, THE DOW CHEMICAL COMPANY, MIDLAND, MI

Mr. WELLS. Thank you, Mr. Chairman, and members of the committee. We appreciate the opportunity to provide you our views on energy-efficiency resource standards and their role in future energy and climate change polices of our country.

First, I would like to address the critical role energy plays for Dow Chemical. As a leading specialty chemicals and advanced materials company, Dow uses the equivalent of 850,000 barrels of oil every day in global operations. Of this total, approximately half is here in the United States.

The energy used by Dow is converted into a wide variety of products essential to our economy and our citizens' qualify of life, including pharmaceuticals, insulations, electronic materials, and much more.

With energy being the key enabler for all our products, it is no surprise that the volatility of energy prices over the last 6 years

has had a dramatic on our company. In 2002, our annual energy and feedstock bill was $8 billion. Last year that number climbed to over $26 billion.

Because of that, we have energy efficiency and conservation program which has been refined over the last two decades. This program—through its energy savings of $8 billion and CO_2 reductions of 86 million metric tons over the past 15 years—has helped us to sustain our operations and retain the ability to invest in our future despite these rising energy costs.

We are not done. We have set a corporate goal to further improve energy efficiency by an additional 25 percent by the year 2015. If the United States was to accomplish a similar goal, we could eliminate the oil equivalent of all imports from the Middle East.

We believe the promotion of both energy-efficiency and renewable energy should be at the heart of any energy security and climate change strategy.

A national energy-efficiency resource standard would be a tangible way to assure that energy-efficiency becomes the tool of choice for achieving early and effective reductions in energy costs, natural gas demand and greenhouse gas emissions.

Currently, new conventional base-load production sources generate electricity at a rate between seven and 14 cents per kilowatt-hours. At a cost of three cents per kilowatt-hour saved, the efficiency improvements are significantly less expensive than building new generation and transmission capacity. Implementing a national EERS would commit every State to utilize this least-cost resource, establish a baseline level of cost-effective and achievable energy savings, and reduce CO_2 emissions far beyond the level possible by those States acting alone.

As already mentioned, the ACEEE estimates that by 2020, a Federal EERS would reduce peak electrical demand by over 110,000 megawatts, cut carbon dioxide emission by approximately 260 million metric tons and create 220,000 net jobs. Furthermore, utility customers would save a net $168 billion. When it's all added up, the benefits of an EERS outweigh the costs by a factor of three to one.

An EERS would also reduce natural gas demand, particularly during peak periods, thereby reducing both its price and volatility. US Manufacturers, long the shock absorber for high domestic natural gas prices, would benefit from a competitive and more predictable natural gas supply.

Under an EERS, utilities would offer a variety of programs to help customers reduce their energy usage. This could take the form of rebates for the purchase of energy-efficient equipment, conducting energy audits and insulating homes.

As an example, our Dow Building Solutions business is partnering with utilities to help them develop cost-effective energy-efficient retrofit programs aimed at addressing the energy performance of our Nation's existing building stock.

We are currently working with the State of Michigan and its two largest utilities to shape that State's new EERS program. We have also recently launched a residential and commercial effort with another major utility aimed at quantifying the energy-efficiency of air

sealing packages for homes, as well as exploring ways to provide incentives for new construction to go beyond existing energy codes.

There is one important fact about energy-efficiency—opportunities exist throughout our economy and throughout the country.

As the committee considers this legislation, we urge the following considerations:

First, assure that the standard is applied to utilities and not to industrial users of energy.

Second, if Congress decides to enact a Renewable Electricity Standard (RES) rather than an EERS, Congress should allow a large part of the renewable mandate to be met through energy-efficiency.

In conclusion, energy-efficiency and renewable energy are essential elements of a comprehensive energy policy—and must be deployed cost effectively if any climate change policy is to be workable. EERS can be an effective tool to assure that these objectives are achieved at the lowest possible cost.

I appreciate the opportunity to speak today and I will be happy to entertain any questions you may have.

[The prepared statement of Mr. Wells follows:]

PREPARED STATEMENT OF RICH WELLS, VICE PRESIDENT, ENERGY, THE DOW CHEMICAL COMPANY, MIDLAND, MI

Chairman Bingaman, Senator Murkowski and members of the committee, thank you for the opportunity to provide our views on the energy efficiency resource standard and its role in the future energy and climate change policies of our country.

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Dow has an energy efficiency and conservation program which has been refined over the past two decades. This program—through its energy savings of $ 8 billion and CO_2 emission reductions of 86 million metric tons over the past 15 years—has helped us to sustain our operations and retain the ability to invest in our future despite these rising energy costs.

And we are not done; Dow has set a corporate goal to further improve energy efficiency by an additional 25% by the year 2015. If the United States was to accomplish a similar goal, it could save the oil equivalent of all imports from the Middle East.

We believe the promotion of both energy efficiency and renewable energy should be at the heart of any energy security and climate change strategy.

A national energy efficiency resource standard would be a tangible way to assure that energy efficiency becomes the tool of choice for achieving early and effective reductions in energy costs, natural gas demand, and greenhouse gas emissions.

Currently, new conventional base-load production sources generate electricity at a rate between 7 and 14 cents per kilowatt-hour. At a cost of 3 cents per kilowatt-hour saved, efficiency improvements are significantly less expensive than building new generation and transmission capacity. Implementing a national EERS would commit every state to utilize this least-cost resource, establish a baseline level of cost-effective and achievable energy savings, and reduce carbon dioxide emissions far beyond the level possible by those states acting alone.

The American Council for an Energy-Efficient Economy estimates that by 2020, a federal EERS could reduce peak electrical demand by about 90,000 megawatts, cut carbon dioxide emissions by approximately 260 million metric tons and create 260,000 net jobs. Furthermore, utility customers would save a net $144 billion.

When it is all added up, the benefits of the proposed EERS outweigh the costs by a factor of 3 to 1.

An EERS will also reduce natural gas demand, particularly during peak periods, thereby reducing both its price and volatility. US Manufacturers, long the shock absorber for high domestic natural gas prices, would benefit from a competitive and more predictable natural gas supply.

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One important fact about energy efficiency—-opportunities exist throughout our economy and throughout the country.

As the committee considers this legislation, we urge the following considerations.

1. Assure that the standard is applied to utilities and not to industrial users of energy.

2. If Congress decides to enact a Renewable Electricity Standard (RES) rather than an EERS, Congress should allow a large part of the renewables mandate to be met through energy efficiency.

In conclusion, energy efficiency and renewable energy are essential elements of a comprehensive energy policy—and must be deployed cost-effectively if any climate change policy is to be workable. EERS can be an effective tool to assure that these objectives are achieved at the lowest possible cost.

Thank you for the opportunity to speak with you today, and I will be happy to answer your questions.

The CHAIRMAN. Thank you very much. Thank you all for your testimony. We will start and ask questions and then call on your colleagues.

One obvious first question is whether or not if we did anything like this by way of legislation, should we also apply it to natural gas?

Mr. Nadel, you say we should, and you cite the 19 States that currently have EERS. How many of those States have applied it to natural gas?

Mr. NADEL. I would have to do an exact count. I believe it is about three. I would get back to you to be sure, but I know Minnesota has it, Michigan has it, and New York is developing it. Let me double check. There are a couple of—maybe——

The CHAIRMAN. Because it does seem that there are some different objectives we are trying to achieve here. I think Mr. Manning points out that they are trying to move some of their customers, if I understand it, away from use of fuel oil and to natural gas, and at the same time they're suggesting that there ought to be additional requirements put on natural gas companies. So Mr. Manning, do you have a comment?

Mr. MANNING. If I could just speak to that. New York City, for instance, buildings within New York City alone, still running on having oil, and they would like to move away from that, obviously. Only 1800 of those buildings were in our service area. They would like to pursue a very aggressive conversion program. Ultimately a program to disallow oil heat within the——

The CHAIRMAN. Do you have suggestions as to what we should do to encourage that shift from heavy oils to natural gas? I would be anxious to hear those.

Mr. MANNING. Absolutely. Of course, there is a lot of work that we are doing with biofuels. For instance, connecting captures. We have been capturing methane and putting it right into our gas distribution system for decades. It was one of the first projects.

We installed the first fuel cell in 1972 in Staten Island. So we do already encourage a lot of technology development of the gas line, so I have to support my colleagues there, but I do think though, in terms of the implementation of an EERS, we have to be sensitive to the opportunities for growth through conversion and the opportunities for advanced technologies in terms of efficiency.

So we are of the view that you can, in fact, facilitate gas conversions through an EERS practice, which of course, gives credit for and requires increased efficiency.

So part of the natural gas conversion opportunity is a 40 percent reduction in emissions.

So there would be clear opportunities if we get the rules right, that people could select the fuel like natural gas to bring in under compliance. So what we have to do as staff is to make sure that those conversions and new growth, and new technologies, such as the electrification of valve sites, there are those out there that believe we have done a tremendous amount of work in natural gas for years. We have been working on that for 20 years.

The CHAIRMAN. We have a couple other questions, just to change. Does anyone want to comment?

Mr. SKAINS. Yes, Senator, I do. Thank you. The principle that you raise is an important one and it doesn't just apply to fuel oil. It applies to all fuels that are higher emitting than natural gas. It could be fuel oil. It could be propane. It could be electric use in homes. That the gas appliances could serve that use more efficiently, more cost effectively with less CO_2 emissions. For example, an electric water heater emits two to three times the amount of CO_2 as a natural gas water heater.

We think any energy-efficient measurement standard should take into account and promote the conversion of higher ended fuel sources to lower ended fuel sources. So I agree with Mr. Manning wholeheartedly and I would expand it to include the prospect of many energy sources. This legislation as it is currently drafted, doesn't get there, but we think we can work with your staff and the other participants to do so.

The other thing we are concerned about, too, is economic growth and development. We don't think that this bill should deter the addition of new natural gas customers, whether they be new homes and businesses, new manufacturing in the United States. We want to encourage economic growth development and jobs here, so we think there should be a credit, not just during the base period calculations, but during the compliance years for new growth in conversions, and that means utilities aren't penalized by adding customers with an efficient fuel.

The CHAIRMAN. Let me ask Mr. Centolella, your point here that we should clarify that States may consider energy-efficiency to be a resource or a reduction to forecast load for purposes of zoning and

planning and procurement. Why would we have to do that? That's something that every State, public utility, presumably, I assume that every utility would do that to the extent that they felt they could improve efficiency, they would want to put that in their forecast, and that would be something we could recognize. What is the point there? I am not understanding.

Mr. CENTOLELLA. In referencing a section of S. 548, which directs States to consider energy-efficiency as a resource, it's a model that is commonly used in practices that have gone on in States for some time in resource planning, but it is a model that we have seen create problems when we get to the level of RTO and RTO advocacy requirements.

At the RTO level, something that is called a resource typically requires the ability to be dispatched by a system operator. Things like energy-efficiency, particularly where we run into this is price responsive, predictable responses of consumers dynamic retail prices.

Those are not dispatchable by the system operator in the sense that, Midwest, for example, is not going to send a dispatch to the plant on the air conditioner, even though my air conditioner might have a chip in it and responds to dynamic retail pricing.

So we want to make sure that States aren't obligated by this law to use a framework that may not be the appropriate framework, particularly as go forward in more and more Smart Grid type of application.

The CHAIRMAN. So you are saying that if we are going to use—referring to this as a resource could cause some problems elsewhere?

Mr. CENTOLELLA. Yes.

The CHAIRMAN. My time is up. Let me see, Senator Menendez was the first one here.

Senator MENENDEZ. Thank you, Mr. Chairman. Thank you all for your testimony.

Mr. Nadel, let me ask you, the latest draft of the committee's RES bill allows a one-quarter of the RES to be met through energy-efficiency. That amounts to a 15 percent RES and a 5-percent EERS. If we were to add up the 19 States EERS currently in place, how would that compare to the 5-percent national RES?

Mr. NADEL. It would equal or slightly exceed national level and get just over 5 percent from existing EERS by 2020.

Senator MENENDEZ. So really if we have a 5-percent EERS, there is not much of an improvement by 2012?

Mr. NADEL. Correct.

The CHAIRMAN. Let me just ask for clarification. Is that just in the 19 States or you are saying nationally there is little or no improvement by having a requirement, a national 5 percent requirement?

Mr. NADEL. Right. The 19 States together will have enough efficiency to equal 5 percent of the whole Nation, of all 50 States.

Senator MENENDEZ. Second, Mr. Manning, let me ask you. You said in your testimony that a significant expansion of combined heat and power technology utilizing natural gas would offer a leading opportunity to generate electricity more efficiently and reduce our carbon footprint, as I recall your testimony.

Mr. MANNING. Yes, that is correct.

Senator MENENDEZ. I couldn't agree more. You know, we looked at the report recently by the Oak Ridge National Laboratory that estimates that combined heat and power has already reduced emissions equivalent of taking 45 million cars off the road and would provide policies, we could easily triple that by 2030. Unfortunately this seems to be severe regulatory barriers in the form of tariffs and difficulty in interconnecting CHP projects in many States.

Do you agree that in order to meet an aggressive national EERS that these barriers to combine heat and power have to be removed?

Mr. MANNING. Yes, that's a personal position and a corporate position. We do believe that proliferation of combined heat and power, both as distributors in terms of baseline. We have a lot of plants, Senator, that are 29 percent efficient. The old single-cycle, where you are basically boiling water and generating electricity.

I would like to give a quick comparison as to whether or not that we have created, based on natural gas, combined cycle, to displace the dam of the Columbia River. The steam, after it's run down—the power is generated by a jet turbine, right off of a DC–10—heat goes out and generates—instead of going out the stack, generates water. The second turbine is a combined cycle. Then the steam goes out the back end into a MacDonald's French Fry factory, and that steam blows the skin off, runs the cutters, runs the fryers, runs the freezer and cycles back in the plant. This is a million pounds a day of MacDonald's French Fries. The trucks are driving by.

So there's an example of how combined cycle becomes cogeneration and your efficiency level goes up at every opportunity. That, of course, within the business of a home, you've got the opportunity, as my friends will point out from AGA, natural gas for the home delivers a much higher efficiency level than if you are generating from large plant sources.

So the combined cycle in the home ranks as the best example for the free market for generating power and heat simultaneously.

Senator MENENDEZ. so just for the record, steam that went into the French Fries was in the machinery, right?

Mr. MANNING. So in summary, real potatoes are used.

[Laughter.]

Senator MENENDEZ. So finally, Ms. Hoffman, if I think that Mr. Manning's answer is the answer of many experts who agreed that expanded use of combined heat and power will be a key part of making an aggressive EERS, and based upon that Oak Ridge Laboratory report that talked about lack of uniform standards and how such CHP projects can act through the grid as a significant barrier to this market, do you think it's time for a National Interconnection Standard?

Ms. HOFFMAN. The Department of Energy helped develop the Voluntary Standard, IEEE 1547, which is an interconnection standard that has been adopted by a number of different States. I think we should look at that standard and see how we can improve on it as it currently exists.

Senator MENENDEZ. Thank you very much.

The CHAIRMAN. Thank you, very much.

Senator CANTWELL. Thank you, Mr. Chairman. Thank you for having this important hearing. A couple of witnesses mentioned Smart Grid and I want to talk a little bit about that.

Mr. Nadel, thank you very much for your leadership in the area in general, for your abdication of the efficiency standard.

I want to focus on the issue of peak demand on this disproportionate cost that we have to the system, and the fact that Congress ought to be looking at ways to decrease the peak demand in addition to energy-efficiency. So Mr. Centolella, would you want to comment on that?

Mr. CENTOLELLA. Sure. Thank you, Senator. Let me comment on both Smart Grid and peak demand reductions.

In terms of Ohio State statute, we have both an energy saving standard and we also have peak demand reduction standard.

Our rules are designed to pursue and facilitate utilities having demand response programs that may be price based or incentive based, as well as on traditional demand reduction programs to meet that standard. One of the things that we are very interested in is how to encourage cost-effective Smart Grid investments. We have already approved two utility scale AMI and Smart Grid projects for Renew Energy Ohio and America Electric Power. Duke Energy in 2009, will put in 50,000 advanced leaders and service carriers and then build it out for 5 years. American Electric Power, in its first phase, as we improve, will put in 110,000 advanced meters. We expect to follow that up with looking at how we can create some dynamic retail pricing, so that, in fact, consumers can benefit from being able to manage their energy use in relationship to what it actually costs to produce energy at any given point in time.

As I mentioned briefly with the Chairman, we are also working with the two RTOs that are active in our State, modified to those RTO tariffs, to make sure that the benefits of that demand reduction actually flow back to consumers and that the investments that are made in Smart Grid have benefits to consumers in terms of dynamic pricing.

Of course, Smart Grid is much broader than just reducing peak demand through demand response. The way we view it is, it is an architectural view, which you are creating an overlay of information and communication systems that is both secure, and also open that provides a platform for distribution, innovation, generation and storage, plug-in electric vehicles and a whole range of applications that we are just now beginning to imagine, many of which could help consumers significantly in terms of energy-efficiency, as well as making this system more reliable, increasing power quality and helping us to integrate new technology.

Senator CANTWELL. Isn't it a case that peak demand response is to distribute storage and other ways help to foster this development.

Mr. NADEL. Yes, there are many ways to reduce peak demand. You just mentioned several. Also, response programs, feedback programs, where people get feedback on their energy use of their previous use and reduce their demand.

But also the traditional energy-efficiency programs, on average, if you a 10-percent savings or better, you get about a 10-percent reduction on peak demand.

Mr. MANNING. One further point, Senator, through many of the regions, your power source is staged in. This will of course, stage in the power which is actually used on peak, you are often using the least efficient sources of energy. So that's just another benefit in these savings. You not only take the pressure off of your distribution system, but you are also probably also idling some of your inefficient energy sources.

Senator CANTWELL. I am trying to figure this out for your ratepayers. What do we do when this credit market is frozen, we have this dilemma of making these investments obviously on a rate of return, and balancing ratepayer based issues as well? What do you think we need to do to move more expeditiously?

Mr. MANNING. That is a real challenge. We, fortunately, are a larger company, so we still have access to the credit lines ourselves. But it really puts us——

Senator CANTWELL. Mr. Manning, that is the issue. We are working with utility commissions for all ratepayers.

Mr. MANNING. That is the issue, is in working with State utility commissions, if you want to drive energy efficiency aggressively, and this is certainly in the areas that they can contribute to that issue, but in other words, another way to do it, of course, is to spread the cost of some of these innovative technologies within the rate base so that they become more affordable. So it does require a new conversation in terms of the regulatory compact between utilities. Decoupling is a first set. I believe it's decoupling that gets the utility onsite, but it also, of course, requires some opportunity for rate recovery to drive the implementation and costs will come down as a result.

Senator CANTWELL. Is there time for one more question?

The CHAIRMAN. Yes, sure. Let me ask, and start with you, Ms. Hoffman, one of the points you make is that we should find a way that people who have, or utilities that have pursued energy-efficiency in a serious way should be given credit for that. We should not be assuming that everyone is starting in the same place. How do we do that? Do you have a suggestion for us, and maybe Mr. Nadel, you have some ideas on how States that have adopted the EERS; if any of you know how to solve that problem, I would interested to hear it.

Ms. HOFFMAN. Look at the baseline and allow some of the States that have implemented energy-efficiency measures to modify that baseline accordingly.

The CHAIRMAN. Do you have a comment?

Mr. CENTOLELLA. Yes, this is part of the reason why we have suggested exempting States that have meet criteria from the Federal standard. What you see as you look across states, and these are States that are in different positions for a whole range of reasons. One of which may be that some States have done all more already in energy-efficiency than others.

But they have different customer bases, they have different levels of load growth, different rates of technology options, and different attitudes in price on consumers, and so we think that it is appropriate to have essentially the same decision criteria that this bill would ask the secretary to use in terms of defining on a uniform and national level what is maximum, achievable cost effective

potential, to take that decisionmaking down to the States that are prepared to move forward with their own standards, and have them apply the same decision criteria about what is maximum achievable cost effective potential. But to do it in a way that reflects their States' conditions, engages the stakeholders, engages the public in a review process in those States, so that you get a standard that reflects where each individual State is at.

I think if we do that and set this national goal by engaging the States and the thousands of consumers that participate in our regulatory proceedings in that process, we will end up with better standards. We will end up with standards that are more likely to take effect sooner and not be subject to litigation and delay. I think we will end up with standards that reflect the differences between the States.

The CHAIRMAN. Mr. Nadel, do you have a thought on how we solve this problem of fair treatment of people who have done the right thing?

Mr. NADEL. We like the concept of banking so that if the States are already doing it, they are saving right now. They come bank a lot of savings that will make it easier.

We have looked at even the utilities that are doing a lot. There are opportunities for at least 10 percent more saving beyond what they are saving. So we think they could achieve it.

The CHAIRMAN. Presumably the banking suggestion and the description that Mr. Centolella gave about Ohio where they allow banking, the banking starts when the requirement is imposed, so you've got to still meet the—whatever it is, 15 percent, 10 percent reduction or improvement in efficiency from that day forward, and I'm concerned that perhaps there are States that have already—not States, but utilities, for example, that have already dramatically improved efficiency, and we are now saying to them, "OK. We are imposing the same requirement on you that we are imposing on the utility."

Mr. NADEL. OK. Banking is giving them a partial credit, if you will, because the targets ramp up so slowly, these more active States will easily exceed the targets in the early years and they can bank those extra. Alternatively, you can give them credit for early action, if you will, but that does reduce the target.

The CHAIRMAN. Are there States that have done that and been given credit for early action?

Mr. NADEL. I mean the States usually, they give credit as of when the law passes. I can't think of any, but I have to check back for anybody who has done early action before the law got passed.

Mr. SKAINS. Senator, I think it's a broader, more difficult question, too. It just doesn't apply to States that have gone to the EERS standards. Our industry, the natural gas industry is leading the way with efficiency in the markets without these standards and without penalties, and as Steve mentioned, there are only three States that have natural gas standards in place today.

The residential natural gas consumer has reduced its consumption of natural gas per degree by 30 percent from 1980 to 2006. In North Carolina, that's 34 percent from 1980 to 2008. We don't have any the EERS standards. So these actions have taken place even without these types of laws in place and without the threat of pen-

alties, and we are very troubled about the penalty aspect of the legislation.

The CHAIRMAN. Senator Cantwell, go right ahead.

Senator CANTWELL. Thank you, Mr. Chairman. I actually know that the Northwest has done a lot in this area. I want to figure out how to create an equitable baseline, I guess, if you will. I want to go back to the Smart Grid element and all of this and the efficiencies. You have all done a great deal of articulating on how important efficiency is. So I hope we are also sold on this as well. But the efficiency savings from the Mackenzie report, basically saying—basically negating the future production of coal power plant. They are huge CO_2 reductions, but we are still stymied by this effort of trying to move forward.

So I want to ask, why don't we look at this issue from the utility commission perspective and the utility investment perspective? So we would be, the Federal Government, would be willing to put a low interest, long amortized periods, 30-year periods of funding of these sufficiency and Smart Grid projects on the table as a way to help in the economics of getting the projects implemented, and everyone can benefit. The ray payers would benefit from this. We are doing this all the time with other areas of government, where we are getting financing for projects in a cost affordable rate to try to pass on the savings. So either of the panel?

Mr. MANNING. I can start. Certainly this is part of the discussion around renewables because there is great enthusiasm for renewables. Renewable capacity is not always located in the center of law. So not only is it Smart Grid, but you are also looking at a new and additional transmission. There are two issues around that, one, which is cost. Who pays? The other, of course, is siding.

I would argue the only way to get this done is for Federal action, perhaps on both counts. The lack of long-term contracts, which used to exist years ago, makes financing more difficult.

So the availability to financing will certainly be a great benefit there, and of course the McKinsey study demonstrates that there is so much that we can do, which is very affordable, without changing our lifestyle.

What it's not doing is it's not addressing the challenge of driving additional renewables in terms of the solution. It just indicates there is much more that can be done in terms of reducing the carbon intensity generation. It also points out, Mr. Chairman, in terms of your earlier question, it's quite a good analysis. It entertains in terms of the cost in the various regions of the country, it demonstrates how much CO_2 abatement you could achieve at a set price across the country. It's highest in the Northeast and it's lowest in the South. So that would be helpful to your staff.

There is some analysis which helps you documents the early action issue, which has to be addressed. But we can't let that prevent us from striving toward great efficiency.

Senator CANTWELL. So how about it, if we drive down the cost of financing, will that help get the green light for these projects approved?

Mr. CENTOLELLA. Senator, I believe that any kind of Federal financing or co-funding is helpful. We have certainly worked with our utilities and encourage them to go after some of the funding

that is in the Recovery Investment Act with respect to their Smart Grid contract. That is very helpful in terms of getting that issue on the table with some of our utilities and moving forward. So certainly additional financial help from the Federal Government, additional incentives, I think would be quite valuable.

I do want to pick up just a moment on what Mr. Manning said about transmission and just offer a couple of cautions about how you may proceed with transmission sections of the energy legislation.

It's important to realize——

Senator CANTWELL [continuing]. You should know that we have separate hearing on that and will probably have at least ten more hearings on that. Go ahead.

Mr. CENTOLELLA. OK. I will keep this very short. Just two overall things to recognize is that there are substitution for transmission in terms of what we do with energy-efficiency, demand response generation——

Senator CANTWELL [continuing]. Distributed generation——

Mr. CENTOLELLA [continuing]. Even a central station plant is located near a city or another load center. I mean, those are all, in effect, substitutes for building long line transmission. So it's important that we look at that in an integrated context to decide what is cost-effective. What makes economic sense?

This is why States do integrated resource planning in order to consider those kind of tradeoffs and back that kind of information to a regional level.

Second, as you look at this, I think you need to understand that there is an essential element to planning a transmission system. An AC electric transmission system is very different than a gas pipeline, because the AC system is not a switch network. It runs on a contingency basis. It is possible, in fact, to build a 765 KV AC line that actually may reduce the transfer capability between the two points that it connects, and you have to be very careful to make sure that what you're building in terms of transmission fits into a broader regional plan, that it is actually accomplishing the objective that you want to accomplish.

So if you go forward in this area, it become important to set criteria about how that the transmission is, in fact, improved.

Senator CANTWELL. I agree, but I think that we shouldn't allow more argument on transmission, which is important to negate the fact that there are efficiencies in Smart Grid technology that can be implemented on existing corridors, and that that savings is a huge potential in saying you don't have to build this coal-fired power plant, and not only that, but the United States has to be a leader of this. This is technology that we could get to world leaders that would use it, and get China to reduce their CO_2 emissions, if they build a plant in a week. Now it's critically important.

Mr. Chairman, I thank you. I know we are going to have a hearing on the finance side that will be included in this, so I need to introduce legislation to really—I think you're looking at the efficiency goal and thinking about this with the RES and all that, but I think it's important that we think about Smart Grid in this mix as well, and that it is part of the efficiency goal that we reach, that it has a role to play here in helping us get there in that par-

ticular—whatever it is, whatever the number is that we come up with. I actually think the administration has hit on a very good number.

Mr. MANNING. Just very briefly, I think a lot of discussion on renewables is capacity. Some States don't feel that they have the capacity for renewables that other States enjoy, and that I would suggest is a transmission opportunity. So with all due respect to my friend, I do think there is great opportunity, a lot of technology, a lot of innovation going on in terms of materials, in terms of diagnostics.

So there are transmission opportunities which will not negate a tremendous effort in terms of energy-efficiency.

The CHAIRMAN. Thank you, Ms. Hoffman, let me ask you. You make a point about we need these good evaluation measurement and verification protocols. If we were to enact a renewable electricity standard that says you can meet part of the standard, 45 percent or so, through efficiency, we need those protocols; do we not?

Ms. HOFFMAN. Yes.

The CHAIRMAN. So the development of the protocols, would be required regardless, and I guess I would like to know, is this a significant obstacle? I guess 19 States already have these. Presumably they have some protocols in place.

Mr. Centolella, is there any a big disagreement about whether or not people are fudging the books here? In Ohio you adopted this very aggressive requirement for improvements in efficiency, are you confident that you can measure and verify what the people are meeting?

Mr. CENTOLELLA. We are. We have included in our rules as part of the compliance statute that each of them must file. They must a report by an independent measurement and evaluation contractor that verifies the savings that they have achieved.

The CHAIRMAN. You think that does the job?

Mr. CENTOLELLA. Yes.

The CHAIRMAN. You are confident that it does as well, Mr. Nadel?

Mr. NADEL. Yes. There are a number of folks that work at the State level. There are small differences. It will be similar to getting uniform national protocol that people argue out of the points of difference, but it's not a dramatic amount of work. I mean, not a dramatic amount of work.

The CHAIRMAN. Again, Ms. Hoffman, as I understood Mr. Centolella's comments, he is suggesting that we give more decision-making to the States, that is allow States to actually determine what is the maximum achievable cost-effective level for energy-efficiency improvements, as I understand, instead of setting a national standard, we should essentially direct the State to set that standard and comply with it once the commission of that State determines what they think that is. What is your reaction to that?

Ms. HOFFMAN. The Department doesn't have an official position but the legislation itself does give flexibility to the States if they want to implement the program within their States. Regardless of the standard, I think the objective should be to encourage more energy-efficiency at the State level. The actual standard could prob-

ably be debated, but the legislation does allow flexibility for the States to take over implementation.

The CHAIRMAN. I think his suggestion is not just the States would be allowed to implement it, his suggestion was States be allowed to set the standard. Mr. Nadel, did you have a reaction to that?

Mr. NADEL. Yes, I do. I think States should be permitted to set higher targets, but I worry that if we allow them to set lower target, many of the States that are not doing much just set very low targets.

My home State of Maryland, the utility argued that there was no money to be saved because it no longer owned power plants. The commission said, "Sure, and for 10 years you didn't do any programs."

These are often political decisions. I worry if we give the States flexibility, we will decimate the program.

The CHAIRMAN. What's your reaction to that, Mr. Centolella?

Mr. CENTOLELLA. I think that is a more cynical attitude toward State regulation than perhaps I do.

The CHAIRMAN. That comes from living in Washington.

Mr. CENTOLELLA. We have States that are very committed to doing energy-efficiency. I look around my region, for example. A little over a year ago we had nine State Governors sign a greenhouse gas platform that said that they supported, 2 percent annual improvements in energy efficiency in their State, starting in 2015 and every year thereafter.

There are many, many States out there that are ready to be very aggressive on this, and I think that the benefit of engaging State regulators and engaging stakeholders and consumers that would participate in the State process outweighs any risk that some States might fall behind.

I will also note that I think that where there are typically differences among the States, it is because they apply a different standard about what is cost-effective, and I think it would be appropriate for the legislation to define cost effectiveness in a way that embodies Congress' intent to achieve significant energy-savings.

Mr. NADEL. He and I agree that many States will do an excellent job. I worry about those other ten or 20 States, not all 50 of them.

The CHAIRMAN. OK. I think all of this has been very useful testimony. We appreciate you all coming, and we will try to understand the issue with and figure out what to do. Thanks.

[Whereupon, at 11:35 a.m. the hearing was adjourned.]

APPENDIX

RESPONSES TO ADDITIONAL QUESTIONS

RESPONSES OF DAVID J. MANNING TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1a. The push to enact a separate RES and EERS calls into question the goals of these standards—is to promote certain technologies, or to reduce greenhouse gas emissions?

If energy efficiency is incorporated into an RES, it would seem to me that utilities would have a much better chance of meeting their requirements instead of facing penalties for noncompliance. Wouldn't it be better to give them greater flexibility to succeed by adopting a single standard?

Question 1b. If Congress decides to enact an RES instead of an EERS, should we allow an unlimited amount of the renewables mandate to be met through energy efficiency measures?

Answer. National Grid believes that the U.S. needs a balanced approach to energy overall—all options must be on the table. We need more expansive, robust energy efficiency programs. We need significant new sources of renewable energy: wind, solar, biomass and geothermal. We need a comprehensive strategy to address our transmission infrastructure, including policies that will enable us to bring renewable energy resources, which are often isolated, to dense urban areas and other load centers. We need smart grid technology and smart meters to maximize the potential of current and future energy efficiency technologies to automate the most efficient use of energy and to remotely scale back energy use during peak use and pricing periods. These actions, combined with clean, no-or low-emitting base-load power generation such as nuclear, hydroelectric, natural gas and emerging clean coal technologies, will lower emissions, lower customers' bills and play an important role in an effective national energy policy.

Three energy policies currently under discussion—climate change cap-and-trade, RES and EERS—each emphasize a different aspect of what we need for a balanced energy policy. While an EERS will undoubtedly produce significant climate change benefits, its unique value is spurring investment in technologies and practices that reduce overall energy consumption and result in benefits beyond reducing greenhouse gases, as outlined in my written testimony. For that reason, we appreciate the efforts of Senator Schumer and others to shine the spotlight directly on energy efficiency with EERS legislation.

At the same time, cap-and-trade, EERS and RES policies are rightly viewed as mutually reinforcing tools for achieving a balanced national energy policy. This may present opportunities to combine elements of the policies, such as including energy efficiency as a resource under a federal RES. National Grid could support such an approach if it is designed in a way that adequately addresses the need to provide appropriate investment incentives for both renewable energy and energy efficiency.

Question 2. This bill appears to provide only penalties, and no incentives, to facilitate compliance with the proposed federal standard. Please describe what other measures, if any, you think should be incorporated to encourage distributors to reach energy savings goals.

Answer. Incentives are an important mechanism to encourage utilities to deliver high quality efficiency programs that consistently meet customers' needs and maximize benefits. The incentives should be tied to the achievement of established goals such as energy savings, cost-effectiveness and comprehensiveness of the range of installed measures in customers' facilities.

Question 3. I am concerned that requiring distribution utilities to develop and administer new energy efficiency programs, or obtain new technology will be expensive—especially for consumer-owned non-profits. The penalty payments called for by this legislation are very high, and there is also the likelihood of "layered" costs from an EERS, RES, and climate change legislation. How can we implement cost control

mechanisms to keep costs for distributors—and therefore businesses and consumers—as low as possible?

Answer. National Grid believes that adequately addressing consumer cost is a critical aspect of designing workable energy legislation, and we support mechanisms that will fund consumer rebate and energy efficiency programs. Accordingly, we support distributing a significant share of the overall allowances under a federal capandtrade program to local distribution companies (LDCs) and requiring them to auction the allowances in a transparent, timely manner. LDCs would be required to use the proceeds to provide rebates to low-and middle-income consumers and small business as well as offer consumers incentives for energy efficiency upgrades and distributed generation resources. These mechanisms will offer immediate financial support to consumers as well as a long-term reduction in consumer energy costs. Similarly, we support returning any alternative compliance payments made under an RES or and EERS to LDCs with a requirement that the funds be used for consumer rebates and efficiency programs.

Additionally, several mechanisms may be adopted to control costs to both utilities offering efficiency programs and to participating customers. First, all services and products delivered through the programs should be secured through a competitive bid process. Second, caps can be placed on the administrative costs for programs to ensure the majority of costs are incurred for the purchase of energy efficiency equipment and services for customers. Third, financing options for the customer's copayment for efficiency projects can spread costs out over a number of years, thereby reducing costs in any one year.

Question 4. The proposed EERS legislation would calculate a utility's "business-as-usual" energy use by averaging its consumption levels in the 2 years prior to enactment. Utilities that are already making great efforts to reduce energy consumption—whether through a state-level EERS or their own initiative—may have a tougher time complying with the federal mandate due to their early action on energy efficiency. Should a federal EERS be designed to avoid disadvantaging those utilities, particularly compared to those who have taken no action?

Answer. A national policy should recognize that many utilities, like National Grid, have already invested heavily in energy efficiency and no longer have the low-hanging fruit available in other parts of the country. To address this disparity and avoid punishing forward-looking companies, an EERS should be designed to equitably credit early actors. Among the options to consider are the following:

- Changing the start date for when electricity savings can begin counting toward a company's compliance obligation. The current EERS bills only allow measures implemented after the date of enactment to count. This could be easily modified to allow credit for prior year activities, e.g. any measure implemented after January 1, 2005. This could be combined with an option to "bank" forward excess electricity savings above-and-beyond the level of their goal.
- Specify a standard conversion factor for energy efficiency spending (e.g., $50/MWh). Utility companies would calculate their average annual energy efficiency spending in 2006-2008 (this is actually reported to EIA). The spending levels would then be converted to MWh savings using the standard conversion factor. These "early action" savings could then be counted toward your annual compliance obligation.
- Cap the standard based on a company's per capita electricity consumption. A company that has driven down its customers' energy use to a very low level should not be subject to the same standards that apply to a company that has done little to reduce its customers' energy use.

Question 5. Under Senator Schumer's bill, the federal EERS would require electricity savings of 15 percent, and natural gas savings of 10 percent, over the course of a decade. For the sake of comparison, can any of you provide the percentage savings that were achieved by these distributors over the course of the past ten years?

Answer. Over the past ten years (ending in 2008), the cumulative savings from National Grid's energy efficiency programs in New England have decreased electricity usage by seven percent. Our gas energy efficiency programs are newer, so we do not have ten years worth of data. Our longest running gas program, in Massachusetts, has been in place for five years and to date the cumulative savings from this program are approximately three percent.

Question 6. You caution that creating the right baseline for measuring energy savings can often raise difficult design issues. Baseline certainty is critical to both the planning and the success of a program. S. 548 directs DOE to issue regulations based on "Business As Usual" forecast and to use a rolling baseline. What are the issues associated with using a "Business As Usual" approach and do you believe DOE has the expertise to properly measure a rolling baseline and verify savings?

Answer. Establishing a "business as usual" baseline is an inexact science but is required to set the benchmark against which energy savings can be reasonably measured. Baselines are most often set at levels of standard practice for the installation of efficient equipment. For example, T-8 lighting with electronic ballasts is now standard practice for lighting in commercial buildings and is often required by state building codes. Lighting equipment with efficiencies greater than this standard is used to calculate incremental energy savings. The challenge with baselines is that they often vary across different regions of the country, change frequently and are difficult to calculate for some end-uses such as more complex HVAC and industrial equipment.

National Grid has extensive experience in developing baselines and believes there is sufficient information in the marketplace to determine reasonable baselines for an EERS. DOE's experience establishing efficiency standards for specific end-uses in recent years provides a strong foundation for setting baselines.

Question 7. You note that a "one-size-fits-all" approach to an EERS could unfairly penalize early actors like National Grid, which have already invested heavily in energy efficiency and no longer have the "low-hanging fruit available in other parts of the country." Am I correct in interpreting this statement to mean that higher levels of energy efficiency have diminishing returns? How difficult would it be for National Grid to achieve the savings required by this legislation?

Answer. As explained in my answer to Question 4, National Grid believes that an EERS should equitably credit the work done by early actors. For utilities such as National Grid that have implemented energy efficiency programs over the past 20 years, much of the low cost energy savings has been achieved. However, there remains substantial energy savings to be achieved at lower costs such as lighting in commercial buildings that will represent a significant portion of the additional savings that must be achieved under an EERS. At the same time, to meet EERS goals, all cost-effective efficiency must be tapped which will naturally lead to higher cost savings associated with more costly measures such as heating, cooling and ventilation equipment. Utilities must work with customers to pursue more complex efficiency measures to ensure no opportunities are overlooked.

Question 8. You state that the EERS should be combined with appropriate rate-setting mechanisms such as decoupling to address the inherent tension between a utility's financial interest in encouraging energy efficiency measures, which results in less energy sold, and the consumer's desire to lower their bills via energy efficiency actions. Please elaborate.

Answer. National Grid believes that decoupling utility revenues from volumetric sales is essential to support and expand investment in energy efficiency for all consumers—and in so doing, help them reduce how much they pay in their overall energy bills.

Without revenue decoupling, there is an inherent tension between utility companies' financial interest in encouraging their customers to use more energy and those customers' own interest in lowering their utility bills through energy efficiency actions. Decoupling benefits customers by alleviating this tension and it works in combination with energy efficiency programs to help consumers lower their monthly utility bills.

How does "decoupling" accomplish this? Decoupling changes an important element in the way that utility rates have traditionally been set. Without decoupling, traditional utility ratemaking creates financial incentives for utilities to discourage—or at least not to encourage or support—energy efficiency. Under the more traditional way that rates are regulated, when a utility sells less of its product (e.g., electricity or gas), it typically means lower utility revenues. Utilities have historically depended on these revenues to fund investment in needed infrastructure between rate cases. Decoupling is a rate mechanism that removes this link between sales and revenues. Decoupling allows companies to be financially indifferent as to whether to sell electricity to customers or to rely on energy efficiency as a tool to help consumers lower their own energy bills.

Decoupling is not about charging "low income consumers more" so that "utility companies can maintain their profit margins." In fact, when consumers, including low income consumers, have access to and participate in energy efficiency programs, their overall bills will be lower and they can actually save money. Therefore, the weatherization and other efficiency programs introduced by the American Recovery and Reinvestment Act, combined with decoupling, provide power support to consumers, workers, and the economy overall.

Customers benefit from lower utility bills, more stable rates (as a result of less frequent rate cases) and the utility's ability to fund investment needed to serve them well. While decoupling potentially increases the utility's delivery charge in the near term, it lowers total customer bills in the long term, as reduced energy usage

can reduce the need to investment in infrastructure than would otherwise be the case in the absence of energy efficiency programs. In fact, for customers who participate in energy efficiency programs of delivery-only utilities (like National Grid), decoupling can result in immediate bill reductions. These customers avoid paying the larger portion of their bills (60%-70%) related to power supply, which more than offsets the slight increase in the part of the customer bill (30%-40%) that makes up the delivery charge.

Question 9. I want to clarify a figure in your written testimony. You state that National Grid has spent $1.5 billion on efficiency technologies. Can you provide an estimate of the total cost of those improvements, including any local, state, and federal funding that was provided in the form of incentives, grants, and so forth?

Answer. The savings achieved through National Grid's programs have been funded solely with funds provided by the on-bill energy efficiency charge or systems benefit charge. The company takes credit only for efficiency measures for which it has paid a rebate from the above funds.

Question 10. You list the Regional Greenhouse Gas Initiative as one impetus for energy efficiency improvements in the northeast. How do you think these efforts in those states would fare without that initiative? At the federal level, how effective do you think an EERS can be without climate change legislation?

Answer. Funds generated through the sale of allowances resulting from the Regional Greenhouse Gas Initiative will enable National Grid to accelerate its efficiency programs beyond what is possible under the existing energy efficiency charge or systems benefit charge. RGGI funds help minimize the increase in customers' electric rates that would otherwise result from an increase in budgets required to fund the ramp up anticipated for National Grid's programs. Significantly increasing the magnitude of efficiency budgets would be difficult without RGGI funds because of the likely opposition resulting from specific customer segments such as the large commercial/industrial sector.

RESPONSES OF DAVID J. MANNING TO QUESTIONS FROM SENATOR SHAHEEN

Question 1. As today's witnesses have noted, energy efficiency measures are incredibly important to address our nation's energy challenges. I think it is important to craft federal policies that incentivize investments in energy efficiency.

One of the concerns that I am aware of with an EERS, however, is that of market manipulation. Under an energy efficiency credit trading program, we may be giving credit for actions that would have already been taken regardless of an EERS mandate.

Many NE states are implementing policies to require utilities to procure all costeffective energy efficiency. These least cost procurement policies, for example, require that a distribution company obtain all cost effective energy efficiency up to the electric supply cost. The goals seem the same as an EERS, with an emphasis on cost-effective measures, and seem to avoid some of the issues of market manipulation.

Would you care to comment on least cost procurement policies and how they compare to an EERS?

Answer. Least cost procurement of energy efficiency can be an effective tool for achieving savings under an EERS. The least cost procurement legislation that dictates the level of energy savings National Grid must achieve in Massachusetts and Rhode Island will likely result in energy savings levels comparable to or greater than those required under a federal EERS.

Question 2. In New Hampshire, we are addressing efficiency and energy conservation by taking auction revenues from RGGI, the United States' first cap-and-trade program for greenhouse gases, and investing those revenues in these energy saving and conservation efforts. In your view, is it more cost effective and efficient to establish an EERS mandate or invest auction revenues in efficiency and conservation measures? What are the trade-offs?

Answer. National Grid views a cap and trade program as a means to fund additional energy efficiency that may be required through an EERS. A cap and trade program and an EERS are not mutually exclusive and can work closely in tandem to achieve both carbon reduction and energy savings goals.

Question 3. It has often been said by those seeking to address climate change that the single most important thing we can do to address climate is put a price on carbon. A price on carbon will, in turn, incentivize renewable electricity and energy conservation measures. Is a national EERS necessary to deploy energy conservation and efficiency improvements if we enact a cap-and-trade program in the US?

Answer. National Grid agrees that the single most important thing we can do to address climate change will be to put a price on carbon. However, we must also pro-

mote technologies and business practices that will enable consumers and businesses to meet greenhouse gas reduction goals cost effectively in both the short-term and the long-term. Complementary policies—like an EERS, RES, CAFE standards, or CCS incentives—are justified in order to promote technologies with broader societal benefits and to address market failures that discourage households or businesses from responding to a price signal and adopting cost-effective reduction measures like energy efficiency.

Question 4. There have been some who suggest an EERS will reduce the cost of a cap-andtrade program. A report by ACEEE states that, "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." By some estimates, electricity prices under cap-and-trade legislation may be 15 percent less if an EERS as well as an RES are also in place. Do you agree with this assessment?

Answer. Energy efficiency investments offer some of the most cost-effective options for reducing greenhouse gas emissions. For example, U.S. EPA's preliminary analysis of the Waxman-Markey Discussion Draft[1] forecasts reduced allowance prices and reduced energy prices by dedicating a portion of allowance value to energy efficiency programs. EPA evaluated a scenario in which energy efficiency programs reduced electricity demand from reference case values by 4 percent in 2020, 5 percent in 2030, and 4 percent in 2050. These investments resulted in an average 10 percent reduction in allowance prices and a 2 percent reduction in electricity prices. EPA has not yet completed a full evaluation of the Waxman-Markey Discussion Draft, including the EERS and RES. Its preliminary analysis was limited to the cap-and-trade proposal. So while we can not comment specifically on the degree to which an EERS might reduce electricity prices, we do believe that energy efficiency investments and programs to promote energy efficiency investments will generally reduce the impacts of meeting a GHG emissions cap.

Question 5. A key goal of U.S. energy policy is lessening our dependence on foreign oil. One way to achieve this goal would be a conversion of the transportation sector from petroleum to electricity through the phased-in and widespread use of hybrid cars, plug-in hybrid cars and fully electric cars. While this will lessen our dependence on foreign oil, it may put additional strains on our electricity system which may require additional generation investments.

I am interested to hear your thoughts on how does the EERS will affect en electrification of the transportation sector? How would these two important policy goals work together?

Answer. An EERS should be designed to promote beneficial technologies, such as smart meters which could assist vehicle electrification, that will shift energy consumption towards lower carbon options. Analysis by EPA indicates that if 10 percent of all passenger vehicles were plug-in hybrids and other electric vehicles, electricity demand could increase by over 1 percent. Although beneficial, this shift to electric vehicles would make it marginally more difficult to meet an EERS. The simplest way to accommodate the growth of electric vehicles in an EERS would be to net out electricity used to power vehicles from a utility's EERS baseline. If actual vehicle consumption data were unavailable, utility baselines could be credited based on the number of customers reporting ownership of an electric vehicle or electric vehicle sales within the utility's service territory.

Question 6. How are other countries addressing energy efficiency and conservation? Have other countries adopted an EERS, or a similar mandate?

Answer. National Grid's international experience is focused in the United Kingdom, where we own and maintain the high-voltage electricity transmission system in England and Wales and operate the entire system across Great Britain. On the gas side, National Grid owns and operates the National Transmission System throughout Great Britain and owns and operates a significant gas distribution network throughout the heart of England. Presently, the UK does not have an EERS, but has adopted an "Energy Efficiency Action Plan," which has a target to reduce energy consumption by nine percent by 2016. The full plan can be accessed at http://ec.europa.eu/energy/demand/legislation/doc/neeap/uk_en.pdf. National Grid's UK energy efficiency efforts are largely directed towards its low-income assistance programs, such as our award winning "Affordable Warmth Programme," which addresses fuel poverty by integrating a range of overlapping stand-alone funded energy efficiency programs and activities.

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[1] http://www.epa.gov/climatechange/economics/economicanalyses.html#wax

RESPONSES OF STEVEN NADEL TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1a. The push to enact a separate RES and EERS calls into question the goals of these standards—is to promote certain technologies, or to reduce greenhouse gas emissions?

If energy efficiency is incorporated into an RES, it would seem to me that utilities would have a much better chance of meeting their requirements instead of facing penalties for noncompliance. Wouldn't it be better to give them greater flexibility to succeed by adopting a single standard?

Answer. On the one hand, energy-efficiency is widely available in all 50 states, and is also generally less expensive than renewable energy. Based on these considerations, yes utilities would have a better chance of meeting requirements if energy efficiency is included. But on the other hand, there are problems with combining the EERS and RES. First, the RES regulates "load serving entities" while the EERS regulates "distribution utilities". While these are often the same, where independent power companies supply power, they are different. We think that distribution utilities can generally do a better job delivering energy efficiency services than independent power companies. Second, most proposals to combine the RES and EERS use energy efficiency as a small "safety valve" with efficiency capped at 4-5% of sales by 2020. Energy efficiency can and should do much more than that and should not be capped at such a low percentage. We are much more open to combining an EERS and RES if efficiency targets of 10-15% are added to appropriate RES targets. Third, most proposals to combine the RES and EERS deal only with electricity; we think that natural gas needs to be addressed as well through its own EERS. Finally, the purpose of an RES is to promote use of renewable energy. We leave it to renewable energy advocates to comment on this further, but we know that they are concerned that the renewable targets would be too low if an EERS and RES are combined.

Question 1b. If Congress decides to enact an RES instead of an EERS, should we allow an unlimited amount of the renewables mandate to be met through energy efficiency measures?

Answer. Allowing unlimited efficiency in an RES would be good for efficiency, but depending on the overall target, could undermine the goal of promoting use of renewable energy. We think a combined EERS-RES is generally better than no EERS, but such a combination needs meaningful targets so that both efficiency and renewables are promoted beyond business-as-usual levels.

Question 2. This bill appears to provide only penalties, and no incentives, to facilitate compliance with the proposed federal standard. Please describe what other measures, if any, you think should be incorporated to encourage distributors to reach energy savings goals.

Answer. ACEEE believes that incentives have an important complementary role to play. We hope that energy legislation will also include incentives, such as some of the programs included in S. 661 as well as incentives for comprehensive retrofits to homes and commercial buildings, along the lines of the program in H.R. 1778. We also support allocating a portion of cap and trade emissions allowances to local distribution companies for the explicit purpose of helping to fund energy efficiency programs. Provisions along these lines were included in the Boxer-Liberman-Warner and Dingell-Boucher bills from the last Congress. Furthermore, S. 548 counts efficiency savings from codes and standards and we support several bills that would increase these savings such as S. 598 on appliance standards (sponsored by Senators Bingaman and Murkowski) and building code provisions and incentives that are now being developed by Committee staff.

Question 3. I am concerned that requiring distribution utilities to develop and administer new energy efficiency programs, or obtain new technology will be expensive—especially for consumer-owned non-profits. The penalty payments called for by this legislation are very high, and there is also the likelihood of "layered" costs from an EERS, RES, and climate change legislation. How can we implement cost control mechanisms to keep costs for distributors—and therefore businesses and consumers—as low as possible?

Answer. From our analyses, an EERS is an important cost control mechanism, helping to moderate energy cost increases and also reducing the cost of carbon emissions allowances, if cap and trade legislation is enacted. This is illustrated by the graphs on p. 16 of my written testimony. A similar finding is made in a just-released study by the National Renewable Energy Laboratory which found that the combination of an EERS and RES results in lower electricity prices than the basecase or an RES alone (see http://www.nrel.gov/docs/fy09osti/45877.pdf).

Furthermore, to ensure that costs are not too high, S. 548 includes alternative compliance payments of 5 cents per kWh or 50 cents per therm of natural gas. The

intent of these payments is to encourage utilities to operate energy efficiency programs that cost less than the alternative compliance payment. Preliminary results from ACEEE research now underway indicates that the average electric efficiency program costs about 3 cents per lifetime kWh saved, while natural gas programs cost an average of 29 cents per therm saved. If the ACP is reduced to be less than the average cost of programs, then many utilities will choose to pay the ACP and not operate programs. In addition, under S. 548, money from the ACP generally goes to the states to operate energy efficiency programs, so these funds will remain in-state. However, since the average cost of programs is about 2 cents per kWh and 20 cents per therm higher than the ACP, there may be room to lower the ACP a little, but we would recommend going no lower than 4 cents per kWh and 40 cents per therm.

One other point regarding ACP's is worth mentioning—the ACP for an RES and for an EERS should probably be different, with the EERS ACP higher than that for the RES. This is the case because with energy efficiency investments, when energy is saved, less power needs to be purchased, so even 5 cents per kWh energy efficiency saves money when power costs 6 or more cents per kWh. With renewable energy, the ACP is in addition to the underlying cost of power, so if conventional power costs 6 cents per kWh, utilities will be willing to pay up to 11 cents per kWh to avoid a 5 cents per kWh ACP (6+5=11). A 5 cents per kWh ACP for efficiency saves consumers money, unlike a similar ACP for renewable which costs money.

Question 4. The proposed EERS legislation would calculate a utility's "business-as-usual" energy use by averaging its consumption levels in the 2 years prior to enactment. Utilities that are already making great efforts to reduce energy consumption—whether through a state-level EERS or their own initiative—may have a tougher time complying with the federal mandate due to their early action on energy efficiency. Should a federal EERS be designed to avoid disadvantaging those utilities, particularly compared to those who have taken no action?

Answer. On the one hand, utilities that have active programs have already picked some "low hanging fruit" and will have to dig a little deeper to achieve the necessary savings. On the other hand, utilities with active programs already have the infrastructure in place and will not have to ramp-up as much, permitting them to achieve more savings in the early years than is required. We favor an approach whereby these utilities can "bank" extra savings achieved in early years and apply these to savings targets in later years. We think this is fair way to address this issue.

I should also note that our studies find that there is a cost-effective opportunity for about 30% electricity savings throughout the country, and so if some states have already achieved 10% savings, they still have about another 20% savings left, leaving a 15% savings target very feasible. Furthermore, the pool of available savings keeps increasing as new technologies are developed, such as LED lighting and improved heating/cooling controls.

Question 5. Under Senator Schumer's bill, the federal EERS would require electricity savings of 15 percent, and natural gas savings of 10 percent, over the course of a decade. For the sake of comparison, can any of you provide the percentage savings that were achieved by these distributors over the course of the past ten years?

Answer. Energy efficiency savings achieved by electric and natural gas distributors range enormously from essentially zero to fairly significant savings. For example, Efficiency Vermont, which operates statewide programs under contract with the Vermont utility commission, has achieved approximately 9% electricity savings over the 2000-2008 period.[1] While I do not have the exact figures, my understanding is that savings in California and the Pacific Northwest have been even higher on a cumulative basis, but they have needed a longer period of time. For natural gas utilities, data ACEEE has compiled from utilities for a forthcoming report indicates that savings from Vermont Gas programs total 7.8% of 2006 sales. Vermont Gas began programs in 1999. Similarly, Iowa gas utilities have saved 8.2% of 2006 sales from programs operated over the 1996-2006 period.

Question 6. You support an amendment to S. 548 to make clear that DOE should factor in growth in electric and natural gas vehicle sales when setting post-2020 targets. Does the bill, as drafted, make any allowance for an increase in economic activity? I'm concerned that while this bill claims to mandate "efficiency," it really focuses on reducing total "consumption," and these are two different things. Increases in energy consumption can result from an increase in economic activities, especially in manufacturing, even when new use is highly efficient.

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[1] Derived by ACEEE from: http://www.efficiencyvermont.com/stella/filelib/EVT__2008__Savings__Claim__Final.pdf.

Answer. The bill requires that a specific level of energy savings be demonstrated relative to a rolling baseline. It does not use a fixed baseline, such as sales in 2008. By using a rolling baseline, in rapidly growing areas, sales can still grow with an EERS, they just grow a little more slowly. This is illustrated by the graph on p. 6 of my written testimony. Under the bill, there is no cap on consumption, just a requirement to demonstrate efficiency savings through program evaluations.

Question 7. In March 2005, ACEEE submitted a statement to the record after this committee held a hearing on "Power Generation Resource Incentives and Diversity Standards." At that time, your organization endorsed a credit trading system to help utilities meet their requirements. In this Congress, however, that credit trading compliance option has been replaced by a different option—bilateral agreements—that appear much more limited. Please explain.

Answer. We worked with many other organizations to develop this year's legislation. Some of these organizations were concerned about the time and resources needed to establish and oversee a national trading market. They were also concerned about opportunities for markets leading to some perverse results, as has happened recently in some financial markets (e.g. derivatives). Bilateral trades are simpler and can be overseen by state regulators. Also, our studies show that large efficiency opportunities are available in all regions, and therefore there is less need for trading with efficiency credits than with other types of credits now being discussed in Congress (e.g. emissions allowances and renewable energy credits).

Question 8. In that same statement, your organization also noted that an EERS could be combined with a Renewable Portfolio Standard. ACEEE also offered several suggestions for how a "Clean Energy Resource Standard" could be enacted—a standard that could have included energy efficiency, renewable energy, combined heat and power, and even clean coal and nuclear. Does your organization no longer support the enactment of such a standard?

Answer. The proposed EERS does include combined heat and power. We are neutral on whether other clean resources are added to an EERS and RES provided that as additional resources are included, the targets need to increase so that they still promote substantial cost-effective efficiency investments. However, we note that adding additional resources increases support by some members but loses support from other members. We leave it to Congress to find the "sweet spot" where support is maximized.

Question 9. Your organization released two reports on the federal EERS last month. The first projects consumer savings of $168 billion over the standard's lifespan. The second lists decoupling as one of the most important factors in achieving "future higher" energy efficiency goals. Does your $168 billion estimate take into account the need for—and spending that could be associated with—decoupling?

Answer. ACEEE believes that decoupling is a useful complement to an EERS. However, there are also other ways to improve the business case for utility investments in energy efficiency. The EERS bill deliberately leaves decisions on how best to handle these issues to state utility commissions. Therefore, we did not include any costs associated with decoupling in our savings estimates. That said, our savings projections use very conservative estimates of future electricity costs prepared by EIA. Most other forecasts predict higher electricity prices, which would increase the value of savings relative to our forecast. So even if decoupling were to modestly reduce savings, this would be compensated by the fact that electricity savings are likely to be more valuable than EIA predicts.

Question 10. This bill appears to provide only penalties, and no incentives, to facilitate compliance with the proposed federal standard. Please describe what other measures, if any, you think should be incorporated to encourage distributors to reach their energy savings goals.

Answer. This is the same question as question # 2.

Question 11. I'm intrigued by "Efficiency Vermont," which is the non-profit, statewide provider of energy efficiency services in Vermont. This is a very different structure than what S. 548 calls for, but I understand it's has been very successful so far—the savings being achieved in Vermont are now among the highest levels of any state. Can any of you discuss "Efficiency Vermont" in greater detail, and what the pros and cons of a similar approach at the federal level would be?

Answer. Efficiency Vermont is a statewide program coordinated by the Vermont Public Service Commission, and operated by a private non-profit organization—the Vermont Energy Investment Corp. (VEIC). VEIC was selected through a competitive request for proposals. The Efficiency Vermont budget is funded through a charge on electric bills by participating utilities. Efficiency Vermont began operations in 2000 and has developed a broad range of efficiency programs to serve many different submarkets, which is illustrated in the graphic on p. 11 of my written testimony. Their programs have been well received, and in recent years, the Commission has in-

creased their budget. This in turn has allowed them to dramatically increase their annual savings, as shown in the graph on p. 12 of my written testimony. Additional information can be found in their annual report, available at: http://www.efficiencyvermont.com/stella/filelib/AR07Revised_Exec%20Summ_MW.pdf

The Efficiency Vermont model works very well due to their excellent staff, good planning and management, substantial budget, statewide operation, and a good working relationship with regulators. While this model has worked very well in Vermont, and a variation on this model is working in Oregon, it may not work everywhere. For example, Delaware has been trying to replicate the Vermont model but has been having difficulty due to a limited budget and the lack of a good in-state organization to run the programs. From our review of the different states, other models for operating programs can also work. For example, Connecticut, Iowa, Massachusetts and Rhode Island have achieved very good results with utility-run programs. And in New York a state "authority" (a quasi-independent state agency) does a good job running programs. In all these cases, the successful program operators are well managed, believe in what they are doing, have good in-state staff, have had strong budgets for multiple years, are not impeded by too many bureaucratic rules, and have good regulatory support. These criteria can be met under a variety of models and we don't believe any single model is "the answer" in all states. Based on these findings, we believe the decision on whether to follow the Vermont model, or whether to use another model, should be made at the state level and not the federal level.

RESPONSES OF STEVEN NADEL TO QUESTIONS FROM SENATOR SHAHEEN

Question 1. As today's witnesses have noted, energy efficiency measures are incredibly important to address our nation's energy challenges. I think it is important to craft federal policies that incentivize investments in energy efficiency.

One of the concerns that I am aware of with an EERS, however, is that of market manipulation. Under an energy efficiency credit trading program, we may be giving credit for actions that would have already been taken regardless of an EERS mandate.

Many NE states are implementing policies to require utilities to procure all cost-effective energy efficiency. These least cost procurement policies, for example, require that a distribution company obtain all cost effective energy efficiency up to the electric supply cost. The goals seem the same as an EERS, with an emphasis on cost-effective measures, and seem to avoid some of the issues of market manipulation.

Would you care to comment on least cost procurement policies and how they compare to an EERS?

Answer. Least-cost procurement policies can work well where the utilities do a good job considering energy efficiency as a resource and where regulators have the skills and interest to oversee these analyses. These factors generally apply in New England, where many states are using least-cost procurement. But in some other regions, utilities are not very interested in considering energy efficiency on a par with other resources, and utility commissions may lack the staff, skills or interest to hold these utilities accountable. In my home state of Maryland, in the 1990s the utilities claimed that there was no efficiency resource that was cost-effective for utilities to pursue and the Commission did not challenge this. It took a new Governor and a legislated EERS to change the situation and only now are programs beginning. Furthermore, planning processes take time, delaying the start of programs by several years. An EERS can be enacted and programs quickly begun. Such an EERS should be based on levels of energy efficiency found to be achievable and cost-effective in a variety of states. States can then conduct planning processes to see if higher savings are achievable and cost-effective. For example, Connecticut has an EERS requiring 1% additional electricity savings each year, and they then conducted a planning process which is recommending much higher levels of efficiency savings.

Question 2. In New Hampshire, we are addressing efficiency and energy conservation by taking auction revenues from RGGI, the United States' first cap-and-trade program for greenhouse gases, and investing those revenues in these energy saving and conservation efforts. In your view, is it more cost effective and efficient to establish an EERS mandate or invest auction revenues in efficiency and conservation measures? What are the trade-offs?

Answer. The two policies are complimentary. An EERS sets savings targets. Use of auction revenue can help fund programs to reach those targets. Ideally both will be done. We believe it is important to set savings targets, so that progress can be monitored and programs encouraged to maximize savings per dollar invested. The goal is achieving savings, and spending money is just a means toward that end. If

just funds are provided, it is unclear how much savings will be achieved and whether cost-effectiveness will be maximized.

Question 3. It has often been said by those seeking to address climate change that the single most important thing we can do to address climate is put a price on carbon. A price on carbon will, in turn, incentivize renewable electricity and energy conservation measures. Is a national EERS necessary to deploy energy conservation and efficiency improvements if we enact a cap-and-trade program in the US?

Answer. There are many market barriers that impede energy efficiency investments, as discussed in my written testimony. Due to these market barriers, many cost-effective efficiency investments are not being pursued today. Adding a carbon price will modestly increase energy prices and modestly increase efficiency investments. To more dramatically increase efficiency investments, supportive programs and policies are needed. In our view, an EERS is probably the most important of these policies.

Question 4. There have been some who suggest an EERS will reduce the cost of a cap-and-trade program. A report by ACEEE states that, "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." By some estimates, electricity prices under cap-and-trade legislation may be 15 percent less if an EERS as well as an RES are also in place. Do you agree with this assessment?

Answer. Yes, we wrote that assessment and we agree with it. I assume this question is more for the other witnesses and therefore will not elaborate further.

Question 5. A key goal of U.S. energy policy is lessening our dependence on foreign oil. One way to achieve this goal would be a conversion of the transportation sector from petroleum to electricity through the phased-in and widespread use of hybrid cars, plug-in hybrid cars and fully electric cars. While this will lessen our dependence on foreign oil, it may put additional strains on our electricity system which may require additional generation investments.

I am interested to hear your thoughts on how does the EERS will affect en electrification of the transportation sector? How would these two important policy goals work together?

Answer. Electrification of the transportation sector is in its infancy and therefore will have little effect on EERS targets in the early years. As noted in my written testimony, we recommend that DOE monitor the success of efforts to electrify the transportation sector, and consider increased electricity sales from transportation, and opportunities for efficiency improvements in transportation, when setting future EERS targets. If efforts to electrify the transportation sector are effective, we would expect this to have a significant effect on future targets.

Question 6. How are other countries addressing energy efficiency and conservation? Have other countries adopted an EERS, or a similar mandate?

Answer. EERS-like policies are becoming common in Europe. These policies are often called "white certificates" in Europe, while renewable energy standards are generally called "green certificates". The United Kingdom has had residential energy savings targets since 2002 and is now in their third three-year implementation period. Utilities exceeded targets for the first two implementation periods. Italy, France, Denmark and the Flanders region of Belgium are all implementing white certificate programs and our understanding is that targets are being met. For example, in Italy the targets apply to electric and gas utilities and are expressed in tons of oil equivalent (TOE). In Italy, the 2005-2007 target was 1.1 TOE, but utilities and third-party providers together achieved 2.0 TOE of savings. In addition, Poland is now developing a program. Furthermore, the entire European Union (EU) has adopted the "Energy Services Directive" which directs all member states to develop policies to achieve 20% energy efficiency savings by 2020. The various member-states have prepared initial plans and are now refining their plans and starting to implement them.[2]

RESPONSES OF PAUL A. CENTOLELLA TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1a. The push to enact a separate RES and EERS calls into question the goals of these standards—is to promote certain technologies, or to reduce greenhouse gas emissions?

If energy efficiency is incorporated into an RES, it would seem to me that utilities would have a much better chance of meeting their requirements instead of facing

[2] Information on many of the European programs can be found at: http://re.jrc.ec.europa.eu/energyefficiency/events.htm

penalties for noncompliance. Wouldn't it be better to give them greater flexibility to succeed by adopting a single standard?

Question 1b. If Congress decides to enact an RES instead of an EERS, should we allow an unlimited amount of the renewables mandate to be met through energy efficiency measures?

Answer. Ohio has an aggressive Energy Efficiency Standard which is separate from our Renewable Energy Standard. Such a separate efficiency standard is appropriate because it addresses a failure of the market to produce an economically efficient outcome and improves overall economic productivity independent of concerns related to greenhouse gas emissions. There is compelling evidence that utility efficiency programs can reduce the total cost of providing energy services. Ohio's electricity law includes a strong Energy Efficiency Standard and provides flexibility with respect to the use of surplus energy efficiency savings, in excess of those required to meet annual Energy Efficiency Standard benchmarks. In addition to its Energy Efficiency and Peak Demand Reduction Standards, Ohio has an Alternative Energy Standard. By 2025, twenty-five percent of electricity sales must be provided by Alternative Energy Resources. Alternative Energy includes both Renewable Energy and Advanced Energy Resources. A minimum of fifty percent of Ohio's Alternative Energy Standard, or 12.5% of 2025 retail sales, must come from Renewable Energy Resources. Additionally, there are escalating annual Renewable Energy and Solar Energy Resource benchmarks. The remaining portion of the Alternative Energy Standard, up to fifty percent, can be met using either Advanced Energy Resources or Renewable Energy Resources. Utilities may elect either to bank surplus energy savings and apply them to meet future Energy Efficiency Standard benchmarks; or they may elect to apply energy savings in excess of their Energy Efficiency benchmarks to their Advanced Energy requirement, that is the non-renewable portion of Ohio's Alternative Energy Standard. Energy efficiency savings cannot be double counted for purposes of complying with more than one standard.

If Congress decides to provide additional flexibility for RES compliance, it should do so directly, not by combining the RES and an Energy Efficiency Standard. For example, Ohio's RES authorizes reductions in a utility's RES benchmark if the total expected cost of generation to consumers while satisfying the requirement exceeds the comparable cost to consumers without meeting the benchmark by more than three percent.

Current proposals, which address energy efficiency only as a means to meet Renewable Energy Standards, are unlikely to significantly increase energy savings. Other witnesses have testified that existing state Energy Efficiency Standards could produce an amount of energy savings equal to or greater than the ceiling on the use efficiency to comply with the RES in such proposals.

If Congress were to adopt an RES, without an Energy Efficiency Standard, and allow the unlimited participation of energy efficiency for meeting RES requirements, the effects would be different in different states depending on state energy efficiency standards, the impact of different market structures on utility incentives to support energy efficiency, and state Commission policies related to utility efficiency programs. This approach would not provide the same catalyst to increasing energy savings as would be provided under a separate Energy Efficiency Standard.

Removing limits on the extent to which energy efficiency can be used to comply with an RES also could mean less renewable energy development in some regions. In deciding whether to adopt such an approach, Congress should consider the potential economic benefits of an RES. The key economic arguments for an RES include that:

- In some cases, an RES may tend to reduce the costs to consumers of achieving greenhouse gas reductions and may mitigate the impact of greenhouse gas regulation on competitive electric prices. This result can occur, in part, because most renewable energy resources have very low operating costs, reduce the need to run generating units with higher variable operating costs, and allow energy prices in organized electricity markets to be set by lower cost units. Other strategies for reducing carbon emissions based on changes in generating capacity have significant costs.
- An RES could allow manufacturers to achieve economies of scale and drive down the cost of clean, renewable energy.

The Ohio General Assembly enacted separate energy efficiency and renewable energy standards and gave the Ohio Commission flexibility to administer the standards in a reasonable manner without unduly penalizing utilities and consumers or compromising the achievement energy efficiency and renewable energy benchmarks. This is a sound model for structuring such standards.

Question 2. This bill appears to provide only penalties, and no incentives, to facilitate compliance with the proposed federal standard. Please describe what other measures, if any, you think should be incorporated to encourage distributors to reach energy savings goals.

Answer. Utility regulation inherently involves a combination of both rules, which must be backed by penalties for non-compliance, and, insofar as may be possible, aligning utility incentives with public policy objectives.

Congress has on several occasions directed the States to consider regulatory policies that would better align utility incentives with encouraging distribution utilities to promote energy savings. For example, in the Public Utility Regulatory Policies Act, 16 U.S.C. §2601(d) (8) and (9), Congress required State Commissions to hold hearings and consider adoption of the following standards:

> (8) Investments in conservation and demand management.—The rates allowed to be charged by a State regulated electric utility shall be such that the utility's investment in and expenditures for energy conservation, energy efficiency resources, and other demand side management measures are at least as profitable, giving appropriate consideration to income lost from reduced sales due to investments in and expenditures for conservation and efficiency, as its investments in and expenditures for the construction of new generation, transmission, and distribution equipment. Such energy conservation, energy efficiency resources and other demand side management measures shall be appropriately monitored and evaluated.
>
> (9) Energy efficiency investments in power generation and supply.—The rates charged by any electric utility shall be such that the utility is encouraged to make investments in, and expenditures for, all cost-effective improvements in the energy efficiency of power generation, transmission and distribution. In considering regulatory changes to achieve the objectives of this paragraph, State regulatory authorities and nonregulated electric utilities shall consider the disincentives caused by existing ratemaking policies, and practices, and consider incentives that would encourage better maintenance, and investment in more efficient power generation, transmission and distribution equipment.

Congress took further action in the Energy Independence and Security Act of 2007, requiring the States to consider the following standard:

> (17) Rate Design Modifications to Promote Energy Efficiency Investments.
>
> (A) In General—The rates allowed to be charged by any electric utility shall—
>
> (i) align utility incentives with the delivery of cost-effective energy efficiency; and
>
> (ii) promote energy efficiency investments.
>
> (B) Policy Options—In complying with subparagraph (A), each State regulatory authority and each nonregulated utility shall consider—
>
> (i) removing the throughput incentive and other regulatory and management disincentives to energy efficiency;
>
> (ii) providing utility incentives for the successful management of energy efficiency programs;
>
> (iii) including the impact on adoption of energy efficiency as 1 of the goals of retail rate design, recognizing that energy efficiency must be balanced with other objectives;
>
> (iv) adopting rate designs that encourage energy efficiency for each customer class;
>
> (v) allowing timely recovery of energy efficiency-related costs; and (vi) offering home energy audits, offering demand response programs, publicizing the financial and environmental benefits associated with making home energy efficiency improvements, and educating homeowners about all existing Federal and State incentives, including the availability of low-cost loans, that make energy efficiency improvements more affordable.

And, the American Recovery and Reinvestment Act of 2009 made the receipt of certain energy efficiency grants conditioned upon the Governor in each state obtaining necessary assurances that:

> The applicable State regulatory authority will seek to implement, in appropriate proceedings for each electric and gas utility, with respect to which the State regulatory authority has ratemaking authority, a general policy that ensures that utility financial incentives are aligned with helping their

customers use energy more efficiently and that provide timely cost recovery and a timely earnings opportunity for utilities associated with cost-effective measurable and verifiable efficiency savings, in a way that sustains or enhances utility customers' incentives to use energy more efficiently.[1]

Many States based on their own State policies and in response to these Federal standards have taken actions to align electric distribution utility incentives with the achievement of energy savings objectives.

One of the lessons from Congress' past efforts to address this issue is that it is not possible to legislate an effective incentive mechanism that will be applicable in all states. For example, in the recent past, some proposed requiring States to "decouple" a utility's recovery of fixed costs from sales levels. While this can be a valuable reform, some utilities have rate structures that are not cost based and others have already adopted rate designs which appropriately recover fixed costs through fixed charges. And, in the case of a utility holding company that is selling generation at FERC approved market-based rates, it may not be possible to fully align the company's incentives with achieving energy savings targets. For such a company, energy savings, at least in the short run, could mean lower prices for all of its generation sales. This issue can be addressed, in some cases, through third party program administration. However, as these examples illustrate, there is no single way in which utility incentives become aligned with reaching energy savings goals.

Question 3. I am concerned that requiring distribution utilities to develop and administer new energy efficiency programs, or obtain new technology will be expensive—especially for consumer-owned non-profits. The penalty payments called for by this legislation are very high, and there is also the likelihood of "layered" costs from an EERS, RES, and climate change legislation. How can we implement cost control mechanisms to keep costs for distributors—and therefore businesses and consumers—as low as possible?

Answer. An Energy Efficiency Standard that is based on achieving the maximum cost effective potential under a Total Resource Cost test[2] will reduce costs to consumers and businesses. Additionally, it will significantly reduce the costs of achieving reductions in greenhouse gas emissions. This is why it is important to adopt a national energy efficiency standard which will either provide a catalyst for the remaining States to adopt comparable state standards or take effect in the absence of appropriate State action.

As indicated in my prepared testimony, States should have the flexibility to opt out of a Federal efficiency standard by adopting a State standard with an equivalent basis, where:

- The State has set, in any form, clearly defined energy efficiency benchmarks;
- Utilities or the State periodically assess the maximum achievable cost-effective level of energy efficiency improvements and that assessment is subject to public review;
- The State certifies to the Secretary of Energy that the State has implemented energy efficiency standards and policies designed to achieve maximum achievable cost effective energy efficiency improvements; and
- The state periodically reports progress toward achieving its benchmarks.

For purposes of the exemption, cost effective measures and programs may be defined by Federal statute as based on a total resource cost or societal test.

Ohio has adopted a total resource cost test for purposes of identifying cost-effective energy efficiency improvements. We would be happy to work with the Committee to craft an opt-out provision for States that have implemented or will imple-

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[1] American Recovery and Reinvestment Act of 2009, §410(a)(1)

[2] "Total resource cost test" means an analysis to determine if, for an investment in energy efficiency or peak-demand reduction measure or program, on a life-cycle basis, the present value of the avoided supply costs for the periods of load reduction, valued at marginal cost, are greater than the present value of the monetary costs of the demand-side measure or program borne by both the electric utility and the participants, plus the increase in supply costs for any periods of increased load resulting directly from the measure or program adoption. Supply costs are those costs of supplying energy and/or capacity that are avoided by the investment, including generation, transmission, and distribution to customers. Demand-side measure or program costs include, but are not limited to. the costs for equipment, installation, operation and maintenance, removal of replaced equipment, and program administration, net of any residual benefits and avoided expenses such as the comparable costs for devices that would otherwise have been installed, the salvage value of removed equipment and any tax credits. In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Opinion and Order (April 15, 2009) at Section 4901:1-39-01(W).

ment standards consistent with achieving maximum cost-effective energy efficiency improvements.

To further reduce any negative cost impact, I also have recommended:

- To the extent that a State does not develop its own benchmarks, but adopts and administers the proposed Federal standard, Federal legislation should authorize the State commission to modify a utility's benchmarks where the utility is unable to meet the benchmark due to regulatory, economic, or technological reasons beyond its reasonable control and has exhausted all reasonable compliance options.
- A national standard authorizing the banking of surplus energy savings for use in meeting any subsequent year's savings benchmark.

Many consumer-owned non-profit utilities have been leaders in promoting energy efficiency. Cost-effective energy savings should have comparable benefits for consumers and businesses served by these utility cooperatives.

Question 4. The proposed EERS legislation would calculate a utility's "business-as-usual" energy use by averaging its consumption levels in the 2 years prior to enactment. Utilities that are already making great efforts to reduce energy consumption—whether through a state-level EERS or their own initiative—may have a tougher time complying with the federal mandate due to their early action on energy efficiency. Should a federal EERS be designed to avoid disadvantaging those utilities, particularly compared to those who have taken no action?

Answer. There are many factors, including but not limited to past initiatives, which can impact a utility's maximum achievable cost-effective energy savings. It is precisely these differences which can be effectively addressed by the modifications to S. 548 proposed in my prepared testimony.

Question 5. Under Senator Schumer's bill, the federal EERS would require electricity savings of 15 percent, and natural gas savings of 10 percent, over the course of a decade. For the sake of comparison, can any of you provide the percentage savings that were achieved by these distributors over the course of the past ten years?

Answer. The U.S. Energy Information Administration collects and publishes data on energy savings from electric utility energy efficiency and other demand-side management programs. I am not aware of comparable data on gas utility energy savings.

Incremental energy savings[3] from electric utility demand-side management programs peaked in 1993 at 8,980 gigawatt hours or 0.3% of annual retail sales. In 1993, electric utilities spent $2.74 billion implementing demand-side management programs. With an increased focus on retail competition policy, demand-side management spending by electric utilities and the resulting annual energy savings fell in the mid-to late-1990s and the early part of this decade.[4] Utility expenditures and savings began to recover in 2005. In 2007, the most recent year for which national figures are available, U.S. electric utilities spent $2.53 billion on demand-side management programs and incremental energy savings from electric utility programs equaled 7,821 gigawatt hours or 0.2% of total retail sales.[5]

Question 6. The Ohio law gives your Commission the flexibility to address changing and unanticipated conditions. For example, the law allows a utility to file an application to amend the standard if they cannot meet it due to regulatory, economic, or technological reasons beyond reasonable control. The law further allows the PUC to reduce a utility's baseline to account for new economic growth. Shouldn't any federal EERS program have similar flexibilities built into it?

Answer. As indicated in my prepared testimony, where a State adopts and administers the proposed Federal standard, S. 548 should be modified to authorize the State commission to modify a utility's benchmarks where the utility is unable to meet the benchmark due to regulatory, economic, or technological reasons beyond its reasonable control and has exhausted all other reasonable compliance options. This is consistent with the provision in Ohio's efficiency standard. It ensures that utilities are required to pursue only cost-effective and reasonably achievable efficiency improvements.

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[3] Incremental energy savings are the effects caused by new program participants and new demand-side programs during a specific year. They do not reflect the total impact of given year's program expenditures as energy savings can persist for many years based on the life of the efficiency measure.

[4] U.S. Energy Information Administration, U.S. Electric Utility Demand-Side Management: Trends and Analysis (1995), available at: http://www.eia.doe.gov/cneaf/pubs__html/feat__dsm/contents.html

[5] U.S. Energy Information Administration, 2007Electric Power Annual (January 21, 2009).

The provision in Ohio's law permitting the Commission to adjust a utility's baseline for new economic growth provides an additional element of flexibility, but is expected to have limited application. As the Commission stated in adopting its Rules on the efficiency standard:

> We expect that any baseline adjustments made to account for economic growth typically will be temporary, and will address circumstances in which unanticipated increases in the overall rate of growth have made full compliance infeasible. We also expect that any adjustments will account not only for positive economic growth, but also negative economic growth. This is clearly pertinent to the economic conditions that have developed since SB 221 went into effect.[6]

The Commission has interpreted this provision of the statute in a manner consistent with provisions on baseline normalization which require any proposed adjustments to be made in a consistent manner from year to year.

Question 7. According to a recent article in the Wall Street Journal, ?customers of Duke Energy in Cincinnati will see a monthly fee for gas service jump to more than $25 in June from $6 in 2008, in addition to a charge based on the amount of gas consumed, to make up for reduced gas usage.? Other utilities in Ohio are also assessing fees on their customers. Can you discuss the importance of decoupling, from the perspective of a utility, and the ultimate impact that it could have on the level of "savings" projected by ACEEE?

Answer. It is important to note that volumetric rates are being reduced along with the increase in the fixed charge such that the average customer is paying no more than under a more traditional rate design. The distribution rate increase is being phased in over two years. An average Duke residential customer using 810 hundred cubic feet (ccf) of gas each year will see their total bill increase $3.40 per month in year one and another 60 cents per month in year two. The increase on the average customer's bill is a result of the rate increase, not the change to a levelized rate structure. The PUCO redesigned the rates so that most of the fixed costs will be charged in a flat monthly rate. There will be a significant reduction in the part of the bill that varies with the amount of gas used. After accounting for the higher flat rate and the lower usage-based rate, the total increase is minimal. The Commission also directed Duke to undertake a program that mitigates impacts of the increased fixed charge for low income, low use consumers.

So, while an average residential customer using 810 ccf of gas a year will see a small increase in rates due to the overall rate increase, that customer will see no impact from the change in rate design. That's because the decrease in the usage-based part of the rate offsets the increase in the flat monthly charge over the course of the year for the average consumer. This has the added benefit of spreading out the delivery costs more evenly throughout the year, so customers aren't paying more of the fixed costs during the winter months, when bills are already the highest.

It is wrong to characterize the move to more recovery through the fixed charge as an additional "monthly fee". From a natural gas utility's perspective, it is not realistic for that utility to undertake investments in energy efficiency without addressing the impact that investment will have on the Company's recovery of its largely fixed distribution and administrative costs. Historically, utilities such as Duke recovered a large portion of their fixed costs for gas distribution through rates charged on a volumetric (per ccf) basis. We have seen reductions in per customer gas usage in recent years as a response to increasing commodity prices. One cannot expect a utility to actively accelerate a decline in its ability to recover fixed costs through energy efficiency programs without mitigating the revenue erosion that would result from the Company's prior rate design. That decoupling can be done through a Decoupling Rider, through directly compensating the utility for the energy efficiency program impacts (i.e. "lost revenues"), or through appropriate rate design as Ohio has chosen to do in this case.

Question 8. That same article also states that "Duke's electricity business implemented a program that allows it to get reimbursed by the state if it loses revenue for encouraging energy efficiency." How much does the State of Ohio expect to spend on that program? At the federal level, could a similar program put the government on the hook for unprecedented new levels of spending?

Answer. The Wall Street Journal article is not entirely accurate in that there will be no expenditure of State funds associated lost revenues for Duke Energy Ohio's energy savings programs. The article appears to be referring to a provision, which

[6] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Opinion and Order (April 15, 2009).

was stipulated to by a broad range of parties and adopted by the Commission, permitting Duke to recover from ratepayers the lost margin associated with rate designs that recover a portion of fixed distribution costs through rates based on kWh sales. This provision does not change the utility's total allowed revenue requirements. It allows the utility to adjust rates based on verified energy savings only to the extent that some of the Company's fixed distribution costs are being recovered through charges based on kWh sales. This provision will have a small impact on rates. Our Order further provided, consistent with the agreement of the parties, that, "if the Commission adopts a decoupling or straight fixed variable rate design, Duke will discuss and implement an appropriate adjustment to its recovery of lost margins. . . "[7]

Question 9. Last Congress, Senator Schumer's EERS legislation included a provision to establish a system of tradable credits to help facilitate compliance. You've indicated your support for that type system, but it isn't part of the legislation we're currently considering. Can you describe the differences you see between tradable credits and their replacement in this bill, bilateral transactions?

Answer. In certain circumstances, S. 548 permits bilateral transfers of savings among utilities in a single state or electric utilities in a single power pool. As a condition of using purchased savings under S. 548, the State commission that regulates the purchasing utility would have to oversee the measurement and verification of savings achieved by the transferring party. And, S. 548 permits the Secretary of Energy to limit the proportion of energy savings benchmarks that can be met by such purchases.

The development of a well designed energy efficiency credit program could lead to a more open and transparent market for energy savings. It could help ensure that the most cost-effective efficiency improvements are undertaken first.

A more flexible energy efficiency credit trading program would require the independent application of standard measurement and verification protocols and provisions to ensure that savings are not inappropriately double counted toward meeting multiple requirements. However, State or power pool limitations on trading, requirements that measurement and verification be overseen by the regulatory authority in the purchasing State, and potential limits on the proportion of savings that can be met by purchases are not necessary terms of an energy savings credit trading program. A more precise comparison would depend on the terms and conditions of any authorized energy efficiency credit trading program.

The Ohio Commission has not had the opportunity to review detailed proposals for energy efficiency credit trading. In adopting the rules governing Ohio's efficiency standard, our Commission stated that, "While the Commission is open to the construct of energy efficiency credits, we are unaware of any accreditation regime currently operating in Ohio. The energy efficiency rules adopted herein do not prevent or preclude the use of energy efficiency credits and should such a regime be created, we may reconsider [this] suggestion."[8]

Question 10. Can you describe, in greater detail, the importance of allowing excess savings to be "banked"? What will happen if an EERS is passed without a "banking" provision for retail distributors?

Answer. First, banking provides an incentive for early reductions that might not otherwise be implemented. In the absence of banking, utilities could have an incentive to plan programs that will meet, but not exceed, annual benchmarks or to suspend programs each year when benchmarks have been met. Program suspensions undermine the ability of consumers and trade allies, such as contractors and equipment vendors, to rely on programs and will tend to make programs more costly and less effective.

Second, banking will provide utilities additional flexibility in complying with the standards in later years. Early surplus energy savings will permit utilities, if necessary, to stretch the transition to meeting increasingly aggressive annual benchmarks.

Third, the availability of banking will tend to deter litigation designed to delay the application of the standards, as such litigation will also defer or eliminate the opportunity to bank early surplus energy savings.

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[7] In the Matter of the Application of Duke Energy Ohio, Inc., for Approval of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 08-920-EL-SSO, Opinion and Order (December 17, 2008).

[8] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Opinion and Order (April 15, 2009).

RESPONSES OF PAUL A. CENTOLELLA TO QUESTIONS FROM SENATOR SHAHEEN

Question 1. As today's witnesses have noted, energy efficiency measures are incredibly important to address our nation's energy challenges. I think it is important to craft federal policies that incentivize investments in energy efficiency.

One of the concerns that I am aware of with an EERS, however, is that of market manipulation. Under an energy efficiency credit trading program, we may be giving credit for actions that would have already been taken regardless of an EERS mandate.

Many NE states are implementing policies to require utilities to procure all cost-effective energy efficiency. These least cost procurement policies, for example, require that a distribution company obtain all cost effective energy efficiency up to the electric supply cost. The goals seem the same as an EERS, with an emphasis on cost-effective measures, and seem to avoid some of the issues of market manipulation.

Would you care to comment on least cost procurement policies and how they compare to an EERS?

Answer. Least cost procurement policies are a valuable complement to an Energy Efficiency Standard. The annual benchmarks in Ohio's Energy Efficiency Standard are the minimum levels of energy savings that electric utility efficiency programs must achieve. Our Commission's rules require Ohio electric utilities to evaluate the technical, economic, and achievable potential for energy savings and to propose a comprehensive portfolio of energy efficiency and demand reduction programs.[9] The provisions of Ohio's electricity law on cost recovery for new generating facilities require a prior determination of need by the Commission, which finding would be made in an Integrated Resource Planning proceeding.[10]

In proposing an exemption from the proposed Federal standard for States meeting specific requirements, my prepared testimony recommended, among other conditions, that the State certifies it has implemented energy efficiency standards and policies designed to achieve maximum achievable cost effective energy efficiency improvements. This recommendation is intended to help ensure that States would both adopt efficiency standards and pursue procurement policies designed to achieve any additional efficiency savings that are cost-effective.

Question 2. In New Hampshire, we are addressing efficiency and energy conservation by taking auction revenues from RGGI, the United States' first cap-and-trade program for greenhouse gases, and investing those revenues in these energy saving and conservation efforts. In your view, is it more cost effective and efficient to establish an EERS mandate or invest auction revenues in efficiency and conservation measures? What are the trade-offs?

Answer. First, this is not necessarily an either / or choice. One could have an efficiency standard and choose to fund some efficiency programs through auction revenues.

Second, auction revenues may fall short of or exceed optimal investment levels in energy efficiency. A better approach is to incorporate the price of greenhouse gas emissions set by the auction in the benefit / cost equation governing investment in energy efficiency. Because we have observed market failures in achieving economically efficient levels of investment in energy efficiency, mandated investments by utilities based on an appropriate benefit / cost test will achieve a more efficient result than relying on an external mechanism such as auction revenues to set the level of investment.

Third, the question of who should administer efficiency programs is potentially related, but can be separated from a decision to use of auction revenues versus a more broadly applied utility charge to fund efficiency programs. In some instances, planning and administration of utility funded efficiency programs has been delegated to independent third party administrators. Utilities tend to approach efficiency programs with greater knowledge about consumer energy usage and established relationships with their customers. Third party administrators, in some instances, can achieve state-wide coordination and scale that would not be available through individual utility programs. And, third party administration may be appropriate option where it is not possible to readily align utility incentives with the achievement of cost-effective energy savings.

Finally, whether it would be more economically efficient and fair to fund efficiency programs through auction revenues or a charge on utility bills depends largely on

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[9] In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, Public Utilities Commission of Ohio Case No. 08-888-EL-ORD, Opinion and Order (April 15, 2009).

[10] Section 4928.143(B)(2)(b) and (c), Ohio Revised Code.

how auction revenues otherwise would be used. Utilities typically fund efficiency programs through broadly based charges to energy consumers.[11] Allowance auction revenues could be used to mitigate the impacts of greenhouse gas regulation on businesses and consumers, compensate for the impacts of such regulation on international trade, reduce economically inefficient or regressive taxes, cut the Federal deficit, or pay for a range of public investments, including investments in energy efficiency. Energy efficiency improvements will provide a foundation for growth in the U.S. economy. However, given the many demands on federal revenues, significant reliance on utilities to support energy efficiency programs through the enactment of an Energy Efficiency Standard is a reasonable policy choice.

Question 3. It has often been said by those seeking to address climate change that the single most important thing we can do to address climate is put a price on carbon. A price on carbon will, in turn, incentivize renewable electricity and energy conservation measures. Is a national EERS necessary to deploy energy conservation and efficiency improvements if we enact a cap-and-trade program in the US?

Answer. Experience has shown that price signals alone have not led to the adoption of all cost-effective efficiency measures. Increasing energy efficiency is the single most important step that can be taken to lower the cost of reducing greenhouse gas emissions for businesses and consumers. A cap and trade program designed to achieve meaningful reductions in greenhouse gas emissions would provide an additional incentive for States to pursue more aggressive energy efficiency policies. However, a national Energy Efficiency Standard, with the modifications proposed in my prepared testimony, could provide a significant further catalyst for State and utility actions, particularly where utilities face inherent market pricing disincentives to reducing demand or have not seen improving the efficiency with which consumers use energy as part of their core business.

Question 4. There have been some who suggest an EERS will reduce the cost of a cap-and-trade program. A report by ACEEE states that, "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." By some estimates, electricity prices under cap-and-trade legislation may be 15 percent less if an EERS as well as an RES are also in place. Do you agree with this assessment?

Answer. While I have not reviewed the details of the ACEEE estimates cited in this question, I would agree that cost-effective utility energy efficiency programs could significantly lower the costs of achieving greenhouse gas reductions.

Question 5. A key goal of U.S. energy policy is lessening our dependence on foreign oil. One way to achieve this goal would be a conversion of the transportation sector from petroleum to electricity through the phased-in and widespread use of hybrid cars, plug-in hybrid cars and fully electric cars. While this will lessen our dependence on foreign oil, it may put additional strains on our electricity system which may require additional generation investments.

I am interested to hear your thoughts on how does the EERS will affect en electrification of the transportation sector? How would these two important policy goals work together?

Answer. Increased electricity use by vehicles will increase the base quantity, as defined in Section 610(a)(4)(A) of S. 548, to which a savings percentage is applied when calculating the required energy savings under the bill. However, S. 548 proposes a rolling, rather than an historical, baseline for calculating utility efficiency savings. As a result, the proposed standard does not require a MWh-for-MWh offset of energy savings for increases in electricity usage by vehicles. Ohio's efficiency standard takes a similar approach using a three year rolling average baseline.

My prepared testimony includes recommendations that would provide States and utilities additional flexibility, consistent with achieving cost-effective energy efficiency improvements. These proposed modifications could alleviate any remaining concern regarding the potential for conflicts between vehicle electrification and an Energy Efficiency Standard.

Electric vehicles may represent a source-to-wheels efficiency improvement over conventional vehicles. Whether and how to recognize this potential improvement is an issue that has not been addressed by the Ohio Commission.

Policies to promote energy efficiency and electrification of the transportation sector work together in two important ways. First, energy efficiency will reduce electricity usage and electricity prices, freeing up additional generating capacity to support electrification of transportation at a lower cost to consumers. Second, both en-

[11] For a detailed analysis of the appropriate allocation of efficiency program costs, see: P. Centolella, et al., Cost Allocation for Electric Utility Conservation and Load Management Programs (Washington, D.C.: National Association of Regulatory Utility Commissioners, 1992).

ergy efficiency and electric vehicles will benefit from the development of a smart power grid. The foundation of a smart grid is an open-architecture communications system which, first, provides a common platform for implementing distribution automation, advanced metering, time-differentiated and dynamic pricing, home area networks, advanced building energy management systems that continuously improve building performance, systems to manage electric vehicle charging, and other applications and, second, integrates these applications with existing systems to improve reliability, reduce costs, and enable consumers to better control their electric bills. The Ohio Commission has approved smart grid deployment plans for American Electric Power and Duke Energy Ohio. Smart grid proposals for Ohio's other electric utilities are currently pending before the Commission.

Question 6. How are other countries addressing energy efficiency and conservation? Have other countries adopted an EERS, or a similar mandate?

Answer. It is my understanding that there are energy efficiency standards in place for retail suppliers or distributors in a number of European countries, including Italy, France, and Great Britain. Additionally, the European Union Directive on Promotion of Energy Efficiency and Energy Services obligated E.U. countries to develop national energy efficiency action plans with specific savings targets. We have not looked at these standards or plans in sufficient detail to permit me to offer an opinion regarding the similarities and differences with the standards proposed in S. 548.

RESPONSES OF THOMAS E. SKAINS TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1a. The push to enact a separate RES and EERS calls into question the goals of these standards—is to promote certain technologies, or to reduce greenhouse gas emissions?

If energy efficiency is incorporated into an RES, it would seem to me that utilities would have a much better chance of meeting their requirements instead of facing penalties for noncompliance. Wouldn't it be better to give them greater flexibility to succeed by adopting a single standard?

Answer. Proposals for a Renewable Energy Standard (RES) would require electric load serving entities to purchase a certain proportion of their electric supply from renewable sources. To our knowledge, none of these proposals would seek to impose similar requirements upon natural gas utilities. Nevertheless, I do believe that as a general matter when government creates a mandate for the energy industry we are best served by providing for maximum flexibility and simplicity in compliance options.

Question 1b. If Congress decides to enact an RES instead of an EERS, should we allow an unlimited amount of the renewable mandate to be met through energy efficiency measures?

Answer. Please see the answer to the preceding question.

Question 2. This bill appears to provide only penalties, and no incentives, to facilitate compliance with the proposed federal standard. Please describe what other measures, if any, you think should be incorporated to encourage distributors to reach energy savings goals.

Answer. As indicated in my testimony before the Committee, one of our primary concerns with the Energy Efficiency Resource Standard (EERS) proposal is its focus on after-the-fact penalties for natural gas utilities if their customers do not meet designated energy savings targets. Emphasis should instead be placed on providing tools and incentives to customers to help them reduce their energy consumption. Utilities have a demonstrated record of helping customers access the tools necessary for them to change their energy consumption habits. Over the last thirty years, natural gas utilities have worked with their residential and commercial customers to reduce their overall consumption by approximately one-third.

This impressive trend has principally resulted from increased appliance efficiency standards, improved building codes, and efficiency programs. Energy efficiency programs administered by utilities, local governments, non-profits and third party service companies provide refunds, rebates, low-cost loans, and other incentives for customers to increase the efficiency of their energy use. These programs are often funded by surcharges on utility rates or by general governmental revenues (sometimes received by state and local government from the federal government). Enhancing the resources available for these types of programs would be a far more effective means of meeting energy efficiency objectives than relying on penalties.

As we move forward, we believe that state regulators should also consider programs that permit their utilities to earn a return on effective energy savings programs as well as to offer energy services to homes and businesses—installing and

operating natural gas-powered combined heat and power, district energy or solar powered energy solutions.

Finally, building codes and standards are important in this regard. Some areas have very outdated requirements, while some have none at all. Modernizing building codes and standards which integrate a full fuel cycle assessment of the efficiency and green house gas emissions of energy use is a relatively low cost means to achieve significant energy reductions.

Question 3. I am concerned that requiring distribution utilities to develop and administer new energy efficiency programs, or obtain new technology will be expensive—especially for consumer-owned non-profits. The penalty payments called for by this legislation are very high, and there is also the likelihood of "layered" costs from an EERS, RES, and climate change legislation. How can we implement cost control mechanisms to keep costs for distributors—and therefore businesses and consumers—as low as possible?

Answer. The penalty payments called for by the EERS are indeed very high, and I find that a cause for concern. Unfortunately, under the EERS the utility will not know until after the fact whether its actions have led to compliance with the targets set by EERS. Should a utility not be deemed to be in compliance with the EERS requirements, it will be assessed a penalty of $10 or $5 per MMBtu. For a large utility these penalties could be measured in millions of dollars. These costs would, necessarily, be passed on to the customers of the utility.

Although I wholeheartedly endorse the goals of maximizing energy efficiency and minimizing carbon emissions, adopting a cap-and-trade carbon regulation program together with an EERS would be "layered" as you have indicated. Indeed, the government would be layering one program aimed at reducing consumption on top of another. This may lead to unintended consequences. Moreover, it could readily lead to utilities and their customers being assessed twice for the same failure in reducing energy consumption.

Residential and commercial natural gas customers have demonstrated during the past four decades that they can and will use natural gas with increasing efficiency—resulting in reduced greenhouse gas (GHG) emissions. For example, while the number of homes served with natural gas increased from 38 million in 1970 to more than 65 million today, the overall energy use and GHG emissions for these customers is virtually the same today as it was nearly 40 years ago. This startling statistic is the result of very effective programmatic measures that have been utilized—tighter homes, more efficient natural gas appliances and a variety of conservation and efficiency related utility-sponsored programs and practices. Federal policy should recognize this demonstrated success and focus on supporting these programmatic measures for residential and commercial natural gas.

A programmatic approach—ramping up building codes, appliance standards, and customer incentives—can provide the same emission reductions as would a cap-and-trade approach and similar energy efficiency as intended by a federal EERS, while shielding consumers from the extraordinary cost of emissions allowances and penalties for failure to meet EERS targets. We are convinced that even without the cost of allowances, consumer costs will be pushed upward by the legislation as more and more natural gas is used to produce electricity, particularly in the first two decades of a control program when other generating options—including coal with carbon capture, nuclear power, solar and wind—are not available in sufficient quantities. Federal funding for a programmatic approach is crucial.

Question 4. The proposed EERS legislation would calculate a utility's "business-as-usual" energy use by averaging its consumption levels in the 2 years prior to enactment. Utilities that are already making great efforts to reduce energy consumption—whether through a state-level EERS or their own initiative—may have a tougher time complying with the federal mandate due to their early action on energy efficiency. Should a federal EERS be designed to avoid disadvantaging those utilities, particularly compared to those who have taken no action?

Answer. The "business as usual" concept at the core of the EERS provision is particularly troublesome. It will essentially require every utility to forecast energy prices, market penetration, economic growth, future efficiency programs, and a host of other variables as well. At some point, after the fact, this forecast will be reviewed either by Department of Energy or state officials. The utility will be measured against this "business as usual" forecast (unless these officials opine after the fact that the business as usual forecast was flawed) in determining whether a utility has served a "significant role" in meeting the EERS-mandated energy efficiency targets. If it is determined that the utility has not done so, it will be assessed a penalty of $10 or $5 per MMBtu. This prospect causes me great concern, and it is at the heart of my difficulty with the EERS construct.

Question 5. Under Senator Schumer's bill, the federal EERS would require electricity savings of 15 percent, and natural gas savings of 10 percent, over the course of a decade. For the sake of comparison, can any of you provide the percentage savings that were achieved by these distributors over the course of the past ten years?

Answer. Total consumption of all U.S. residential, commercial, and industrial natural gas consumers declined by 8 percent from 1999 through 2008. Residential and commercial natural gas customers reduced their consumption per customer by over 9 percent from 1998 through 2007. (Data through 2008 is not yet available for this measure.) We do not track data on industrial consumption per customer. I would further note that, unlike the draft carbon cap and trade legislation, natural gas utilities would be responsible for the consumption practices of large industrial customers under the proposed EERS bill. We oppose this construct and suggest that the industrial market should be treated separately under any energy efficiency standards and should not be the responsibility of local distribution companies.

Question 6. In your testimony, you noted that "approximately 90% of the energy value of natural gas is delivered to consumers." From the perspective of a natural gas utility, how difficult would it be to achieve energy savings of 10% over the course of a decade? Should a federal program recognize the savings already achieved by "early actors"?

Answer. We see such a target as achievable if framed with proper incentives for utilities and their customers. However, because of energy efficiency achieved to date, it will be increasingly difficult to achieve further reductions. As a consequence, continuation of this trend, as noted in my testimony before the committee and in answers to questions above, will require a significant commitment of resources. Moreover, a federal approach to increasing energy efficiency and reducing greenhouse gas emissions should recognize the significant reductions achieved by natural gas utilities and their customers to date, particularly relative to their electric counterparts. As noted in my testimony before the committee, residential natural gas customer have reduced their average annual consumption by 38% since 1970 while the average electric customer's consumption increased by 59% over the same time period. Natural gas customers will need access to new technologies to allow them to continue their current efficiency trend. Federal support for developing and commercializing high-efficiency, low-emissions natural gas end-use technologies will be important.

Question 7. At the root of this new mandate is an incongruous requirement—utilities must convince their customers to use less of their product, or else be subject to penalties. While utilities can educate consumers, perform energy audits and provide incentives like rebates for efficient appliances, they simply cannot get "behind the meter" and control consumers' actions. Is the structure of an EERS inherently unfair?

Answer. There appears to be some very elemental and irreconcilable tension between expectations that utilities will be effective proponents for energy efficiency and the reality that utilities do not actually make the ultimate decisions impacting energy use, consumers do.

Question 8. This bill appears to provide only penalties, and no incentives, to facilitate compliance with the proposed federal standard. Please describe what other measures, if any, you think should be incorporated to encourage distributors to reach energy savings goals.

Answer. Natural gas utility managers are increasingly aligning their businesses to help customers meet their energy needs by making increasingly efficient energy choices. This realignment is facilitated to a great degree by the progress that has been made to align natural gas utility shareholder and consumer financial interests through state regulator-approved rate mechanisms that separate the fixed cost revenue recovery from the volume of energy provided to customers—37 natural gas utilities in 21 states are serving 26 million residential customers under either decoupled or flat monthly fee rate designs, both of which make natural gas utilities indifferent to the amount of energy their customers consume.

Increasingly, state regulators are implementing policies that prioritize energy efficiency and encourage natural gas utilities to move beyond "indifference" by providing opportunities to recover program costs and earn on the delivery of energy efficiency programs and services. Currently 19 utilities in 10 states receive either a return on investments in energy efficiency programs or a reward for exceeding energy efficiency program goals. Companies in these states may earn a financial reward for meeting program performance targets, have a shared savings incentive, or have the opportunity to earn a rate of return on their energy efficiency investments equal to other capital investments. These incentive structures vary from state to state as they reflect the policy goals set forward by governments and regulators in each jurisdiction.

Finally, we know that customers will purchase more efficient appliances if the initial cost of more expensive high efficiency appliances is lowered and potential savings are communicated to customers. This can be done by rebates or tax credits. Without such tools it is very difficult to convince customers to purchase more expensive appliances with long payback periods.

RESPONSES OF THOMAS E. SKAINS TO QUESTIONS FROM SENATOR SHAHEEN

Question 1. As today's witnesses have noted, energy efficiency measures are incredibly important to address our nation's energy challenges. I think it is important to craft federal policies that incentivize investments in energy efficiency.

One of the concerns that I am aware of with an EERS, however, is that of market manipulation. Under an energy efficiency credit trading program, we may be giving credit for actions that would have already been taken regardless of an EERS mandate.

Many NE states are implementing policies to require utilities to procure all cost-effective energy efficiency. These least cost procurement policies, for example, require that a distribution company obtain all cost effective energy efficiency up to the electric supply cost. The goals seem the same as an EERS, with an emphasis on cost-effective measures, and seem to avoid some of the issues of market manipulation.

Would you care to comment on least cost procurement policies and how they compare to an EERS?

Answer. This question appears to be geared more toward the electricity-related aspects of EERS, so we do not believe we are best qualified to answer.

Question 2. In New Hampshire, we are addressing efficiency and energy conservation by taking auction revenues from RGGI, the United States' first cap-and-trade program for greenhouse gases, and investing those revenues in these energy saving and conservation efforts. In your view, is it more cost effective and efficient to establish an EERS mandate or invest auction revenues in efficiency and conservation measures? What are the trade-offs?

Answer. There is a demonstrated record of success of natural gas utilities and their customers in achieving significant gains in the efficiency of energy use that spans four decades. For example, while the number of homes served with natural gas increased from 38 million in 1970 to more than 65 million today, the overall GHG emissions from these homes is virtually the same today as it was nearly 40 years ago. This startling statistic is the result of very effective programmatic measures that have been utilized—tighter homes, more efficient natural gas appliances and a variety of conservation and efficiency related utility-sponsored programs and practices. Federal policy should recognize this demonstrated success and focus on supporting these programmatic measures for residential and commercial natural gas. Although it is a bit difficult to generalize across so many customers and so many years, we believe that these savings have been the result of incentives rather than mandates.

Question 3. It has often been said by those seeking to address climate change that the single most important thing we can do to address climate is put a price on carbon. A price on carbon will, in turn, incentivize renewable electricity and energy conservation measures. Is a national EERS necessary to deploy energy conservation and efficiency improvements if we enact a cap-and-trade program in the US?

Answer. In many ways, it appears that the goals of a national approach to regulating greenhouse gas emissions and those of a federal EERS are overlapping, and the implementation mechanisms might produce conflicting results. For this reason, along with other concerns raised in this response and my testimony before the Committee, we recommend addressing natural gas end-use efficiency through programmatic means within a federal greenhouse gas emissions reduction framework rather than through a separate EERS structure.

Residential and commercial natural gas customers have demonstrated during the past four decades that they can and will use natural gas with increasing efficiency and resulting in reduced GHG emissions. A programmatic approach can provide the same emission reductions as would a cap-and-trade approach, but it would not subject these small users to the extraordinary cost of emissions allowances. Natural gas utilities and other interested stakeholders would work with state public utility commissions to develop both the goals and programmatic mechanisms that would deliver real GHG emission reductions while taking advantage of the lower carbon emissions associated with the direct use of natural gas.

Question 4. There have been some who suggest an EERS will reduce the cost of a cap-and-trade program. A report by ACEEE states that, "energy efficiency reduces the cost of cap-and-trade because less new energy facilities are needed and also be-

cause a smaller portion of existing facilities need to be upgraded to help meet emissions ceilings." By some estimates, electricity prices under cap-and-trade legislation may be 15 percent less if an EERS as well as an RES are also in place. Do you agree with this assessment?

Answer. While we are not aware of similar estimates of cost-effectiveness that would support an EERS applied to natural gas, we fully recognize, as do state utility commissions, the impact that increased efficiency of energy use can have in lowering the portion of consumer utility bills related to the cost of the natural gas commodity. Continuing the efficiency gains already realized by natural gas consumers will require investments in higher efficiency appliances and equipment. Ramping up the full potential in this area is a near-term, cost-effective option for getting at the "low hanging" fruit many efficiency advocates suggest. However, progress will depend directly on the resources (e.g., increased funding for incentives and rebates) allocated.

Question 5. A key goal of U.S. energy policy is lessening our dependence on foreign oil. One way to achieve this goal would be a conversion of the transportation sector from petroleum to electricity through the phased-in and widespread use of hybrid cars, plug-in hybrid cars and fully electric cars. While this will lessen our dependence on foreign oil, it may put additional strains on our electricity system which may require additional generation investments.

I am interested to hear your thoughts on how does the EERS will affect en electrification of the transportation sector? How would these two important policy goals work together?

Answer. As a representative of natural gas utilities, I do not have experience or expertise in this area.

Question 6. How are other countries addressing energy efficiency and conservation? Have other countries adopted an EERS, or a similar mandate?

Answer. We have no expertise to offer on the topic of implementation of international energy efficiency performance standards in other countries.

RESPONSE OF THOMAS E. SKAINS TO QUESTION FROM SENATOR BURR

Question 1. North Carolina is a growing area. Piedmont Gas is growing to meet the demand of customers. The direct use of natural gas is currently one of the most environmentally beneficial options to heat a home. Under an EERS program, would your company be able to meet growing demand while complying with required reductions in total consumption?

Answer. I am concerned that the proposal as structured would not allow natural gas utilities to effectively meet the energy needs of what we hope will be a vibrant and expanding economy—not only in the Southeast but for the nation as a whole. As a starting point, goals measured on a use per customer basis (rather than on total energy consumption) may better allow for utilities to partner with policymakers to encourage greater efficiency in energy use overall while allowing for the growth in use necessary to meet the needs of a growing economy. Natural gas utilities and the customers they serve should not be penalized for facilitating economic expansion, growth and job creation by attracting and serving new customers (whether industrial, commercial or residential) in their service areas with a fuel that is lower carbon emitting than other energy sources. We believe the proposed EERS program as currently drafted would do just that.

RESPONSES OF RICH WELLS TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1a. The push to enact a separate RES and EERS calls into question the goals of these standards—is to promote certain technologies, or to reduce greenhouse gas emissions?

If energy efficiency is incorporated into an RES, it would seem to me that utilities would have a much better chance of meeting their requirements instead of facing penalties for noncompliance. Wouldn't it be better to give them greater flexibility to succeed by adopting a single standard?

Answer. We don't have an expressed preference for one standard or two. We do have a preference for emphasizing energy efficiency in any standard Congress chooses to endorse.

Question 1b. If Congress decides to enact an RES instead of an EERS, should we allow an unlimited amount of the renewables mandate to be met through energy efficiency measures?

Answer. If Congress were to enact an RES, we would recommend that it allow energy efficiency to meet a certain percentage of the total obligation that represents a better than "business as usual" scenario for energy efficiency.

Question 2. This bill appears to provide only penalties, and no incentives, to facilitate compliance with the proposed federal standard. Please describe what other measures, if any, you think should be incorporated to encourage distributors to reach energy savings goals.

Answer. Dow believes that addressing climate change through a cap and trade program would, coupled with an EERS, provide significant incentives for energy efficiency. Other policies to promote energy efficiency in buildings and homes include tax incentives for homeowners to increase the energy efficiency, labeling programs for buildings and homes, and improved model building codes to emphasize energy efficiency.

Question 3. I am concerned that requiring distribution utilities to develop and administer new energy efficiency programs, or obtain new technology will be expensive—especially for consumer-owned non-profits. The penalty payments called for by this legislation are very high, and there is also the likelihood of "layered" costs from an EERS, RES, and climate change legislation. How can we implement cost control mechanisms to keep costs for distributors—and therefore businesses and consumers—as low as possible?

Answer. It will be necessary to have a penalty that is higher than the cost of energy efficiency measures. ACEEE believes that energy efficiency measures can be implemented at a cost of $0.03 per kWh. The penalty provision in legislation should exceed this amount.

Question 4. The proposed EERS legislation would calculate a utility's "business-as-usual" energy use by averaging its consumption levels in the 2 years prior to enactment. Utilities that are already making great efforts to reduce energy consumption—whether through a state-level EERS or their own initiative—may have a tougher time complying with the federal mandate due to their early action on energy efficiency. Should a federal EERS be designed to avoid disadvantaging those utilities, particularly compared to those who have taken no action?

Answer. The answer depends on the meaning of the phrase "disadvantaging those utilities". If utilities compete against each other for the same customers, then there would be a need to design the program so as not to penalize utilities for early action.

Question 5. Under Senator Schumer's bill, the federal EERS would require electricity savings of 15 percent, and natural gas savings of 10 percent, over the course of a decade. For the sake of comparison, can any of you provide the percentage savings that were achieved by these distributors over the course of the past ten years?

Answer. We do not have data to be able to answer this question. However, Dow is a large energy user (and electricity producer), and we have exceeded these savings over the past ten years. Furthermore, our actions have saved us money as well as energy. Since 1994, Dow's energy efficiency and conservation program has resulted in significant cumulative energy, financial and GHG savings—approximately 1,600 trillion Btus, $8.6 billion and 86 million metric tons of CO_2.

Question 6. According to the materials you provided with your testimony, Dow Chemical sells energy efficiency products. Does your company stand to profit from the enactment of a stand-alone federal EERS mandate?

Answer. A portfolio standard will potentially benefit some Dow products through increased consumer demand. Such a standard will also likely increase the cost of purchased electricity and natural gas. Indirectly, an EERS will reduce demand for natural gas and help to lessen US natural gas prices, which is good for US manufacturers. Overall, we believe an EERS will be good for Dow. More importantly, an EERS is good for the country, as improving energy efficiency will help promote energy security, reduce GHG emissions, and lessen the price of energy for all Americans.

Question 7. Do you believe an EERS should be combined with appropriate rate-setting mechanisms such as decoupling to address the inherent tension between a utility's financial interest in encouraging energy efficiency measures, which results in less energy sold?

Answer. Dow believes it is important to align utility incentives to promote energy efficiency. We do not, however, know how decoupling can be implemented to best align utility incentives toward energy efficiency.

Question 8. You state than an EERS should not apply to industrial users of energy. But Dow has made great strides in the energy efficiency arena. Why do you believe an exemption for industrial users is necessary?

Answer. It is up to Congress to decide on the scope of any EERS. Because of the way certain state electricity markets are structured, a bill that focuses on retail electricity providers may impose a mandate beyond public utilities. We think it is important to point this out.

If the focus on public utilities is to leverage their expertise and resources to help residential customers improve energy efficiency, then the bill should focus on public

utilities. We note that industrial consumers of electricity and natural gas have every incentive to improve their energy efficiency, as Dow has done.

Question 9. In your written testimony, you urge Congress to incorporate energy efficiency into the RES. Does Dow Chemical support a single, unified standard that includes both renewable energy and energy efficiency, or do you prefer separate standards?

Answer. We have stated that if Congress were to enact only a single RES, we would prefer that energy efficiency be allowed to meet as much of the requirement as practicable, and that such an efficiency standard go beyond "business as usual".

RESPONSES OF RICH WELLS TO QUESTIONS FROM SENATOR SHAHEEN

Question 1. As today's witnesses have noted, energy efficiency measures are incredibly important to address our nation's energy challenges. I think it is important to craft federal policies that incentivize investments in energy efficiency.

One of the concerns that I am aware of with an EERS, however, is that of market manipulation. Under an energy efficiency credit trading program, we may be giving credit for actions that would have already been taken regardless of an EERS mandate.

Many NE states are implementing policies to require utilities to procure all cost-effective energy efficiency. These least cost procurement policies, for example, require that a distribution company obtain all cost effective energy efficiency up to the electric supply cost. The goals seem the same as an EERS, with an emphasis on cost-effective measures, and seem to avoid some of the issues of market manipulation.

Would you care to comment on least cost procurement policies and how they compare to an EERS?

Answer. Dow does not have particular knowledge of procurement policies and how they might compare to an EERS.

Question 2. In New Hampshire, we are addressing efficiency and energy conservation by taking auction revenues from RGGI, the United States' first cap-and-trade program for greenhouse gases, and investing those revenues in these energy saving and conservation efforts. In your view, is it more cost effective and efficient to establish an EERS mandate or invest auction revenues in efficiency and conservation measures? What are the trade-offs?

Answer. Dow supports legislation to impose a price on carbon through an economy-wide program, the centerpiece of which is cap and trade. We have testified in support of an EERS as a complementary policy to an economy-wide program. We recommend this complementary policy in order to ensure significant emission reductions through energy efficiency in the early years of a cap and trade program. We don't view EERS as antithetical to a cap and trade program.

Question 3. It has often been said by those seeking to address climate change that the single most important thing we can do to address climate is put a price on carbon. A price on carbon will, in turn, incentivize renewable electricity and energy conservation measures. Is a national EERS necessary to deploy energy conservation and efficiency improvements if we enact a cap-and-trade program in the US?

Answer. A cap and trade program will provide incentives for meeting the compliance obligation in cost-effective ways, but it will not determine where emission reductions occur or how much reduction will be achieved by energy efficiency. Furthermore, there are features of current markets that discourage energy efficiency (asymmetric information, split incentives) to be deployed cost-effectively. For these reasons, an EERS can be an effective complementary policy to cap and trade as it will ensure significant emission reductions through improved energy efficiency in energy distribution and in buildings and homes.

Question 4. There have been some who suggest an EERS will reduce the cost of a cap-and-trade program. A report by ACEEE states that, "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." By some estimates, electricity prices under cap-and-trade legislation may be 15 percent less if an EERS as well as an RES are also in place. Do you agree with this assessment?

Answer. The answer depends on the degree to which energy efficiency and other low-cost GHG emission-reduction options are chosen by those who have a compliance obligation under a cap and trade program versus a cap-and-trade program with an EERS.

Question 5. A key goal of U.S. energy policy is lessening our dependence on foreign oil. One way to achieve this goal would be a conversion of the transportation sector from petroleum to electricity through the phased-in and widespread use of hy-

brid cars, plug-in hybrid cars and fully electric cars. While this will lessen our dependence on foreign oil, it may put additional strains on our electricity system which may require additional generation investments.

I am interested to hear your thoughts on how does the EERS will affect en electrification of the transportation sector? How would these two important policy goals work together?

Answer. This is an interesting and important question. To the extent that retail electric providers subject to an EERS would provide electricity for the transportation sector, then an EERS will encourage efficiency above and beyond what would otherwise occur in transportation from the use of electricity.

Question 6. How are other countries addressing energy efficiency and conservation? Have other countries adopted an EERS, or a similar mandate?

Answer. The UK Government imposed a similar mandate on utilities and this resulted in utilities supplying their customers hundreds of millions of Compact Fluorescent Light Bulbs (CFLs). One drawback, however, was the absence of a system for checking that the bulbs were used.

There has been much more experience with an EERS from various state programs. It may be useful for Congress to consider lessons learned from individual states.

RESPONSES OF PATRICIA HOFFMAN TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. The push to enact a separate RES and EERS calls into question the goals of these standards—is to promote certain technologies, or to reduce greenhouse gas emissions?

a. If energy efficiency is incorporated into an RES, it would seem to me that utilities would have a much better chance of meeting their requirements instead of facing penalties for noncompliance. Wouldn't it be better to give them greater flexibility to succeed by adopting a single standard?

b. If Congress decides to enact an RES instead of an EERS, should we allow an unlimited amount of the renewables mandate to be met through energy efficiency measures?

Answer. The Administration is currently reviewing its position on EERS and RES legislation and thus the Department does not have an official position. In general, any given GHG reduction target can be achieved most efficiently by providing the maximum flexibility to States and producers to meet the cap using the most cost-effective measures, which may include a mix of energy efficiency, renewable energy, carbon sequestration, and other measures.

Question 2. This bill appears to provide only penalties, and no incentives, to facilitate compliance with the proposed federal standard. Please describe what other measures, if any, you think should be incorporated to encourage distributors to reach energy savings goals.

Answer. S. 548 does not appear to prevent a state from adopting incentive policies. Therefore, for example, a state would be able to adopt different approaches to address lost revenue and profit opportunities for its private utilities, as some states have done, that can occur from reduced utility sales resulting from delivering efficiency measures to electric and gas ratepayers. Further a state may chose to implement improved building codes or equipment standards, as some have done for products that are not covered by Federal law. Language to make clear that states may continue to adopt these kinds of incentive policies could be considered. As the President has made clear, the core of a plan to encourage energy savings should be a cap-and-trade program that puts a price on GHG emissions, thus creating incentives for energy efficiency and the development of low-carbon energy sources.

Question 3. I am concerned that requiring distribution utilities to develop and administer new energy efficiency programs, or obtain new technology will be expensive—especially for consumer-owned non-profits. The penalty payments called for by this legislation are very high, and there is also the likelihood of "layered" costs from an EERS, RES, and climate change legislation. How can we implement cost control mechanisms to keep costs for distributors—and therefore businesses and consumers—as low as possible?

Answer. S. 548 and the RES discussion draft both exempt the majority of small utilities from their provisions, most of which are consumer-owned. For example, about 360 of the Nation's 3,200 distribution electric utilities would be subject to S. 548. Utility-administered energy efficiency programs do have direct costs, but utility and customer costs are at least partially offset by avoided energy supply costs.

In general, the greater the flexibility to use the lowest-cost measures to achieve the standard, the lower the cost burden on utilities and their customers. It is noted

that S. 548 provides other measures to increase flexibility and reduce costs. These include savings targets that can be met through a wide variety of different types of measures and policies, not just utility programs. Many states may opt to rely on a portfolio approach to achieve the EERS standard targets which includes energy efficiency programs, codes and standards, and distribution system savings.

Question 4. The proposed HERS legislation would calculate a utility's "business-as-usual" energy use by averaging its consumption levels in the 2 years prior to enactment. Utilities that are already making great efforts to reduce energy consumption—whether through a state-level HERS or their own initiative—may have a tougher time complying with the federal mandate due to their early action on energy efficiency. Should a federal EERS be designed to avoid disadvantaging those utilities, particularly compared to those who have taken no action?

Answer. A DOE-sponsored review of recent resource plans of utilities (or state energy plans) that have been among the "leaders" in energy efficiency suggests that these utilities and states are planning to continue to rely heavily on energy efficiency in the future, but to the extent that these utilities have already implemented some of the "low hanging fruit," it may be more costly for them to achieve continued improvements in efficiency should new methods for achieving efficiency improvements no longer become evident. However, it would be technically challenging to design an EERS that allows states to claim savings from early action when the evaluation measurement and verification protocols required for the national HERS have not been developed or adopted.

Question 5. Under Senator Schumer's bill, the federal EERS would require electricity savings of 15 percent, and natural gas savings of 10 percent, over the course of a decade. For the sake of comparison, can any of you provide the percentage savings that were achieved by these distributors over the course of the past ten years?

Answer. There is limited historical data available, at the level of individual electricity and gas distributors, on the combined energy savings achieved by utility-funded programs, as well as codes and standards, combined heat and power, and reduced distribution system losses, proposed by S. 548. If 2008 spending levels (i.e. in those states with their own HERS or similar policies, and absent a national EERS) on just electric utility-funded efficiency programs were extended over ten years, roughly 11 states could be expected to achieve cumulative savings of ten percent or more, and roughly 19 states could be expected to achieve cumulative savings of five percent or more. Added to these cumulative savings numbers would be any energy savings achieved through building energy codes, appliance efficiency standards, combined heat and power, and reduced distribution system losses that typically are not included in state EERS policies, but are included in S. 548 as options. Many of those states that have EERS or similar policies conducted "achievable potential studies" before enacting their requirements. Those studies showed that state-level efficiency targets similar to those in the proposed national EERS are achievable. Similar studies at the national level have reached similar conclusions.

Question 6. If a federal mandate is put in place, ACEEE believes that most states will choose to administer their own EERS programs. Should that happen, the Department would only be responsible for drafting regulations and providing general oversight. But I'm curious as to what would happen if some states—for example, the 31 states that have not enacted an EERS—do not choose to do this due to cost or some other factor.

a. Is the Department capable of implementing and administering a federal EERS?

b. Would your answer change if Congress also passed a stand-alone RES?

c. And, finally, what if both of those standards AND climate change legislation all pass—is the Department ready to meet its responsibilities under all three of those measures?

Answer. The Department will be able to implement its responsibilities under any, or all, of the three measures that may be enacted. How the legislation defines the interaction between the measures is important for implementation. Also important is how each enacted measure interacts with comparable existing state requirements. The Department has gained considerable expertise from technical assistance it and its national labs provide states on the design and implementation of both state-level energy efficiency and renewable energy resources standards, including interactions between the different types of standards within and between states.

Question 7. As we've learned from Commissioner Centolella, the Ohi o law provides the flexibility to address changing and unanticipated conditions. For example, the law allows a utility to file an application to amend the standard if they cannot meet it due to regulatory, economic, or technological reasons beyond reasonable control. The law further allows the FUC to reduce a utility's baseline to account for new economic growth. Shouldn't any federal EERS program have similar flexibilities built into it?

Answer. In S. 548, the energy savings requirements for a retail electric or gas distributor in each year are based on its "base quantity", which is defined as the average retail sales delivered to customers in the two preceding years. The proposed approach has the advantage that it is a straight-forward, consistent, and administratively traceable approach to defining the base quantity from which savings targets are calculated, which can be applied across all states. The issues raised by Commissioner Centolella may provide additional flexibility, but are technically and administratively complex and introduce subjective judgment. One option is to allow DOE to address these issues as part of a rulemaking process, where the policy intent can be balanced against feasibility and workability.

RESPONSES OF PATRICIA HOFFMAN TO QUESTIONS FROM SENATOR SHAHEEN

Question 1. As today's witnesses have noted, energy efficiency measures are incredibly important to address our nation's energy challenges. I think it is important to craft federal policies that incentivize investments in energy efficiency.

One of the concerns that I am aware of with an EERS, however, is that of market manipulation. Under an energy efficiency credit trading program, we may be giving credit for actions that would have already been taken regardless of an EERS mandate.

Many NE states are implementing policies to require utilities to procure all cost-effective energy efficiency. These least cost procurement policies, for example, require that a distribution company obtain all cost effective energy efficiency up to the electric supply cost. The goals seem the same as an EERS, with an emphasis on cost-effective measures, and seem to avoid some of the issues of market manipulation.

Would you care to comment on least cost procurement policies and how they compare to an EERS?

Answer. An EERS can be implemented with or without tradeable energy savings credits, and S. 548 does not include a provision for energy efficiency credit trading. The bill does allow utilities to contract with other entities for energy savings; however, this provision does not appear to create any specific opportunities for gaming or market manipulation. In fact, adding an opportunity for tradeable credits as one compliance approach could allow national efficiency gains to be achieved at lower cost.

With respect to a comparison between EERS and least-cost procurement policies, one establishes a quantity constraint and the other a price constraint. Which is better depends on the goal. If the goal is to ensure that a specific level of energy efficiency is achieved, then a quantity constraint (EERS) is more suitable. This can be made more efficient by allowing trading among utilities with different costs of achieving energy efficiency gains. If the goal is to ensure that only cost-effective measures are adopted, least cost procurement policies can provide a cap on the costs of the adopted measures.

Question 2. In New Hampshire, we are addressing efficiency and energy conservation by taking auction revenues from RGGI, the United States' first cap-and-trade program for greenhouse gases, and investing those revenues in these energy saving and conservation efforts. In your view, is it more cost effective and efficient to establish an EERS mandate or invest auction revenues in efficiency and conservation measures? What are the trade-offs?

Answer. Either approach could result in the implementation of cost-effective policies and programs that support improvements in energy efficiency. The actual cost-effectiveness of such programs, however, is determined by factors such as program design, the commitment to rigorous program evaluation, including the use of sound techniques for measuring and verifying the resulting energy savings, and the willingness to use evaluation results to redesign policies and programs so as to maximize cost-effectiveness. The most cost-effective strategies for improving energy efficiency will generally be a mix of market mechanisms, such as cap and trade, and well focused policies and programs designed to overcome market barriers to cost-effective efficiency improvements. Such policies and programs could include efficiency standards, training and education, voluntary commitments, improved consumer information, and focused incentives for investment. A cap-and-trade program creates incentives to increase energy efficiency and conservation because of the carbon price signal that it sends to consumers, but market barriers often inhibit or prevent energy users from effectively responding to such signals. For this reason, the President has proposed to strengthen a broad range of other measures to encourage or require cost-effective efficiency improvements, including the use of a portion of cap-and-trade revenue for investments in clean energy technology and efficiency. An EERS mandate that allows varied responses by government agencies, as well as utilities,

may be another way of producing similar benefits. An EERS mandate that allows varied responses by government agencies, as well as utilities, may be another way of producing similar benefits.

Question 3. It has often been said by those seeking to address climate change that the single most important thing we can do to address climate is put a price on carbon. A price on carbon will, in turn, incentivize renewable electricity and energy conservation measures. Is a national EERS necessary to deploy energy conservation and efficiency improvements if we enact a cap-and-trade program in the US?

Answer. Ensuring that electricity rates reflect the environmental and other costs of greenhouse gas emissions by putting a price on carbon would incentivize renewable electricity and energy conservation measures, but as a result of a wide range of market barriers, prices alone will not result in the implementation of many cost-effective efficiency measures. For this reason, other policies and programs have been developed and implemented to help remove or overcome the barriers to cost-effective efficiency investments. A Federal EERS might be one way of helping to spur such cost-effective efficiency investments in concert with a cap and trade program, however, such a mandate, if poorly designed or implemented, might also result in the adoption of energy efficiency measures that were not the most cost-effective means of meeting a specified greenhouse gas emissions cap.

Question 4. There have been some who suggest an EERS will reduce the cost of a cap-and trade program. A report by ACEEE states that, "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." By some estimates, electricity prices under cap-and-trade legislation may be 15 percent less if an EERS as well as an RES are also in place. Do you agree with this assessment?

Answer. Cost-effective improvements in energy efficiency would help minimize the costs of achieving a greenhouse gas emissions cap, as well as reducing the costs of achieving a specific Renewable Energy Standard (RES). An Energy Efficiency Resource Standard (EERS), such as that proposed in S. 548, could provide a strong incentive for states and utilities to increase their support for a wide range of policies and programs that could lead to significant efficiency gains, though these might not always be the most cost-effective measures for meeting the cap. The effect that an EERS mandate would have on electricity prices and on the costs of achieving a greenhouse gas emissions cap depends on a number of different factors, such as the cost-effectiveness of the policies and programs undertaken, the cost of the generating capacity or fuel avoided because of the reduced demand, and the way in which these costs and savings are reflected in utility rates. If the efficiency measures undertaken are very cost-effective and the generating capacity and fuel costs avoided are substantially higher than average costs, then a EERS mandate could reduce the price impacts of achieving a greenhouse gas emissions cap. The impact of an RES on electricity prices and the costs of achieving a greenhouse gas emissions cap will be determined by the comparative costs of the renewable and non-renewable options for reducing greenhouse gas emissions. If a RES spurs the rapid development of less costly renewable energy generation technologies, it could also help reduce the overall costs of achieving greenhouse gas emission caps.

Question 5. A key goal of U.S. energy policy is lessening our dependence on foreign oil. One way to achieve this goal would be a conversion of the transportation sector from petroleum to electricity through the phased-in and widespread use of hybrid cars, plug-in hybrid cars and fully electric cars. While this will lessen our dependence on foreign oil, it may put additional strains on our electricity system which may require additional generation investments.

I am interested to hear your thoughts on how does the EERS will affect en electrification of the transportation sector? How would these two important policy goals work together?

Answer. Encouraging the use of plug-in electric vehicles to reduce our dependence on oil, while simultaneously making significant reductions in total carbon dioxide emissions, will require new policies and technologies. While electric vehicles are more efficient at using energy than internal combustion engine vehicles, they will nonetheless place additional demand on electricity generation, transmission and distribution. Meeting this demand, while also reducing total greenhouse gas emissions, will require new, low-or no-carbon-emitting generation. Cost-effective improvements in the efficiency of electricity use would likely make meeting these dual challenges somewhat easier and less costly. EERS is one of several possible strategies for spurring further improvements in the end-use efficiency of electricity.

Question 6. How are other countries addressing energy efficiency and conservation? Have other countries adopted an EERS, or a similar mandate?

Answer. Other countries have pursued policies such as utility demand side management, building energy codes, appliance efficiency standards, and appliance labeling programs. Three European countries—England, Italy, and France—have enacted EERS policies that apply to retail electricity and natural gas distributers.

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