
ENERGY EFFICIENCY OF BUILDINGS

HEARING
BEFORE THE
SUBCOMMITTEE ON ENERGY
OF THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED TENTH CONGRESS

FIRST SESSION

TO

RECEIVE RECOMMENDATIONS ON POLICIES AND PROGRAMS TO IMPROVE THE
ENERGY EFFICIENCY OF BUILDINGS AND TO EXPAND THE ROLE OF ELECTRIC
AND GAS UTILITIES IN ENERGY EFFICIENCY PROGRAMS

FEBRUARY 12, 2007



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ENERGY EFFICIENCY OF BUILDINGS

MONDAY, FEBRUARY 12, 2007

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

The subcommittee met, pursuant to notice, at 2:30 p.m. in room SD-366, Dirksen Senate Office Building, Hon. Byron L. Dorgan presiding.

OPENING STATEMENT OF HON. BYRON L. DORGAN, U.S. SENATOR FROM NORTH DAKOTA

Senator DORGAN. We'll call the hearing to order. I'm Senator Dorgan, chairman of the subcommittee. We're joined by the chairman of the full Energy and Natural Resources Committee, Senator Bingaman and we expect others to join us soon.

We welcome all of you to the first Energy Subcommittee hearing of the 110th Congress and today the topic is energy efficiency. We have some excellent witnesses on this subject and we're anxious to hear them. This is an issue that I've been involved with for some long while. I was honored to serve as co-chairman of the Alliance to Save Energy. In fact, I succeeded in that position the Senator from New Mexico, who served in that same position for some long while.

Both of us are very interested in this issue of energy efficiency, but we all recognize we have serious energy problems and a significant challenge ahead of us with respect to energy. We import over 60 percent of our oil, much from troubled parts of the world. We also have substantial challenges with respect to the production of electricity and the use of coal, and a whole range of issues in this new age of interest in energy and climate change and global warming. One of the evident solutions to dealing with all of these issues is the area of efficiency. We understand that you have to be involved in the question of production of energy, conservation of energy, and the development of renewable energy. We also understand that a significant part of this issue of energy use and how we become more efficient is the issue of efficiency itself, in which we discuss the things that sound like a foreign language—SEER-13 for air conditioners—and those kinds of debates which we have been involved with on this committee for some long while.

Today we're going to focus on two related topics with respect to efficiency: efficiency in the building sector in this country, and also the electric and gas utility energy efficiency programs. The United States Federal Government has an interest in this issue of effi-

ciency aside from the policy standpoint. We, in the Federal Government, own and lease about 475 thousand buildings, or about 3.2 billion square feet throughout the world. GSA, I'm told, spent \$380 million dollars on energy costs in their Federal buildings in FY 2006. Presidents Clinton and Bush, as well as the Congress through EPAct 2005, called for the Federal Government to lead by example in building efficiency, so we know that we have responsibilities in this area. We know that there's a substantial amount of energy savings to be achieved by thoughtful efficiency policy and programs, and that is the purpose of this hearing. I'm pleased that all the witnesses have joined us, and let me call on my colleague Senator Bingaman for any opening statement.

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

The CHAIRMAN. Mr. Chairman, I congratulate you on having the hearing. It's obviously the first issue we need to be addressing, as we try to improve our energy security, and I'm glad we could get this distinguished group of witnesses. I'm looking forward to hearing them. Thank you.

Senator DORGAN. Senator Bingaman, thank you very much. We are joined by the ranking member of this subcommittee, Senator Murkowski.

Senator, I have just made a few brief comments as an opening statement, then I called on Senator Bingaman, and I'd be happy to have you make any statements you wish to make at this point.

**STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR
FROM ALASKA**

Senator MURKOWSKI. I appreciate that a great deal; now you get to get to hear twice how much I appreciate you calling this hearing on this very, very important topic.

I don't want to take too much time this afternoon, but I think it is important to repeat and remind folks that when we consider that about 40 percent of total U.S. energy consumption goes to heating, cooling, and lighting our buildings and homes, it is clear that for us to make progress in improving energy efficiency, we must improve both the design of our commercial buildings and our homes, as well as the energy efficiency of their electrical and mechanical systems—the appliances that go inside of them. We made some good steps with the Energy Policy Act of 2005, did some good concrete things, but we recognize and appreciate that we have more to go. We have more to do in terms of the authorization of certain programs that we saw through EPAct.

I've been disappointed myself with some of the actions that we have seen; the weatherization program is one of those. If we did better at our home weatherization programs, we probably wouldn't be looking at as much funding as the LIHEAP. I know that many of the witnesses this afternoon will discuss these programs and the importance of actually starting to put more money toward saving energy through appliance and greater building efficiencies.

I would like to personally welcome one of our witnesses here this afternoon, Jack Hébert. Jack is from Fairbanks, and I had the opportunity to visit him at the Cold Climate Housing Research Cen-

ter that is located on the University of Alaska, Fairbanks campus and to go through the model homes that they have developed using the research. I know most of you don't like to think that Alaska can be utilizing our solar assets, but in fact in a place like Fairbanks, where we can have 40 below periods, we've got some research that has demonstrated incredible advances in our energy efficiency. So Jack, I appreciate you being here. I know you're trying to get on a plane to get back North before the snow comes, so we hope that we're successful in that.

I do want to also note: I was reading through the testimony and Mr. Stewart, you note that buildings are responsible for 71 percent of the electricity consumed in America and account for nearly 10 percent of all carbon dioxide emissions. It's information like that, that I think gets people's attention here, and again the reason why this hearing this afternoon is so important. So with that, Mr. Chairman, again I thank you and look forward to some great suggestions from our panelists this afternoon.

[The prepared statement of Senator Sanders follows:]

PREPARED STATEMENT OF HON. BERNARD SANDERS, U.S. SENATOR FROM VERMONT

Chairman Dorgan, Ranking Member Murkowski, thank you for convening this very vital hearing on one of the best ways to address the problems of global warming: energy efficiency.

Energy efficiency is so important. In fact, it is one of those win-win things: you reduce consumers' bills and you reduce the amount of global warming pollutants released to our atmosphere. So, why is it that we aren't funding the excellent energy efficiency programs that are already on the books, including weatherization? Additionally, when it comes to energy efficiency, we need to make sure that the federal government leads by example. One simple way to do this is to utilize energy performance contracts, which do not require any up-front capital from the agency. We also need to authorize additional energy efficiency programs, including some mentioned by the witnesses at today's hearing. I am particularly intrigued by the notion of allowing utilities to make a profit, perhaps even a greater profit than they would otherwise, by promoting energy efficiency over generation. I look forward to exploring this issue more.

I look forward to working with my colleagues and member of the community to determine the best ways to move forward because I know that we all share the desire to ensure a better energy future for our country so that good jobs and a good economy will peacefully co-exist with a healthy environment.

Senator DORGAN. Senator Murkowski, thank you very much. We have six excellent witnesses. I appreciate very much all of you coming to be with us today. I would like to call on all six for their statements, and after which we will ask some questions. I also invited someone from North Dakota to be on the panel, so we have North Dakota and Alaska represented, along with the four other distinguished witnesses.

Kim Christianson runs the Energy Program in North Dakota, in the North Dakota Department of Commerce. I was with him earlier today and did not brag about him, and I should have. He does an outstanding job. I'm really impressed with the work that he has done. I've worked with him on a good many issues but he, and I expect Mr. Hébert, and others, will bring their perspective to this issue. I think Kim Christianson has a unique perspective. We're very pleased that you're with us. Mr. Christianson you may proceed.

STATEMENT OF KIM CHRISTIANSON, MANAGER, OFFICE OF RENEWABLE ENERGY AND ENERGY EFFICIENCY, NORTH DAKOTA DEPARTMENT OF COMMERCE, AND ALSO ON BEHALF OF THE NATIONAL ASSOCIATION OF STATE ENERGY OFFICIALS

Mr. CHRISTIANSON. Thank you, Senator Dorgan and Senators Bingaman and Murkowski. In addition to being with the Department of Commerce in North Dakota, I also chair the Agriculture and Rural Development task force of the National Association of State Energy Officials for NASEO. I greatly appreciate the opportunity to be here today. My testimony today will serve a dual purpose: to highlight energy efficiency activities and policy in North Dakota, and to present NASEO policy positions on energy efficiency and to describe other State efforts. My written testimony is far longer than what I am able to cover in 7 minutes so I will very briefly summarize the testimony content and ask that the full written testimony be placed into the hearing record.

Senator DORGAN. Without objection.

Mr. CHRISTIANSON. There's a tremendous amount of energy development activity taking place in North Dakota today, especially in the areas of wind energy, ethanol, bio-diesel and biomass. At the same time, North Dakota has abundant fossil fuel resources—including lignite, coal, oil, and natural gas—and a very significant electricity generation industry, which exports approximately 70 percent of the electricity produced mostly to the east. North Dakota Governor John Hoeven has encouraged the existing energy industry and the developing renewable energy industry to work together where possible. A good example of this synergy is the announced combined heat and power plant near my hometown of Jamestown, North Dakota. The project involves the existing Cargill malting facility, a proposed 100 million gallon per year ethanol production plant, and a new Great River Energy 40 megawatt power plant which is coal-fired. By co-locating facilities and utilizing steam from the power plant and waste water from the malting facility, tremendous cost efficiencies will be realized by all of the parties.

With all the attention on renewable energy developments and the substantial economic activity generated, it's very easy to overlook the good work and benefits of energy efficiency efforts. Our office has been actively involved with efficiency efforts in North Dakota since the late 1970's, and we continue to administer the Weatherization Assistance Program and the State Energy Program. My written testimony highlights the best practices initiative that our State Weatherization Program has implemented over the past couple of years. This is a comprehensive effort to implement state-of-the-art approaches to residential energy efficiencies flowing from around the country and to develop an instructional manual that is applied consistently throughout the State. It includes intensive training and the use of sophisticated diagnostic equipment, so that all crews are equipped to do the best job possible to help low-income households get a handle on their energy consumption and costs. North Dakota's Best Practices" initiative has been recognized around the country as an innovative, comprehensive, and cost-effective approach to providing energy efficiency assistance to low-income residents.

I also highlight the energy efficiency work we have done in North Dakota with State-owned buildings. Over the years we have provided technical and financial assistance for energy efficiency projects in 412 buildings, amounting to \$24 million in projects, which have resulted in over \$3 million of annual cost savings. We have combined a unique working partnership with the North Dakota Association of Physical Plant Administrators and technical and financial assistance for energy analyses and efficiency improvements, to greatly reduce energy consumption and cost. A current example is a \$2.3 million project at the University of North Dakota in Grand Forks, which includes upgrades to 75 buildings. This project is expected to result in energy cost savings of over \$330,000 per year.

Finally, we are more and more involved in the initial planning and design stages of proposed new facilities. We have successfully obtained the Energy Star designation for a number of new State facilities, including the one in which our agency is housed, and we continue to expand our efforts in this area. While we are proud of the energy efficiency efforts in North Dakota, we are a small agency with limited resources and know that we have only scratched the surface of what could be accomplished. I'm very impressed with the innovative programs and tremendous successes that my colleagues and other State energy offices have achieved. On behalf of our agency and other State energy offices, I thank you, Senator Dorgan and other committee members, for your continuing support of the Weatherization Assistance Program and State Energy Program. In our case, and I'm sure with most other States, these two programs have served as a foundation of our energy efficiency efforts.

In my written testimony I have included brief summaries of innovative and successful efficiency programs from a number of States. I also have a NASEO publication that highlights State success stories with efficiency and renewable programs, and I ask that that be included in the record.

Senator DORGAN. Without objection.

Mr. CHRISTIANSON. Also included in my written testimony are a number of policy positions put forth by the National Association of State Energy Officials. I do not have time to adequately cover these this afternoon, but I would like to focus on a few key items. Robust energy efficiency expansion requires both significant research and development, but also deployment and demonstration programs. It doesn't make sense to put priority on R&D for future energy-saving opportunities at the expense of programs which are producing those savings today. As you consider funding at the Department of Energy, USDA, and EPA, please consider the value of both sides of the equation. NASEO recognizes that you have a limited budgets, but the Energy Policy Act of 2005 authorized and reauthorized a number of energy programs that are significantly underfunded. Both the State Energy Program and the Weatherization Assistance Program are facing budget cuts that we believe are unwarranted. These are successful programs that help real citizens and real businesses in all sectors of the economy. There were a number of programs included in EPAct that were not sufficiently funded, if at all. These include efforts to target appliance efficiency standards, the

Energy Star program, upgrading building codes, upgrading public buildings, and others.

I'll just mention one other thing. A number of energy efficiency provisions in the Farm Bill, especially section 9006, are increasingly important to the States and we would urge your support of expanding those provisions. Again, there is a more complete summarization of NASEO's policy positions in my written testimony. On behalf of my colleagues and other State energy offices, I thank you for your attention and your continued support. Thank you.

[The prepared statement of Mr. Christianson follows:]

PREPARED STATEMENT OF KIM CHRISTIANSON, MANAGER, OFFICE OF RENEWABLE ENERGY AND ENERGY EFFICIENCY, NORTH DAKOTA DEPARTMENT OF COMMERCE, AND ALSO ON BEHALF OF THE NATIONAL ASSOCIATION OF STATE ENERGY OFFICIALS

INTRODUCTION

Good afternoon Senator Dorgan, and subcommittee members. My name is Kim Christianson, I am the Manager of the Office of Renewable Energy & Energy Efficiency within the North Dakota Dept. of Commerce and the Chair of the Agriculture and Rural Development Task Force of the National Association of State Energy Officials (NASEO). I greatly appreciate the opportunity to appear before you today. My testimony today will serve a dual purpose: 1) to highlight energy efficiency activities and policy in North Dakota; and 2) to present NASEO policy positions on energy efficiency and to describe other state efforts.

NORTH DAKOTA ACTIVITIES

These are exciting times for energy development and the energy industry in North Dakota, particularly in the areas of wind energy, ethanol, biodiesel and other renewable energy developments. In the past few years, ten wind energy projects have been installed or announced, including 383 utility-scale wind turbines with a total rated capacity of 578 MW. Five ethanol production plants and another four biodiesel production facilities are under construction or soon to begin construction. Various groups are exploring the potential for biomass energy development in the state, particularly the use of cellulosic feedstock for ethanol production.

North Dakota has abundant fossil fuel resources, including lignite coal, oil, and natural gas, and a significant electric generation industry that exports nearly 70 percent of the electricity produced to neighboring states, mainly to Minnesota. Governor John Hoeven has encouraged the existing fossil fuel industry and the developing renewable energy industry to work together when feasible. An excellent example of the synergy potential between the two energy sectors is the recently announced Spiritwood project, near my hometown of Jamestown, North Dakota. The project involves the existing Cargill malting plant outside of Spiritwood, a proposed 100 million gallons per year ethanol production plant, and a new coal-fired 40 MW generation facility to be built by Great River Energy. Steam heat from the power plant will be used at both the ethanol and malting facilities. Waste water from the malting plant will be utilized by the ethanol facility for their needs. The electricity generated by this project will be placed on the transmission grid and sent to Great River's customers in Minnesota. Because the Cargill malting plant can replace their expensive and often interrupted supply of natural gas with inexpensive steam from the power plant, they have recently expanded their operation, making it the largest of its kind in North America.

With all the attention on renewable energy development and the substantial economic activity generated, it is easy to overlook the good work and benefits of energy efficiency efforts. Our office has been actively involved with energy efficiency efforts in North Dakota since the late 1970's, and we continue to administer the Weatherization Assistance Program and the State Energy Program. My testimony will highlight three particularly successful energy efficiency activities in North Dakota—the Weatherization program, the State Energy Program and our efforts to improve the energy efficiency of state-owned buildings.

As you know, the Weatherization Assistance Program provides low-income households with energy efficiency improvements to their homes. In North Dakota, our program assists approximately 1,300 households annually, benefiting over 2,700 low-income persons, 55 percent of whom are elderly or children. Weatherization services in North Dakota are delivered by seven regional Community Action Agencies.

Over the last couple of years, our state has implemented what we call a “Best Practices” initiative. This is a comprehensive effort involving all levels of the state’s Weatherization program—from state administrators, to Community Action Agency energy coordinators, to the weatherization crews themselves—to implement state-of-the-art approaches to residential energy efficiency from around the country and to develop an instructional manual that is applied consistently throughout the state. The “Best Practices” initiative includes intensive training and the use of sophisticated diagnostic equipment so that all crews are equipped to do the best job possible to help low-income households get a handle on energy consumption and costs. Continuing education is provided to Weatherization crew members to ensure early adoption of improved methodologies.

In addition to reducing energy costs and improving comfort, the Weatherization crews have expanded their efforts to include emergency repair and replacement of furnaces, which in a number of instances has resulted in the identification and elimination of life-threatening safety issues. For example, the Community Action Program Region VII, Inc., in Bismarck reported one particular case in which a woman had chronic headaches and complained of feeling ill whenever she was in her mobile home for any length of time. It turned out that the level of carbon monoxide in her home was elevated well beyond safe levels. She very easily could have died from carbon monoxide poisoning and was fortunate that the weatherization crew discovered and corrected the problem.

North Dakota’s “Best Practices” initiative has been recognized around the country as an innovative, comprehensive, and cost-effective approach to providing energy efficiency assistance to low-income residents. I’m proud to tell you that my friend and colleague, Cal Steiner, who along with state manager Howard Sage administers the program for North Dakota, will be receiving the prestigious James Gardner National Weatherization Award from the National Association of State Community Services Programs; their top award for excellence.

In addition to North Dakota’s Weatherization program, I want to discuss our energy efficiency efforts for state-owned buildings. Over the years, we have provided technical and financial assistance for energy efficiency projects in 412 buildings, amounting to \$24 million in projects, resulting in over \$3 million in annual cost savings.

For many years, our office has had a close working partnership with the North Dakota Association of Physical Plant Administrators. They represent all the major state facilities, including the buildings owned by the state university system, and the group has now expanded to include major school district facility managers and others. Through the State Energy Program, we annually provide funds for training programs implementing a variety of energy efficiency measures. Recent examples include sessions on direct digital control systems and steam trap maintenance and replacement programs.

We’ve done much to encourage reduced energy consumption and costs in state and local buildings. As I mentioned, we have provided technical and financial assistance for detailed energy analyses, and for energy efficiency improvements. In recent years we have encouraged and assisted state facility managers with two mechanisms to implement efficiency improvements—a state “bonding” program and energy performance contracting. Many of these activities are supported by the State Energy Program.

The state facility energy improvement program has provided bond funds for larger-scale efficiency improvements, based on detailed energy audits that indicate favorable returns on investment. The savings on utility costs are then used to pay back the state bonds. A current example is a \$2.3 million project at the University of North Dakota in Grand Forks, which includes upgrades to seventy-five buildings. This project is expected to result in energy cost savings of over \$330,000 per year.

A second mechanism for efficiency projects at state facilities is performance contracting. This allows a third-party vendor to work with the institution to identify potential energy-saving improvements and to arrange for the financing for those improvements. Under this program, the vendor guarantees that the facility will realize sufficient energy cost and operational savings to pay back the financing within a prescribed period; usually within ten to fifteen years. Our office includes a registered and certified energy engineer who works closely with state facility managers to review proposals and contractual documents to make sure projected utility savings are realistic and achievable.

Finally, we are more and more involved in the initial planning and design stages of proposed new facilities. Our agency is housed in a very modern and energy efficient office building called the Century Center, which is owned by the state’s Workers Safety and Insurance agency. Our engineer worked with the building design team to suggest a geothermal (or ground-source) heating and cooling system and a

number of other efficiency features. The Century Center, along with a nearby Job Service North Dakota office building, received the Energy Star designation from the Department of Energy/Environmental Protection Agency program. We are also working with the Bank of North Dakota (our state-owned bank) on their new building, currently under construction, to hopefully also achieve the Energy Star designation.

While we are proud of our energy efficiency efforts in North Dakota, we are a small agency with limited resources and know that we have only scratched the surface of what could be accomplished. I'm very impressed with the innovative programs and tremendous successes that my colleagues in other state energy offices have achieved. On behalf of our agency and other state energy offices, I thank you, Senator Dorgan, and other committee members for your continuing support of the Weatherization Assistance Program and State Energy Program. In our case, and I'm sure with most other states, these two programs have served as the foundation of our energy efficiency efforts. We very much appreciate it.

STATE ENERGY EFFORTS/FEDERAL APPROPRIATIONS

I also want to highlight the efficiency policy positions of our national organization, the National Association of State Energy Officials (NASEO).

On behalf of NASEO, I want to point out that the state energy offices have been working hard to implement energy efficiency programs throughout the United States. The state energy offices directly implement projects, work to develop projects and programs with the private sector and work with all levels of government to develop innovative solutions to our energy problems. State energy offices advise our Governors on energy policy and work cooperatively with the state public service commissions. We look forward to working with Andrew Karsner, the relatively new DOE Assistant Secretary for Energy Efficiency and Renewable Energy, as he attempts to refocus DOE efforts in creative ways.

The Energy Policy Act of 2005 (EPACT) is a good starting point for a number of positive programs. EPACT reauthorized the State Energy Program (SEP)(Section 123), the Weatherization Assistance Program (Section 122) and the Low-Income Home Energy Assistance Program (LIHEAP)(Section 121). The authorization levels for FY'07 in EPACT for these critical programs are: 1) SEP—\$100 million; 2) Weatherization—\$600 million; and 3) LIHEAP—\$5.1 billion. While we do not know what the ultimate appropriations will be for FY'07, the FY'08 Administration request is: 1) SEP—\$45.5 million, of which \$10.5 million would be for a new competitive program and \$35 million for the base grant, which is well below the \$49.5 million in the FY'07 budget request for the base program; 2) Weatherization—\$144 million, which is a cut of almost \$100 million from the FY'06 appropriated levels; and 3) LIHEAP—\$1.782 billion, of which \$1.5 billion would be the regular grant and \$278 million would be contingency funds, down from \$2.161 billion in FY'07, plus \$1 billion in emergency funds last year. These three programs are the existing core of the federal-state relationship in the energy area.

In addition to the base Weatherization funds, approximately 10% of the LIHEAP funds are transferred to Weatherization activities on a yearly basis. We also ask this Subcommittee to reauthorize these programs this year.

We urge the Congress to encourage the Administration to support federal funding in FY'07 of at least \$49.5 million for SEP, \$242 million for Weatherization and \$2.161 billion for LIHEAP, with supplemental funds equal to the \$1 billion level provided last year. For FY'08, we would encourage Congress to move towards the authorized levels contained in EPACT, but, at a minimum, to provide \$80 million for SEP, \$300 million for Weatherization and the \$3.1 billion funding level for LIHEAP.

Numerous studies of the effectiveness of state energy programs have been prepared over the past few years by individual states that show the successes, enormous leverage of private and other public resources and dramatic delivered energy savings. In addition, a study prepared by Oak Ridge National Laboratory a few years ago (in an era of lower energy prices) showed that for every federal dollar invested in the State Energy Program over \$7 in energy savings was realized and over \$10 in leverage of other resources was achieved. This study did not even account for the critical efforts in energy emergency preparedness or promotion of alternative fuels and alternative-fueled vehicles.

We are also very concerned with under-funding of DOE's industrial energy efficiency program. This program received well over \$100 million five years ago and has dropped to \$55 million in FY'06, with a further proposed decrease to \$46 million in FY'08. The industrial sector requires more funding.

In addition to these core programs, a number of other critical programs were authorized in EPACT, that have not been funded or have not been sufficiently funded:

1) *Energy Efficient Appliance Rebate Program (Section 124)*—\$50 million authorization. This is a new program that was originally proposed by Senator Schumer based upon a successful model implemented by the New York State Energy Research and Development Authority (NYSERDA), which helped transform the market by getting individuals to purchase energy efficient products. No funds were requested in the FY'08 Budget.

2) *Energy Star Program (Section 131)*—This joint EPA/DOE program is an essential component to many state energy efficiency activities. The Energy Star label is ubiquitous now and we utilize it to encourage homeowners and businesses to purchase energy efficient products. Large retailers are also helping to encourage the use of these products. The EPA program was proposed for a cut to \$43.5 million in FY'08 from \$50 million in FY'06. We would recommend that this program be doubled. NASEO members have developed a number of partnerships with EPA, and they have delivered real, measurable savings to help American consumers. The DOE Energy Star Program received a \$1 million increase from the FY'07 request to \$6.776 million. This is insufficient.

3) *State Building Energy Efficiency Codes Incentives (Section 128)*—\$34 million authorization. The Administration requested \$3.75 million in FY'08. The FY'06 funding was \$5.575 million. This program matches state and local efforts to both upgrade the energy efficiency of building codes and train local code officials to enforce such codes. This is a key component of any major energy efficiency effort in buildings in this country. Without training of local code officials, builders and architects, a higher building energy code is inadequate.

4) *Energy Efficiency Pilot Program (Section 140)*—\$5 million authorization. This new program would help encourage best practices in states. The state energy officials are committed to working with their brethren in the other states to implement programs that are road-tested in other jurisdictions. No funding was requested in FY'08 for this program.

5) *Energy Efficient Public Buildings Program (Section 125)*—\$30 million authorization. This new initiative was based upon legislation introduced by Representative Mark Udall (D-CO) and former Representative Sherwood Boehlert (D-NY), focused on upgrades to school buildings. In negotiations on a bi-partisan basis, this program was expanded to all public buildings. No funds have been requested in FY'08 for this program. Energy efficiency in public buildings could be greatly improved throughout the United States. This program would leverage significant state and local resources, and would leave more funds for high priority activities such as education and health care.

6) *Appliance Energy Efficiency Standards (Sections 135 and 136)*—NASEO supports funding for an accelerated and expanded appliance standards program. This is an extremely successful program which requires increased attention by DOE.

In the tax area, we strongly urge Congress to go beyond last year's tax extenders bill and to extend the energy efficient commercial buildings deduction, credit for construction of new energy efficient homes, credit for certain non-business energy property, credit for energy efficient appliances and the credit for residential energy efficient property. The proposed tax benefits for combined heat and power should be included in any new energy tax provision. We support extension of the production tax credit for wind and other technologies, as well as the solar investment tax credit, credit for qualified fuel cells and microturbines and the Clean Renewable Energy Bonds.

In the alternative fuels and transportation area, we support the recommendations of the Governors Ethanol Coalition and the 25x25 group, as well as efforts to encourage the further expansion of hybrid electric and plug-in hybrid vehicles. The proposals advanced during the Senate Energy and Natural Resources Committee's recent hearing to encourage the use of biofuels, ethanol with existing feed stocks and the expanded use of cellulosic ethanol are all strongly supported by the state energy offices.

Title IX of the 2002 Farm Bill is a good starting point for more aggressive action in the energy area for the agriculture sector. Section 9006, providing for energy efficiency and renewable energy for farmers, ranchers and rural small businesses, has been especially effective, though under-funded. Mister Chairman, your proposals, Senator Harkin's "REAP" legislation and the President's recent suggestions are a good starting point for this expansion.

A few issues and trends are worth bringing to the Subcommittee's attention as you deliberate on new energy legislation and responses to environmental challenges.

First of all, we are seeing the states working together on a regional basis to a far greater extent than previously. The resolution and reports prepared by the Western Governors Association in the summer of 2006, known as the Clean and Diversified Energy Initiative, is a balanced approach to addressing our energy needs. The northeast and mid-Atlantic states are moving forward with their Regional Greenhouse Gas Initiative (RGGI). California and the west coast states are joining together on comparable programs. New York and California have established a number of innovative energy efficiency and renewable energy programs. The state energy offices are working closely with all these efforts.

A wide variety of states have instituted new statewide energy plans and programs. A number of jurisdictions are pushing for and implementing renewable portfolio standards. The Governor of Oregon has just announced a planned 25% RPS by 2025, expanded use of biodiesel and ethanol, as well as certain climate change proposals. Georgia issued a new energy plan in late 2006. The Governor of Connecticut has just announced a new, expanded energy agency. The Governor of Wisconsin has also called for a new energy agency. A number of states are expanding public benefit programs and energy efficiency and renewable energy programs.

There is broad national recognition among energy professionals that energy security is an ever-increasing problem. Our state energy offices are responsible for energy emergency preparedness, but we recognize that emergency preparedness and response is not sufficient. One of the critical issues that we are facing is the increasing volatility of energy supplies. This impacts the electric utility sector, consumers of all types and especially the agricultural and industrial/manufacturing sectors of the economy. Our energy efficiency programs must refocus on reducing peak demands for natural gas in order to moderate this volatility. The National Action Plan for Energy Efficiency, developed with state energy office input, through a joint EPA/DOE task force, is a very positive step. We are working in the individual states and on a regional basis to implement many of the recommendations of that effort. It builds on successful "best practices" that we have initiated in each state.

In addition, as you consider both energy policy and funding decisions, we urge you to consider the key role for both energy R&D and deployment programs. R&D, without the use of the technology developed, is a waste.

In addition to our efforts in North Dakota, there are a myriad of examples of successful state energy programs throughout the United States. I will be supplying a state-by-state set of examples for the record.

Some selected examples:

Alabama.—The state energy office has implemented projects in energy efficient buildings (saving \$5 million per year), rural water leak prevention programs (savings of \$1.7 million per year in energy costs), biomass energy projects (36 projects saving over \$10 million annually so far) and a recycling program (saving \$5 million in energy costs, and recycling 9 million gallons of oil and diverting 1,000 tons of materials from landfills).

Florida.—The energy office has focused on energy efficiency in schools. The state is also promoting solar technology, ethanol, biodiesel and solar water heating for low-income homeowners.

Hawaii.—The Governor proposed, and the legislature enacted, four new major energy bills in 2006. This effort will expand energy efficiency in buildings (including promotion of Energy Star products), expanded biofuels, a 20% RPS by 2020, expansion of energy performance contracting, and promulgation of a tropical energy efficiency building code.

Idaho.—The state has been focusing on getting homeowners to purchase and construct energy efficient manufactured and modular homes (with a certification program) and new Energy Star high performance site-built homes. The energy office has also funded alternative energy demonstration projects, promotion of geothermal projects and a variety of agricultural energy programs.

Kentucky.—This state has been in the forefront of promoting Energy Star products. The energy office is focusing on schools and energy service performance contracts, as well as biofuels.

Louisiana.—The state has been focused on Hurricane Katrina response and reconstruction. The energy building code was upgraded last year. The state is educating consumers and building construction professionals in energy efficient design.

Montana.—The state has focused on improving statewide building codes and training of local code officials and builders to actually implement improvements. In addition, the state has issued bonds to improve energy efficiency in buildings, with 67 projects completed and 21 additional projects in the pipeline. The state is also addressing the residential sector with a state tax credit of \$500 for new and existing homes. In 2005 alone, \$5.6 million was provided to homeowners for this energy efficiency credit with homes built to Energy Star standards.

New Jersey.—The Clean Energy Program has expended \$124 million for a variety of energy efficiency and renewable energy projects. In addition to project implementation, the state has developed a new wireless energy management demonstration project, a bioheat rebate program and an alternative fuel vehicle rebate program.

New Mexico.—Expanded programs for energy efficiency utilizing advanced motors, appliances and new energy codes has been a major new effort in New Mexico. In the renewable energy area, there has been an expanded focus on clean fuels, geothermal resources, wind resources and new incentives for photovoltaic systems and solar water heating.

North Carolina.—In the industrial energy efficiency area, the state has promoted energy savings improvements that have led to more than \$170 million in projects. In the residential energy efficiency area, the state is implementing a “Healthy Built Homes” program, focusing on furnaces and energy efficient heat pumps. A utility savings program for state facilities has saved \$30 million since 2002. In addition the state energy office manages an energy service performance contracting program that has \$40 million in projects underway.

Oregon.—In Oregon, as noted above, the Governor has been promoting a range of new energy efficiency and renewable energy initiatives. The 35% business energy tax credit for energy efficiency, renewable energy, recycling and transportation programs, the residential energy tax credit and the statewide energy loan program have produced \$2.1 billion in energy efficiency project investment and have saved 53.1 trillion Btu’s through 2005. Significant initiatives to promote energy efficiency in schools and for manufactured homes are key.

South Carolina.—The schools and government buildings energy efficiency program has provided 29 loans, generating \$30 million in energy savings over the lifetime of the projects. The state has also certified energy efficient manufactured homes. A unique truck stop electrification program has been implemented in conjunction with Georgia and North Carolina. This program has displaced over 220,000 gallons of diesel fuel each year. The energy office has also focused on developing landfill gas projects.

South Dakota.—The state implemented an energy efficiency grant program requiring a 50% match. The recent focus has been on heating and controls upgrades, lighting and energy recovery systems. The energy office also operates an energy loan program, which recently developed a \$3.3 million project on steam tunnel improvements, as well as construction of biomass and wood-chip boilers

Tennessee.—The state’s small business energy efficiency loan program has provided \$10 million for a variety of energy projects. The local government energy efficiency loan program has provided over \$17 million in loans, producing savings of over \$4 million.

Washington.—The state has been focusing on improving building energy efficiency techniques. The state has focused on net metering, tax credits and biofuels development. The state energy office has been working with the Northwest Energy Efficiency Alliance to implement \$20 million per year for market transformation efforts and resource acquisition programs for energy efficiency.

CONCLUSION

Thank you for the opportunity to testify. I would be happy to answer any questions.

Senator DORGAN. Mr. Christianson, thank you very much for your testimony. Next we will hear from RK Stewart, who’s president of the American Institute of Architects here in Washington, DC. Mr. Stewart, you may proceed.

STATEMENT OF RK STEWART, PRESIDENT, AMERICAN INSTITUTE OF ARCHITECTS

Mr. STEWART. Mr. Chairman, members of the subcommittee, good afternoon.

I am RK Stewart, the president of the American Institute of Architects. On behalf of our 80,000 members and the 280,000 Americans who work for architecture firms nationwide, I’d like to thank you for the opportunity to appear today. I’d like to share the thoughts of our Nation’s architects on energy consumption and how it relates to the most overlooked sector in the greenhouse gas de-

bate: buildings, the buildings in which our people live, work and play. I've submitted written testimony to the subcommittee and would like to stress those points the AIA feels is most important.

The AIA feels strongly that now is the time to act to address climate change by tackling energy use in buildings. Our Nation needs to begin making significant reductions in the amount of fossil-fuel-generated energy our buildings consume. According to the Department of Energy, buildings and their construction are responsible for nearly half of all greenhouse gas emissions in the U.S. every year. The building sector—as the Senator noted—alone, accounts for 39 percent of U.S. total energy consumption, more than either the transportation or industrial sectors. Buildings consume 71 percent of U.S. electricity production and buildings in the United States account for 9.8 percent of carbon dioxide emissions worldwide. Put another way, U.S. buildings account for nearly the same amount of carbon emissions as the economies of Japan, France, and the United Kingdom combined. If we want to be serious about energy use reductions, buildings must become a significant part of the discussion. The AIA believes that architects must advocate for this sustainable use of our earth's resources. We have adopted an official position establishing energy reduction targets for all buildings. Architects across the country have embraced this position and are expanding the use of design practices that enhance design quality as they increase the environmental performance of buildings.

To truly revolutionize the way our Nation designs and uses buildings, a combination of regulations and incentives must be used to greatly reduce fossil fuel energy and improve energy efficiency nationwide. The AIA strongly urges Congress to take the lead in the fight against global warming by establishing new energy consumption standards for Federal buildings. As Congress has jurisdiction over all Federal buildings, Congress can literally show the way for the private sector to attain energy consumption reductions by the built environment. The AIA recommends that Federal agencies be required to immediately ensure that new buildings and buildings undergoing major renovations consume no more than half the fossil fuel energy that a similar Federal building consumed in 2003. Beginning in 2010, agencies should be required to meet a declining cap on energy consumption such that they meet minimum energy reductions when compared to the 2003 baseline. We propose that by 2010 new and significantly renovated Federal buildings be required to reduce fossil-fuel-generated energy by 60 percent. By 2015, the cap should be lowered to a 70 percent reduction continuing until 2030 when we should achieve a 100 percent reduction in fossil-fuel-generated energy in all Federal buildings. Setting declining caps on energy usage is not a new idea. In the past, Congress has adopted similar legislation, and recently Governor Bill Richardson of New Mexico established energy reduction targets in his State. These are important first steps.

Energy reduction requirements have shown a record of success, as referenced in my written testimony. It demonstrates that the AIA-recommended energy reduction targets are readily achievable. In my experience, the primary concern at your compliance about building green, is first: cost. It is true that some energy-efficient building systems may cost slightly more than their traditional

counterparts. However, the buildings, once in operation, the saving and expenditures alone often far outweigh the initial cost of installing green systems. There is increasing evidence confirming this, and the AIA is currently working with economists to research the economic benefits of energy efficiency in Federal buildings. The study will analyze estimated energy in dollar savings that the Federal Government will realize by implementing our energy reduction goals. We expect to complete this study by this summer and would be happy to submit it for the record.

Polls show that the American public believes the time is now to reduce energy usage and reduce the risks of climate change. They increasingly believe it is important to the national interest and the planet to reduce our reliance on fossil-fuel-generated energy and move toward a sustainable future. Reducing energy use in Federal buildings would be a major step in redesigning our future. We encourage Congress to consider our proposal, and I welcome your questions. Thank you, Mr. Chairman and members of the subcommittee.

[The prepared statement of Mr. Stewart follows:]

PREPARED STATEMENT OF RK STEWART, PRESIDENT, AMERICAN INSTITUTE OF ARCHITECTS (AIA)

INTRODUCTION

Mr. Chairman, Members of the Subcommittee—good afternoon. I am RK Stewart, the President of the American Institute of Architects.

On behalf of our 80,000 members and the 281,000 Americans who work for architecture firms nationwide, I would like to thank you for the opportunity to appear today to share some of our nation's architects' thoughts on energy consumption, energy efficiency and how these important topics relate to the most overlooked sector in the greenhouse gas debate, buildings: the buildings in which our people live, work, and play.

According to the Department of Energy's Energy Information Administration, buildings and their construction are responsible for nearly half of all greenhouse gas emissions produced in the U.S. every year. DOE's recently released Building Energy Data Book reveals that the building sector accounts for 39 percent of total U.S. energy consumption, more than both the transportation and industry sectors.¹ The same study found that buildings are responsible for 71 percent of U.S. electricity consumption and that buildings in the United States alone account for 9.8 percent of carbon dioxide emissions worldwide.²

In fact, according to the Department of Energy, U.S. buildings account for nearly the same amount of carbon emissions as all sectors of the economies of Japan, France, and the United Kingdom combined.³

Therefore, if we in the United States want to be serious about energy efficiency and energy reductions, buildings must become a significant part of the discussion.*

The data shows that the building sector is only going to become more critical to the discussion. Annual U.S. energy consumption is projected to increase by 32 percent over the next twenty five years.⁴ The AIA believes strongly that now is the time to act to reverse this course and start making significant reductions in the amount of fossil-fuel generated energy our nation consumes through its buildings.

Over the next 30 years, the character of the built environment will change dramatically. Currently, U.S. building stock sits at 300 billion square feet. Experts predict that between now and 2035, 52 billion square feet will be demolished, 150 billion square feet will be remodeled, and another 150 billion square feet will be newly constructed.⁵ Because buildings are such a major producer of greenhouse gases,

¹ <http://buildingsdatabook.eere.energy.gov/docs/1.1.3.pdf>.

² <http://buildingsdatabook.eere.energy.gov/docs/3.1.1.pdf>.

³ <http://buildingsdatabook.eere.energy.gov/docs/3.1.1.pdf>.

* Graphic has been retained in committee files.

⁴ http://www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab_1.pdf.

⁵ <http://www.architecture2030.com>.

the AIA believes that if Congress and our nation want to reduce greenhouse gas emissions, addressing energy consumption in the next generation of buildings is a vital endeavor. We believe that the federal government can and must take the lead to change the way our buildings use energy.

SHOWING THE PROMISE OF GREEN BUILDING

The Genzyme Center, Cambridge, MA

The design team, the developer, the client and the construction team worked together to create a 21st Century center for biotechnology that employs technology and design to reduce energy costs. The building uses steam from an adjacent power plant to run its heating and cooling systems, a “smart” ventilation system that shuts off when it senses that doors and windows are open, and solar panels on the roof, which help to reduce estimated energy costs by almost half. Occupancy sensing dimmers and natural daylighting expect to reduce lighting energy by 45 percent. These and other energy saving strategies earned this building a LEED Platinum rating, the highest LEED rating available.*

To reduce energy consumption in the building sector, the AIA believes that architects must advocate for the sustainable use of our earth’s resources through their work for clients. To support this principle, in December 2005, the AIA Board of Directors approved an official Institute position stating that all new buildings and major renovations to existing buildings be designed to meet an immediate 50 percent reduction in fossil fuel-generated energy (compared to a 2003 baseline) and that at five year intervals, that reduction target be increased by at least 10 percent until new and renovated buildings achieve carbon neutrality in 2030. Architects across the country have embraced this principle and are currently utilizing design practices that integrate built and natural systems that enhance both the design quality and environmental performance of the built environment. But in order to truly revolutionize the way our nation designs buildings, the public sector, especially the federal government, must also play a role. The federal government alone has jurisdiction over a significant portion of all buildings in the U.S.⁶ Through a combination of both regulation and incentives, we can achieve the goals of greatly reducing fossil fuel generated energy and improving energy efficiency nationwide.

It is important for the federal government to show that energy efficient buildings are both realistic and cost-efficient. Requiring significant energy reduction targets in new and renovated federal buildings will demonstrate to the private sector that the federal government is leading by example. It would help spur the development of new materials, construction techniques, and technologies to make buildings more energy efficient. And it will help show that significant energy reductions are both practical and cost-effective.

The AIA strongly urges Congress to take the lead in the fight against global warming by establishing new energy consumption standards for federal buildings. As Congress has jurisdiction over all federal buildings, Congress can literally show the way for the private sector to attain energy consumption reductions by the built environment.

FEDERAL BUILDING ENERGY EFFICIENCY

The AIA proposes that federal agencies be required to ensure that new buildings and buildings undergoing major renovations today consume no more than half the fossil fuel generated energy that a similar federal building consumed in 2003.

SHOWING THE PROMISE OF GREEN BUILDING

Alberici Corporate Headquarters, Overland, MO

One of St. Louis’ oldest construction companies converted this manufacturing plant into a productive and environmentally friendly office space. The designers used a “saw-tooth” wall pattern to re-orient the building’s facade from southwest to south, reducing heating levels, and developed an open plan that provides natural light to 75 percent of building occupants. A 65 kilowatt wind turbine provides 20 percent of the building’s energy needs, while an underfloor air distribution system focuses heating and cooling at the occupant’s level. The combination of design and technology allows the building to exceed ASHRAE 90.1-1999 minimum energy efficiency requirements by 60% and won it an AIA Committee on the Environment 2006 Top Ten award.

* Graphic has been retained in committee files.

⁶ <http://www.eia.doe.gov/emeulcbecs/cbecs2003/introduction.html>.

Beginning in 2010, the agencies should then follow a declining cap on energy consumption such that they meet a minimum energy performance reduction when compared to the 2003 baseline. We propose that by 2010, new and significantly renovated federal buildings be required to reduce fossil fuel generated energy by 60 percent. By 2015, the cap would lower to a 70 percent reduction, continuing until 2030 when we would achieve a 100 percent reduction in fossil fuel generated energy in all new federal buildings.

Setting declining caps on energy usage is not a new idea. In 1999, President Clinton issued an executive order requiring energy consumption reductions in all federal buildings; The Energy Policy Act of 2005 extended and deepened these reduction goals, and last year, Governor Bill Richardson of New Mexico signed an executive order calling for a 50 percent reduction in energy consumption for new and renovated public buildings in the state. And just last month, President Bush issued an executive order requiring federal agencies to reduce energy use by almost a third over a 2003 baseline by 2015. These are important first steps, but we need an aggressive commitment to long term energy reductions for new buildings and major renovations, well into the future.

Energy reduction requirements like these have shown a record of success, as demonstrated by DOE's recently submitted annual report to Congress on Energy Management and Conservation programs. DOE's report found that in 2005, federal agencies responding to President Clinton's 1999 Executive Order had reduced their consumption levels by 29.6 percent, narrowly missing the goal established by President Clinton's Executive Order by only 0.4 percent [see graph below].* This makes it clear that when they are required to do so, federal agencies have the ability to meet reduced energy consumption targets.

We encourage Congress to build upon these sound policy steps by taking an even more aggressive stance. A number of Senators have recently introduced legislation that sets new energy reduction goals in existing federal buildings. In most cases, these proposals would require federal agencies to retrofit their facilities to meet the energy savings targets. While the AIA is happy to see Congress address the issue, we recommend that instead of mandating retrofits, Congress should also focus energy reduction goals on new construction and buildings undergoing significant renovations as it is easier and more cost-effective to address energy usage issues beginning with the design stage of the building process.

Requiring all new and significantly renovated federal buildings to consume significantly less fossil-fuel generated energy is a bold idea, but one whose time has come. It would show the world and the private sector that the United States government believes that climate change is real and that aggressive action is needed in order to reverse its course. It demonstrates that the AIA-recommended energy reduction targets are achievable in new and significantly renovated buildings, often through little or no additional life cycle costs.

SHOWING THE PROMISE OF GREEN BUILDING

Rinker Hall, University of Florida, Gainesville, FL

A LEED Gold building, Rinker Hall's designers faced a challenge: in Florida's humid environment, metal and glass best release heat. But the University's prevailing architectural style is brick and masonry, which traps heat. So the architects designed a metal and glass structure with a free-standing masonry shade wall on the west and south facades, thus making it fit in and reduce heating loads. The building is anticipated to use 57 percent less energy than a building meeting ASHRAE 90.1-1999, and is expected to reduce annual utility bills by more than \$20,000.

Architects across the country are designing high performance or "Green Buildings" that are environmentally responsible, healthy places to work, and economically practical. We are doing this through the use of better planning, technological tools and smarter material selection that incorporate natural heating, cooling, ventilation, and day-lighting strategies. The AIA's Committee on the Environment (COTE) annually recognizes such accomplishments in its Top 10 Awards for Sustainable Design. Federal buildings can and should be built in ways that reduce energy consumption and decrease the amount of greenhouse gases they produce, as demonstrated through COTE's Top 10 Awards.

*Graphic has been retained in committee files.

THE COST OF BUILDING GREEN

In my professional experience, the primary concern I hear from clients about building “green” is cost. It is true that some energy efficient building systems may cost slightly more than their traditional counterparts. However once the building is in operation, the savings in energy expenditures alone often far outweigh the initial costs of installing “green” systems. While there have been some studies to date that show this, the AIA is currently working with a team of economists to research the economic benefits of energy efficient federal buildings. This study will analyze the estimated energy and dollar savings that federal government would realize by implementing our energy reduction goals for federal buildings over the lifespan of the building. We expect to have the study complete by this summer and we would be happy to submit it for the record. Other sources, most importantly the noted cost consultant Davis Langdon, argue that the cost of sustainability is statistically insignificant to a project’s total cost.⁷

The economic value of energy reductions from federal buildings can be seen by looking at previous energy reduction mandates in federal buildings. Because of federal legislation and President Clinton’s 1999 Executive Order, federal agencies consumed nearly 30 percent less energy per square foot in 2005 compared to 1985. As a result of this improved energy efficiency, the federal government saved approximately \$2.2 billion on energy costs in standard federal buildings in 2005 when compared to 1985. While there are clearly other factors aside from federal energy management activities that go into this reduced spending, improved energy efficiency and energy reduction clearly played a large role.

AMERICA IS READY

Finally, the American public believes the time is now to reduce energy usage and reduce the impacts of climate change. The Tarrance Group and Lake Research Partners recently conducted a nationwide poll of voters and found that 74 percent of those polled agreed that “the government should take the lead in promoting real estate development that conserves our natural resources.” In addition, 71 percent of voters agreed that “the government should immediately put into effect new energy policies that drastically reduce greenhouse gas emissions.” The American public supports conserving our precious resources, and believes that it is in the best interests of our nation and the world to reduce our reliance on fossil fuel produced energy and move towards a sustainable future. Reducing energy use in federal buildings would be a major step towards that goal.

We encourage Congress to consider our proposal, and I welcome any questions from the subcommittee. Thank you Mr. Chairman and members of the subcommittee.

Senator DORGAN. Mr. Stewart, thank you very much for your testimony. Next, we’ll hear from Mr. Charles Zimmerman, vice president, Prototype and New Format Development for the Wal-Mart Stores at Bentonville, Arkansas. Mr. Zimmerman, thank you for being with us.

STATEMENT OF CHARLES R. ZIMMERMAN, P.E., VICE PRESIDENT, PROTOTYPE AND NEW FORMAT DEVELOPMENT, WAL-MART STORES, INC.

Mr. ZIMMERMAN. Chairman Dorgan, Chairman Bingaman and Ranking Member Murkowski, my name is Charles Zimmerman and I’m vice president of Prototype and New Format Development for Wal-Mart Stores, Inc.

In my current role, I’m responsible for the architectural and engineering systems design for all of our retail facilities. On behalf of Wal-Mart and our 1.8 million associates around the world, I’d like to thank the subcommittee for its work on this important issue and for holding this hearing today. Wal-Mart appreciates the opportunity to participate in this critical discussion.

⁷Matthissen, Lisa and Morris, Peter. “Costing Green: A Comprehensive Cost Database and Budgeting Methodology”. June, 2004; Davis Landon.

Our company holds a unique position in the world of energy. While there are no firm statistics, it is widely understood that Wal-Mart is the largest private purchaser of electricity in the world. In fact the only entity thought to purchase more electricity than Wal-Mart is the U.S. Government. Since energy is also Wal-Mart's second largest operating expense, it should be no surprise that we have been focused on energy efficiency practically since the day we were founded. Fortunately, our global presence gives us a great opportunity for energy comparisons. As Wal-Mart has continued to expand into other countries, our primary mode of expansion has been to acquire existing stores in those countries. Therefore it is interesting to note that the stores that we have built in the United States are actually more efficient on an energy-per-square-foot basis than those we've acquired in any other country. This is even true for stores in countries with much more stringent energy regulations and much higher utility rates than the United States, such as the U.K. and Japan.

Nearly one-third of Wal-Mart's energy is consumed in the form of lighting; therefore, we have developed over the last decade what we feel is one of the most efficient lighting systems in the world. In fact, the installed lighting mode in one of our newer stores is more than 40 percent less than the baseline requirements established in the Energy Policy Act of 2005. This truly innovative system results in the fact that during the day our sales floor lighting in stores built in the last decade is either off or at the very least significantly dimmed. This is possible thanks to a sophisticated daylight harvesting system comprised of hundreds of skylights per store that are connected to sensors and state-of-the-art control technology. This allows our sales floor lighting system to continually modulate the amount of energy needed based on the natural light available. This system is so dynamic that it even gradually ramps the lighting levels up and down as clouds pass over the store. In our non-sales floor areas, such as offices, breakrooms and restrooms, lighting is controlled by occupancy sensors that turn off the lights when no one is in the space.

Even our freezer-case lighting has now evolved into an amazing display of advanced technology, as it is now comprised of motion activated LEDs or Light Emitting Diodes. These lights turn themselves on as the customer approaches and turn themselves off as the customer leaves. The result is a building where virtually all the lighting is dynamic and only on to the degree the conditions warrant—and this is just our lighting system.

As efficient and forward thinking as our energy practices already are, we have very aggressive goals in our sustainability and energy efficiency efforts for the future. In October 2005, we announced plans to reduce the energy consumption of our already energy-efficient existing buildings by another 20 percent over the next 7 years. We also announced plans to develop a new store prototype that will increase energy efficiency 25 to 30 percent over the next 4 years. So how are we doing in achieving these goals? With regards to our existing stores, we are in the midst of efforts this year to retrofit over 400 of our refrigeration systems and 400 of our HVAC systems with technologies that will reduce our energy consumption by 8 percent and 6 percent, respectively. Both of these

initiatives have paybacks of somewhere between 18 and 24 months. Additionally, just last Thursday we approved a proposal to retrofit 500 of our existing stores with our new motion-activated LED lighting technology. Currently we have over a dozen similar retrofit initiatives that are in some phase of development or implementation, all averaging approximately 2- to 3-year paybacks.

With regards to our new store program, we opened the first of our newly developed higher efficiency prototypes 3 weeks ago in Kansas City, Missouri. These stores are predicted to be 20 percent more efficient than our earlier prototypes. By this time next year, we plan to be opening stores that are 27 percent more efficient, thus reaching our new store prototype goal mentioned earlier.

As proud as we are of these accomplishments and innovations, we are more proud to be sharing what we are learning with everyone, including our competitors. We have recently shared the details on our energy initiatives and their related paybacks with the Pentagon, the Defense Science Board, the Office of Management and Budget, and even with our retail competitors, Office Depot and Best Buy. We've also taken the likes of Food Lion, Target, Publix, Costco and many, many other of our competitors on tours of our recent stores that featured some of our newer energy-efficient technologies.

The best thing about the information we're sharing is that it is not theory. It is proven—real initiatives with proven real paybacks. I'm often told by others that until there are new technologies, or until there is additional legislation, energy efficiency will never achieve mainstream attractiveness. Believe me, the technology exists. We're proof of that, and while Wal-Mart is not waiting for legislation to cause us to act proactively in the area of energy efficiency, we would encourage Congress to continue to look at new incentives that would help others to act proactively as well.

In conclusion, I'm very proud to work for a company that is committed to invest to up to \$500 million per year to move toward our goal of eventually being supplied by 100 percent renewable energy, but I'm even more proud that they encourage me to proactively share our innovations with the world. We at Wal-Mart applaud Congress on its efforts to communicate the necessity and the benefits of energy efficiency.

Thank you for your time, and allowing me to speak on behalf of Wal-Mart on this very important topic. We look forward to working with you to effectively and constructively address these issues. Thank you.

[The prepared statement of Mr. Zimmerman follows:]

PREPARED STATEMENT OF CHARLES R. ZIMMERMAN, P.E., VICE PRESIDENT,
PROTOTYPE AND NEW FORMAT DEVELOPMENT, WAL-MART STORES, INC.

Chairman Dorgan, Ranking Member Murkowski and distinguished Members of the Committee, Wal-Mart Stores, Inc., thanks the Subcommittee for its work on this important issue and for holding this hearing today. Wal-Mart appreciates the opportunity to participate in this critical discussion.

BACKGROUND

Wal-Mart is based in Bentonville, Arkansas. Our company employs approximately 1.3 million Associates from all 50 states and approximately 1.8 million Associates worldwide. Each week over 176 million customers worldwide choose to shop at Wal-Mart, which we feel reflects the success of our dedication to providing Every Day

Low Prices to our customers. Wal-Mart does not just operate stores, clubs, and distribution centers in communities; we take a proactive stance in community involvement on a number of issues.

PURPOSE OF HEARING AND WAL-MART'S ROLE

The purpose of this hearing is to receive recommendations on policies and programs to improve the energy efficiency of buildings and to expand the role of electric gas utilities in energy efficiency programs. Wal-Mart is eager to share its information and experiences.

WAL-MART'S POLICIES AND PROCEDURES

Wal-Mart is pleased to be a part of this process. As part of Wal-Mart's industry-leading sustainability commitment, CEO Lee Scott has set aggressive goals for Wal-Mart to significantly reduce our energy consumption and greenhouse gas emissions. In pursuit of those goals we intend to be the most energy efficient retailer in the world and we are working hard to achieve this commitment.

While there are no firm statistics, it is widely understood that Wal-Mart is the largest "private" purchaser of electricity in the world. In fact, Wal-Mart is widely considered to be the second largest purchaser in total energy, second only to the U.S. government. Energy is also Wal-Mart's second largest operating expense. Therefore, it should be no surprise that Wal-Mart has been focused on energy efficiency practically since it was founded.

As Wal-Mart has continued to expand into other countries, our primary mode of expansion has been to acquire existing stores in those countries. The stores we have built in the U.S. are more efficient on an "energy per square foot basis" than those we have acquired in any other country. This is even true for stores in countries with much more stringent energy regulation than current U.S. regulations and much higher utility rate, such as the U.K. and Japan.

Nearly one-third of Wal-Mart's energy is consumed in the form of lighting. Recognizing this as an opportunity for responsible business practice, we have developed over the last decade, what we feel, is one of the most efficient lighting systems in the world. Our installed lighting load is more than 40% less than the baseline requirements established in the Energy Policy Act of 2005.

During the day, sales floor lighting, in stores built in the last decade, is off or significantly dimmed. This is possible thanks to a sophisticated daylight harvesting system comprised of hundreds of skylights per store that are connected to state of the art sensors and control technology. This allows our sales floor lighting system to continually modulate the amount of energy needed, based on the natural light available. This system is so dynamic that it gradually ramps up and down as clouds pass over the store. In our non-sales floor areas such as offices, break rooms and restrooms, lighting is controlled by occupancy sensors that turn off the lights when no one is in the space. Beginning in January, even our freezer case lighting has evolved into an amazing display of advanced technology when it became comprised of "motion-activated LEDs". The lights turn themselves on as a customer approaches, and turn themselves off as the customer leaves. The result is a 200,000 square-foot building where virtually all of the lighting is dynamic and only "on" to the degree that conditions warrant.

From an HVAC and refrigeration standpoint, Wal-Mart has always "reclaimed" or "recycled" the waste heat from our refrigeration equipment to generate our domestic hot water. We are beginning to take this a step further in new stores, testing the concept of heating the entire store with the "waste heat" generated by this equipment. Wal-Mart views the "waste heat" as a source of energy and we are expanding the use of this "free" energy source.

Wal-Mart recognizes the influence and implications of responsible energy policy by a large retailer. We strive to continue to decrease our footprint on the environment. As efficient and forward-thinking as our energy policies already are, we have very aggressive goals in our sustainability and energy efficiency efforts for the future.

In October of 2005, we announced plans to reduce energy consumption in our existing energy-efficient buildings by 20% over the next 7 years. We also plan to develop a new store prototype that will increase efficiency 25%—30% over the next 4 years.

We also plan to retrofit over 400 of our refrigeration systems and HVAC systems this year with technologies that will reduce our energy consumption by 8% and 6% respectively and have a payback of less than two years. Additionally, a proposal is currently being reviewed to retrofit hundreds of stores with new LED lighting technology to reduce energy consumption by 3% and have a payback of 2 years. Wal-

Mart plans to continue using energy retrofit efforts to reduce energy consumption; currently over a dozen similar initiatives are in some phase of development or implementation.

In regards to new store prototypes, we opened the first of our newly developed "higher efficiency" prototypes three weeks ago in Kansas City, MO. These stores are predicted to be 20% more efficient than our earlier prototypes. By this time next year we plan to have met our goal and be opening stores that are 27% more efficient. Plans are already in development for stores that approach and possibly exceed 50% efficiency in certain climate zones.

As proud as we are of these accomplishments and innovations, we are more proud to share what we are learning with everyone, even our competitors.

Wal-Mart recently opened a new facility in Savannah, GA, which included the first low-temperature CO₂ secondary loop refrigeration system ever installed in the United States. At the grand opening, we conducted tours of the facility providing detailed descriptions of the systems to Target, Food Lion, Publix, Costco, and many others since.

We have recently shared these details on our initiatives and their related paybacks at the Pentagon, Defense Science Board, Office of Management and Budget and even with our retail competitors, Office Depot and Best Buy. We will also be sharing this information on February 14, 2007, at a Department of Energy sponsored event at the National Building Museum here in Washington, DC, and again on February 15, 2007, at the National Academy of Sciences. Furthermore, the following week we will also be sharing our story of energy efficiency in Mexico City at a meeting of the Commission on Environmental Cooperation. The information we are sharing is not theory; it is real initiatives and real paybacks.

I am often told by others that there needs to be new technologies or there is a need for new legislation before energy efficiency becomes something with mainstream attractiveness. While Wal-Mart is not waiting for legislation to act proactively in the area of energy efficiency, we would encourage Congress to continue to look at new incentives that will help others to act proactively like Wal-Mart.

I'm very proud to work for a company that has committed to invest up to \$500 million dollars per year in innovative, energy saving and climate-friendly technologies, but I am even more proud they encourage me to pro-actively share our innovations with the world.

CONCLUSION

Wal-Mart seeks excellence and responsibility in everything we do. We constantly strive to improve our business processes and to enrich the communities in which we are located. We at Wal-Mart applaud Congress in its efforts to communicate the necessity and the benefits of energy efficiency.

Thank you for your time in allowing me to speak on behalf of Wal-Mart on this very important topic. We look forward to working with you to effectively and constructively address these issues.

Senator DORGAN. Mr. Zimmerman, thank you very much for your testimony. Next we will hear from Jack Hébert from the State of Alaska. He's president and CEO of Cold Climate Housing Research Center in Fairbanks, Alaska. Mr. Hébert, thank you for being with us.

STATEMENT OF JACK HÉBERT, PRESIDENT AND CEO, COLD CLIMATE HOUSING RESEARCH CENTER, FAIRBANKS, AK

Mr. HÉBERT. Thank you, Mr. Chairman. Senator Bingaman and Senator Murkowski, I am humbled and thank you for inviting me. I am Jack Hébert, president and CEO of the Cold Climate Housing Research Center. I'm also a 30-year builder from Alaska, designer and builder, and represent the National Association of Homebuilders as their State rep from Alaska, so a rather broad background. As we all know, Alaska has some big issues. I left written testimony that formally outlines some of the programs that we're doing. I'd like to make sure that you look it over and that's it's entered on the record.

Senator DORGAN. Without objection.

Mr. HÉBERT. All the things that are affecting this Nation are exacerbated in our climate up there. It needs to be understood that if your air conditioning isn't working, you'll survive—other than Arizona—but in Alaska if the heating isn't working, you don't survive. Our isolated communities are at a crisis point on all their infrastructure on their built environment, but also what supports it. In some of those communities electricity is running over \$1 a kilowatt hour. Fuel oil is over \$6 a gallon, and there's no economy, so that's a challenge. It's a beautiful State but things are changing. We also have the issue up there—as I'm sure you're all aware—of climatic changes. For one reason or another, it is happening and it's happening very strongly in Alaska. Whole communities that have been settled for 10,000 years are now threatened in their very existence. So whatever we do must be done right, and that first step is knowing what is right.

Toward that end, the Alaska State Homebuilding Association—working builders in the State—established the Cold Climate Housing Research Center because locally, in our community of Alaska and our family of Alaska, we were borrowing from everywhere else, with no strong research supporting what was working and what wasn't working. Out of that frustration, those of us who swung a hammer created a 501(c)(3) so that we could do the research that addressed what we saw as real problems. We brought in partnerships. We knew we couldn't do this research alone, so we brought in Federal, State and industry partners to address this problem, and there's been a lot of success. We were able to build a \$6 million research and testing facility in Fairbanks. This is an amazing facility and I thank you for mentioning it, Senator. We're doing everything in that building from creating energy from renewable sources, through wood-fired co-generation, and work that we're doing with that to produce both heat and electricity on a residential scale. We're partnering with BP Solar to do a solar demonstration project for rural villages that can show that solar, combined with other systems, can address in a renewable form energy for small communities.

There's many things that I think the Nation can learn from our isolation and the extremes that we have in Alaska, and maybe the biggest one is working together. Alaska Housing Finance Corporation is one of our major partners. It's a State-owned loaning institution that basically is taking the money from their loans and putting it back in improving shelter—a very nice program. Our local utilities are our partners. They have green energy programs. We're working with geothermal with them. We're looking at using bio-waste for generation. Again the partnerships are a critical thing. Part of that partnership is the Federal Government, a big part of that partnership. We have to have money for programs that promote and move us ahead to deal with this crisis, and there have been some very good ones: Building America, the DOE program that involved production builders, and builders like myself, to introduce energy-efficient technologies at or below the same cost as conventional technologies in the built environment, are very important, as well as the PATH program, Department of Energy's PATH program—Partnership for the Advancement and Technology in

Housing. These are very much applied research programs. They need to be funded if we're going to find these answers. We may want to build the most energy-efficient building in the world, but if we don't know how or if we're doing it wrong, do we really have the time or the resources to do it over? I also think that this is a real opportunity, a real moment for the Nation, to come together. If we can agree and not bicker about the problems that we have with energy, with housing, with sheltering our people and turning on the lights at night, and realize that we can't continue to go in the direction we're going. As a Nation, as individuals, if we can agree on them, we can accomplish so much. We're proud to be Americans because we addressed challenges and we found solutions—but only when we work together, only when we collectively decide this is what we're going to do. Again, thank you for having me and this will be a lifetime experience. Thanks.

[The prepared statement of Mr. Hébert follows:]

PREPARED STATEMENT OF JACK HÉBERT, PRESIDENT AND CEO, COLD CLIMATE HOUSING RESEARCH CENTER, FAIRBANKS, AK

INTRODUCTION

Although there is not a firm consensus on the exact figures, there is agreement between builders and researchers that buildings account for a significant amount of the United States energy consumption. The energy usage is divided almost equally between residential buildings and commercial buildings (Source: Annual Energy Review 2003. DOE/EIA-0384 (2003). Energy Information Administration, U.S. Department of Energy. September 2003.)

With proper planning, most developments and buildings today can be designed to use much less energy at little additional cost. Attention to siting, building form, glass properties and location, material selection and the incorporation of natural heating, cooling, ventilation, and day-lighting are among the strategies available to achieve this end. Through the application of the most current research, the energy needed by a building, a development or a community, can be supplied or supplemented by renewable sources such as solar, photovoltaic, wind, biomass, and other viable sources. All of these strategies incorporate energy efficiency and conservation to produce the most effectively-sustainable buildings and homes for the nation and beyond.

In Alaska, energy efficiency is important for our very economic viability and survival, especially in our homes and buildings. To that end, the Cold Climate Housing Research Center (CCHRC) is currently engaged in research, demonstration projects, and in product testing and development to provide healthy, durable housing that is affordable and energy efficient—in a word, sustainable. Our research has made clear those areas where the federal government can help support the research in the development of building technologies that use much less energy in the near term, with the goal of our nation's building stock being more efficient in construction and operation. It should also be noted that Alaska's needs are indicative of the needs for energy systems in many under-developed regions of the world. Systems deployed successfully in Alaska will have applications in many parts of the world, opening new markets for innovative American businesses. Additionally, experience with new technologies in remote Alaska settings will be applicable for growing the use of distributed-generation technologies in the lower 48 states power grid.

If U.S. building energy usage is halved or even approaches zero in the foreseeable future, this will have a major impact on national energy security and the sustainability of our communities—not to mention the fuel bills of home and business owners! In this effort, CCHRC is leading by example. Our new Building and Infrastructure Research and Testing Facility (RTF) is designed to use 60% less energy than a conventional building of comparable size and function in Fairbanks, Alaska. CCHRC is also working to reduce fossil fuel use even further by using bio-fuels and solar energy systems.

Included here are six aspects of work that CCHRC is doing to reduce energy usage in Alaska: and recommendations for how the federal government can further that work.

PRIVATE SECTOR COLLABORATION—CCHRC EXAMPLES

In 1999, the Alaska State Home Building Association, representing over 1000 building industry members, and itself a member of the National Association of Home Builders, recognized the need to conduct research, test, and develop materials and technologies appropriate to northern climates. To this end, the members committed to the creation of the Cold Climate Housing Research Center, a 501(c)(3) nonprofit entity, whose mission is: promoting and advancing the development of healthy, durable and sustainable shelter for Alaskans and circumpolar people through applied research. Four years after its start, the CCHRC Board of Directors authorized construction of a facility to house the testing and product development labs needed to accomplish its mission. The charge is clear: research, test, and develop, if necessary, the materials and technologies to provide healthy, durable, and economically sound housing for the people of Alaska and other northern locales.

CCHRC's nonprofit status allows it to establish collaborations with both private and public sector partners. CCHRC is located on the campus of America's only Arctic university, the University of Alaska Fairbanks (UAF) where the newly-constructed Research and Testing Facility (RTF) is housed. CCHRC works with UAF faculty and staff to develop joint research proposals. Major funding comes from state and federal agencies that collaborate with many private sector donors who contribute materials, products, labor, and funds to support the goals of the RTF. CCHRC is also developing relationships with industry partners to help further guide and support the product testing and development programs at the RTF.

Some examples of the collaboration with private sector partners in product testing include:

- *HVAC digital control systems*—Siemens Building Technologies;
- *Insulation*—DuPont, Johns Manville, Thermo-Kool, Western Insulfoam, Vertex;
- *Ventilation*—Venmar, Lifebreath, Fantech, Solutions to Healthy Breathing;
- *Heating*—Weil-McLain, Viessmann, Monitor, Stone Castle Masonry;
- *Windows*—Capitol Glass/Northern Window;
- *Building materials*—Spenard Builders Supply, Mannington Commercial, Rivers Wood Products; and,
- *Data collection and display*—GW Scientific, Campbell Scientific;

CCHRC also has cooperative agreements with such other nonprofit agencies as:

- *Golden Valley Electric Cooperative*—demonstration of alternative energy systems and conservation strategies and technologies;
- *Interior Alaska Building Association*—outreach and continuing education;
- *Alaska Building Science Network*—outreach, education, and training;
- *Cooperative Extension Service, UAF*—outreach, education, and sustainability; and,
- *Audubon International*—outreach and community sustainability.

CCHRC Recommends

Cooperative programs involving private sector partners need increased funding by the federal government. Programs such as the Partnership for Advancing Technology in Housing (PATH), Partnerships for Home Energy Efficiency (PHEE), The Small Business Innovation Research (SBIR) and the National Science Foundation's Partnerships for Innovation (PFI), Building America, Healthy Homes, Weatherization, and others, benefit from private sector partnerships because they have the ability to leverage government funding into grounded projects that address real private sector needs.

NATIONAL SECURITY, GLOBAL WARMING, SUSTAINABILITY, AND ENERGY

To meet growing energy needs, the U.S. imports an ever-increasing percentage of its energy supply, in the form of gas and oil, each year. This creates an unsustainable and unstable situation for national security, environmental concerns, and economic needs. It places U.S. energy security in the hands of other nations, fuels concerns over climate change, and may contribute to the increase in dramatic weather events with significant costs in terms of human life and public and private funds. The U.S. does not have enough reserves of its own to reverse the nation's supply shortages by simply increasing domestic production. Development of economically and environmentally sustainable energy efficiency programs and alternative sources of energy is critical and will require a significant investment. One way to reduce energy consumption in the built environment is through efficiency and conservation, which takes committing large amounts of both public and private resources.

CCHRC has undertaken several initiatives to address this situation:

- CCHRC Research and Testing Facility is designed to lead by example using 60% less energy than a comparable building and showcasing several strategies for energy efficiency, conservation, and alternatives.
- Audubon International has designated CCHRC as the Alaska Center for Sustainable Community Development.
- With the North-North Network and UAF, CCHRC is working on a Sustainability Initiative to increase the sustainability of the UAF campus and to begin an interdisciplinary curriculum in northern sustainable design at UAF.
- With partners at the Alaska Housing Finance Corporation (AHFC) and the Canadian Mortgage & Housing Corporation (CMHC), CCHRC is planning a Forum on Sustainable Northern Shelter to be held in Fairbanks this October.
- With the Cooperative Extension Service at UAF, CCHRC is committed to finding solutions to community sustainability in rural Alaska, especially housing and related systems.

With the Alaska Housing Finance Corporation and the Alaska State Home Builders Association, CCHRC has begun the process of recasting the Alaska Building Energy Efficiency Standard in terms of the International Energy Conservation Code with the intent that it might be addressed by a statewide building code review.

CCHRC Recommends

The federal government, through programs at U.S. Department of Energy, the U.S. Environmental Protection Agency, the National Science Foundation, and the U.S. Department of Housing and Urban Development must initiate programs aimed at energy independence. Part of this effort must: (a) target energy use reduction through increased efficiency and conservation in homes and other buildings, and (b) develop environmentally-sound energy sources for buildings and communities. Partnerships that involve the private sector, along with universities and state agencies, are particularly well-suited to contribute real solutions. National support for transformative processes already underway by groups such as the National Association of Home Builders (NAHB) and the many state and local groups focused on green building will be essential.

DEMONSTRATION PROJECTS—THE RTF EXAMPLE

The CCHRC Building and Infrastructure Research and Testing Facility (RTF) on the University of Alaska Fairbanks campus is designed with transparency in mind. CCHRC encourages public tours of the building and visits to its website to demonstrate how it operates. CCHRC wants to show:

- how much energy from each source is being utilized,
- how efficiently and cleanly the energy is consumed,
- the different ways to heat and cool the building,
- the better ways to filter indoor air,
- how wall and window systems are performing,
- that the lighting strategy is providing maximum daylight and using minimum electricity,
- that the water system is collecting rainwater, recycling grey water and storing storm water on our green roof; and
- how the building is interacting with the permafrost and ground water beneath it.

Over 400 sensors are embedded in and beneath the building to monitor its operation and performance. In addition to housing research, testing and product development, the building itself is a multitude of research and testing projects.

Demonstration projects such as this are important to lay the foundation for change. The public needs to see that efficient strategies exist and that they work. Essentially, people need to be able to “kick the tires” before they will “buy” new ways to design communities, get to work and play, and build and live in homes and office buildings that consume much less energy.

CCHRC has an agreement with Golden Valley Electric Cooperative to demonstrate alternative energy systems, such as solar, wind, bio-fuel, and hybrid systems, at the RTF. The Fairbanks North Star Borough is also funding a project in the facility to demonstrate the use of several clean-burning, wood-fired heating appliances with the goal of making the building produce more energy than it uses.

The success of the RTF as a demonstration project is remarkable. CCHRC has had so many requests for public tours that it has had to set up a regular public tour schedule on Thursday afternoons. CCHRC has had a steady interest from UAF faculty and students in proposing joint research projects. CCHRC has also had many requests to test products, even though it is not yet set up to do so. Finally,

CCHRC fields frequent calls from future homeowners seeking advice about a piece of equipment or a certain approach to building. Obviously, there is substantial public interest in building better shelter.

CCHRC Recommends

Demonstration projects are important elements to facilitate change for efficiency in the building community. Even if the technology is well proven to scientists and engineers, it is still crucial to educate builders and owners about better ways to design and construct buildings. The federal government must vigorously fund and support state and local efforts to demonstrate products and technologies that can make this change happen.

ALTERNATIVE ENERGY PROJECTS AT CCHRC

One of CCHRC's important goals is to test, develop, and demonstrate alternative energy solutions. Some of the technologies are built into the RTF and some await future funding to be implemented. However, some alternative energy projects are already underway or are on the thawing board and they include:

Masonry Heater Project.—The first thing one sees when entering the RTF is a beautiful, natural rock fireplace called a masonry heater. It has an enclosed firebox, like a woodstove with a glass door, and a massive rock edifice like an old-fashioned fireplace. The flue does not, however, go straight up the chimney as it would in a stove or fireplace; rather, it is convoluted throughout the masonry so that the heat of the fire can be transferred to the rock and brick. In this way, one hot fire per day can provide enough constant radiant heat to warm an average house throughout the cold Fairbanks winter. This technology was first developed in China and Greece long ago and was widely used in 15th century northern Europe. Because the fire is so hot (reaching 2000 degrees F) it burns very cleanly compared to a conventional wood stove or fireplace. The RTF heater is instrumented so that CCHRC can document its efficiency and emissions levels. The heater's massive size and associated cost are drawbacks to widespread use of masonry heaters in homes, yet CCHRC plans to work toward developing lower cost versions as options for people who want to burn wood in the most efficient and environmentally sound manner.

Wood Energy Project.—The wild land fires in the interior of Alaska pose both a challenge and an opportunity. A primary way to reduce the risk to settlements in and adjacent to these vast forested regions is to reduce the fire fuel-load by clearing fire breaks around individual structures as well as along entire ridge lines. This presents an opportunity to develop local economic enterprises utilizing the bio-fuel that otherwise would be wasted. If a sufficiently robust industry can be developed using this "waste wood," it could help fund the continued creation of firebreaks around the vulnerable areas of the Fairbanks North Star Borough.

The Fairbanks North Star Borough has funded a project to research, develop and test a variety of wood-burning technologies and products that could be the basis for local enterprises. These technologies range over a wide scale of complexity and size from ordinary wood stoves and pellet stoves to masonry heaters and village-scale combined heat and power units. Perhaps the most compelling need is to develop the technology for building combined heat and power (CHP) generators in villages in rural Alaska where the price of fuel oil and electricity is threatening their very existence. This project will evaluate the technological options for providing the fuel source, processing it, and feeding it into a CHP boiler. CCHRC will provide some of these critical evaluations, testing and demonstration links in establishing new and sustainable local enterprises. In addition the project will develop and test the cleanest wood burning technologies available so as to minimize the impact on the urban air shed in Fairbanks.

Solar-Thermal Demonstration Project.—Utilizing the sun to heat domestic hot water is practical in Fairbanks, Alaska for about 8 months out of the year. Solar-heated domestic water systems have reasonable payback periods even though they are only usable for part of the year. They also may allow oil-fired boilers to be shut down for several months, thereby eliminating the worst period of standby losses. These systems are particularly well suited for visitor industry facilities that only operate seasonally.

CCHRC plans to purchase an evacuated-tube solar hot water collector and the associated parts to integrate this system into its Viessmann Boiler domestic hot water system. CCHRC is also working with the Golden Valley Electric Association and the Cooperative Extension Service to offer a technical training class in the installation of solar hot water collection systems which will feature hands-on training actually installing this system in the RTF. The system will be instrumented so that performance and cost-effectiveness can be demonstrated in an on-going manner to a broader audience via the internet.

Solar Photovoltaic Hybrid Demonstration Project.—The Cold Climate Housing Research Center has proposed to partner with British Petroleum (BP) and Alaska Native corporations on a project to develop a sustainable solar power system that works in circumpolar regions. The project will be based at CCHRC's Research and Testing Facility. The "Beyond Petroleum"—Integrating Solar Energy in Rural Alaskan Communities Research Project will benefit many communities in the circumpolar regions. Many rural circumpolar communities face ever-increasing energy costs due to being off the grid and the rising costs of fuel transport. The RTF is a perfect site for testing northern solar power systems and developing Alaskan expertise in solar system design, installation and maintenance to benefit Alaskan villages. The Fairbanks climate offers the full range of weather conditions for cold climate testing and performance evaluation of products, systems and techniques.

The purpose of this project is to design, install, and operate a micro-hybrid power system. It will consist of 15 KW of PV solar panels, battery banks, AC and DC coupled inverters with capability to tie into the GVEA grid, and a back-up generator. A web-based data acquisition component will be incorporated allowing researchers to share results. The system will feature: (a) testing of several different solar/micro-grid configurations, (b) the potential to incorporate other energy technologies (biodiesel, fuel cells, bio-mass etc.), (c) robust data collection, and (d) education, research and outreach components, including an interactive "Solar on the Web" feature.

CCHRC Recommends

These critical research, development, and demonstration projects usually involve, in one way or another, the donation of equipment, materials, and labor from private sector partners. This important private sector contribution should be encouraged by offering tax incentives. Congress should consider tax incentives that would encourage more investment by private sector partners that work on projects to shift away from fossil fuels to alternative, environmentally sound energy sources. By utilizing private sector partners in this way, the burden of developing and expanding critical research in efficiency programs is not shouldered solely by industry or government alone.

A strong federal and state partnership to develop and demonstrate new energy-saving, energy-generation and transmission technologies is clearly warranted. Such an investment would not only serve Alaska's residents, but also help to develop a market for American technologies by inviting the developing world to see how America is solving its energy needs for its rural and remote regions. Alaska could easily become America's showcase for distributed power generating technologies.

DOE BUILDING AMERICA IN ALASKA

CCHRC was funded by two grants under the Department of Energy's Building America program. Some of CCHRC's work began with funding from the second grant and has been carried forward with funds from Alaska Housing Finance Corporation. These grants have led to important advances in basic envelope design in Alaskan residential construction, which is called the Residential Exterior Membrane Outside-insulation Technique (REMOTE), or REMOTE technique.

Building America in Alaska I.—CCHRC, the U.S. Department of Energy, and Alaska Housing Finance Corporation (AHFC) formed a federal/state/industry partnership to implement the Building America program in Alaska. A Building America in Alaska (BAA) team of building industry professionals from across the state worked with cold climate experts from the Building Science Consortium. The primary goal of this project was to develop plans for energy efficient, durable, healthy, and cost effective homes that are affordable to moderate-income Alaskans. The team designed a single-family residential home with modifications for each of three major climatic regions/environments found in Alaska. Building America home, using the CCHRC design or Building America technology, were constructed by Bee Construction in North Pole (Interior) and blu-Spruce Construction in Juneau (Southeast) and sold shortly at or near completion. The performance target for these homes is Five Star Plus, or the highest level of efficiency.

A Final Report was delivered to AHFC October 30, 2001, and included the building design, material list, construction costs, and performance testing and energy modeling of the finished homes. CCHRC staff worked with the Fairbanks Chapter of Habitat for Humanity to utilize the Building America design and technology in other projects. The Builders Guide: Cold Climates, developed through the Building America program, was reviewed by the Alaska team and CCHRC staff and updates were recommended, compiled, and delivered to the Building Science Consortium.

Building America in Alaska II.—CCHRC's second grant from the Department of Energy was awarded for a State Energy, Program Special Project to continue work on the Building America in Alaska program. The goals were: (1) to develop builder's

education courses on BAA approaches to residential construction and to continue education and promotion of Building America techniques to the Alaskan home building industry; (2) to test and monitor the Building America houses constructed in Alaska in 2001 and assess their performance; and (3) to develop a Building America strategy to address the cold, wet climate of Southeast Alaska which includes construction of a test module for checking wall panels for moisture, durability and energy efficiency. Within this project, the CCHRC Mobile Test Lab (MTL) was constructed in North Pole and shipped to Juneau in January 2003. Students of Construction Technology at the University of Alaska SE built and monitored various wall systems in the test module for a year. The wall built with the REMOTE technique out performed other wall sections in terms of drying. The MTL was later refitted with new wall panels, new equipment, and continues to be monitored under funding from AHFC.

REMOTE Wall.—The REMOTE technique combines an outside insulation wall envelope system with more conventional roof and foundation envelopes to maximize the benefits of both systems. An impermeable membrane is attached to the exterior of the wall's sheathing with foam insulation exterior to that. This membrane is then tied to an interior vapor barrier for the roof and foundation of the structure. The benefit of this system is that condensation within the building envelope is eliminated along with all the associated moisture problems. Nine wall systems were tested in Juneau utilizing the Mobile Test Lab. Of the nine walls tested, the best performing wall was the REMOTE wall. The REMOTE wall offered the most reliable results to the drying of built-in moisture and had the lowest recorded moisture content in the sheathing, framing and bottom plate at the conclusion of the testing. During intentional wetting experiments in which moisture was introduced to the wall cavity, the empty cavities dried in days, the fiberglass filled cavities dried in weeks, and the foam-filled cavities did not dry during the experiment. This shows that the fundamental design where all of the insulation is on the outside of the wall is the most robust for eliminating moisture problems.

In September 2005, the Tlingit-Haida Regional Housing Authority (THRHA) received an award in recognition for its development and application of innovative approaches and best practices in housing and community development at the U.S. Department of Housing and Urban Development's (HUD) National Indian Housing Summit. The work involved an application of the REMOTE wall. THRHA was one of six housing organizations from around the country to receive one of the prestigious awards. In addition, THRHA was recognized for its partnerships with CCHRC, the University of Alaska Southeast Construction Technology Department, and Southeast Alaska Building Industry Association for exploring new building techniques and materials suitable to Southeast Alaska's climate.

CCHRC Recommends

The U.S. Department of Energy's Building America program has been very important for developing and demonstrating improved building techniques. Greater focus should be given to energy efficiency and conservation in buildings within this program. The program should also be expanded with funding to ensure its availability in all of the states with a regional structure, primarily so that applications can be considered in the context of the local region. Building America has been very successful nationwide and has been embraced by NAHB and the homebuilding industry.

HUD HEALTHY HOMES AND DOE WEATHERIZATION

CCHRC, the Alaska Housing Finance Corporation, University of Alaska Fairbanks and Anchorage, and state of Alaska Weatherization agencies in Fairbanks and Anchorage partnered on the Healthy Homes in Alaska Project which studied the connection between indoor air quality (IAQ) and asthma in children. CCHRC has also done several other projects on IAQ and ventilation issues, including the mold survey and wildfire smoke remediation studies described below. All of these studies are more fully reported at <http://www.cchrc.org/completed.html>. There is an essential connection between the development of energy efficient buildings and ventilation: as we insulate and tighten up buildings to prevent heat loss or entry, it becomes increasingly important to provide intentional, mechanical ventilation to supply fresh air and to control the build up of moisture in the buildings. The ventilation system must be optimized to use the minimum amount of energy and materials consistent with the air exchange requirements. Finally, outdoor air is not necessarily "fresh," so it is often important to filter the incoming and re-circulated air to obtain the best, healthy indoor air quality.

The Healthy Homes in Alaska Project.—This project was designed to test whether or not improving the indoor environmental quality of homes for children with asth-

ma might improve their health. Only children who lived in low-income homes were eligible, and the parent or guardian of the child was required to own the home. Another goal of this project was to increase the capacity of the Low-income Weatherization Program to remove possible respiratory hazards in the homes of low-income people who have children with asthma or other upper respiratory diseases. The Healthy Homes in Alaska project was conducted in two areas in the state. Fairbanks is Alaska's second largest city and is located in the Interior. Hooper Bay is a larger bush community of 1014 residents on the Bering Sea coastline. These communities were selected because they have residents with diagnosed asthma, have an involved health provider in the region, and are generally representative of conditions and housing stock throughout the state. The project provided indoor air quality assessment, health screenings of affected children, and housing remediation to selected homes. We identified and studied a total of 36 homes: 10 eligible participants in the Fairbanks area, 9 participants in Hooper Bay, and 8 and 9 control homes in Fairbanks and Hooper Bay, respectively. The remediation in the control homes consisted of the standard weatherization items such as improving insulation, replacing windows and doors, sealing air leaks, as well as providing some safety items such as smoke and CO detectors. In the participants houses the weatherization protocol was augmented by items designed to remove possible asthma triggers such as moldy window sills, bedding, or furniture. Some changes in the home were made to prevent the moisture and temperature conditions that lead to the growth of mold such as adding clothes dryers, installing shelving and bed frames to improve air circulation by the walls and floors, and installing quiet bath and kitchen fans to remove moist air from the house. Qualitatively, the clients in the healthy homes reported improved comfort and health as well as reduced energy bills. While the quantitative results of this study were based on a small number of research subjects, and asthma is a disease with multiple causes, there are some interesting suggestive results: (1) It is possible that the homes of children with asthma have higher levels of indoor air pollution than the homes of similar people without asthma; and (2) The remediation may have helped to improve the pulmonary function tests and the IgE levels of asthmatic children, although the numbers from this small a study were not sufficient to reach statistical significance.

Mold and Mildew Survey.—The prevalence of mold in Alaska Native housing is a significant health issue. CCHRC documented over 1,700 residences with mold problems in a survey funded by HUD. See <http://www.cchrc.org/completed.html#mold>. These instances varied from mild mildew around windows, in kitchens, or in bathrooms to severe mold development requiring the destruction of the building. CCHRC has been funded by the Alaska Housing Finance Corporation to provide consulting services to Alaska Native housing authorities on these and other issues including the development of low-cost ventilation systems as adequate ventilation is one of the keys to maintaining a healthy, mold-free home.

Remediation of Wildfire Smoke in Fairbanks Homes.—For over two weeks in the summer of 2004, fires around interior Alaska raised the outdoor particulate level significantly over EPA's fine particle standard for PM 2.5 of $65\mu\text{g}/\text{m}^3$. The actual figure exceeded $1,000\mu\text{g}/\text{m}^3$ during part of that period. This study demonstrated a 76-92% improvement of indoor air quality, depending on method of remediation. See <http://www.cchrc.org/FANTECH.pdf>. Indoor air was tested in houses pressurized with filtered outdoor air, as well as in non-pressurized houses in which the air was re-circulated and filtered. Although residents of all houses rated the improvements from "better" to "very significant," the percentage reduction in fine particulates was greatest in pressurized houses. This study has implications for builders in areas in which air quality can be hazardous to health, no matter the cause.

CCHRC Recommends

The DOE Weatherization programs provide a significant improvement in the older housing stock, reducing the annual gas heating bills by an average of 32% (see http://www1.eere.energy.gov/office_eere/pdfs/wap_fs.pdf). As CCHRC develops more strategies for retrofitting older houses, the lessons learned by the weatherization agencies across the nation will be increasingly important to incorporate. Improvements in the health of children and adults with asthma and other respiratory conditions can also be made with the development and application of appropriate ventilation and filtration standards.

In addition to the work of CCHRC, we are acutely aware of the national focus on energy consumption of buildings, green building and the need for incentives to promote sustainable building practices. These issues have gained significant prominence in national public policy forums.

ENERGY CONSUMPTION AND EFFICIENCY

Energy efficiency is the primary focus for many builders and home buyers. While many figures are being thrown around these days, the Energy Information Administration (EIA) estimates that buildings accounted for 39.4% of total U.S. energy consumption in 2002. Residential buildings accounted for 54.6% of that total, while commercial buildings accounted for the other 45.4% (Annual Energy Review 2003, DOE/EIA-0384 (2003))—for heating, cooling and electric appliances. Builders know that building with energy conservation in mind is both practical and profitable.

Recently, a number of groups, including the U.S. Conference of Mayors, have joined with the American Institute of Architects (AIA) to support the Architecture 2030 Challenge, which suggests that buildings are the major source of demand for energy and materials and, incidentally, produce greenhouse gases. The Challenge includes the goals of:

- All new buildings must be designed to use 50% less fossil fuels;
- An equal amount of existing building area must be renovated annually to use 50% of the amount of fossil fuel they are currently consuming; and,
- All new buildings must be carbon-neutral by 2030 (i.e., uses no fossil fuels and emits no greenhouse gases in operation).

A more detailed look at data provided by the EIA reveals that the 2030 challenge has arbitrarily derived the number of “half” of energy consumption and greenhouse gases by combining two categories for which the EIA reports and creating a new “buildings” category. Based on EIA’s 2000 Annual Energy Review, adding the categories of “Commercial,” “Residential,” and a portion of the “Industry” categories, the 2030 challenge arrives at a number of 48%. This estimate reflects a portion of the industrial sector that is attributed to buildings because of heating, cooling, etc., but how the AIA arrive at the actual percentage is open to question.

Older homes, for which present day builders and architects bear little responsibility, account for a very large share of residential energy consumption. Single family and multifamily units built in the decade before the Residential Energy Consumption Survey (RECS) of 2001 account for only 2.5 percent of total energy consumption in the U.S. Even if each of the new homes built over the 1991-2001 period consumed zero energy, it would only have reduced total consumption in the U.S. by 2.5 percent. Finally, more than half of total residential energy consumption consists of energy lost between generation and consumption—that is, energy lost in the process of producing and transmitting electricity, rather than energy actually used in residential structures. This fact illustrates the importance of developing energy producing systems in the structures themselves.

ENERGY STAR AND GREEN BUILDING

Energy Star is the most prominent of the many voluntary programs builders utilize and was the very first program endorsed by the National Association of Home Builders (NAHB). Energy Star homes meet specific energy efficiency guidelines established by the U.S. Environmental Protection Agency that achieve notable energy savings above the current energy standards. To date, more than a half-million above-code Energy Star homes have been built.

Energy Star also serves as a resource and efficiency benchmark and as an integration point for NAHB’s own Model Green Home Building Guidelines. Since the 1990s, NAHB has been preparing for the evolution of green building into the main stream. Green building means energy efficiency, water and resource conservation, sustainable or recycled products, and indoor air quality all incorporated into the everyday process of home building.

Published in 2005, NAHB’s Model Green Home Building Guidelines (Guidelines) were developed through an extensive year-long review of existing programs and industry best practices within an open, consensus-based process involving more than 60 industry stakeholders—including builders, researchers, manufacturers, environmentalists, and government agencies. The NAHB Research Center, an American National Standards Institute (ANSI)-accredited standards developing organization, co-developed the Guidelines with NAHB. Due to broad acceptance by local home builder associations, the Guidelines will undergo formal consideration procedures to become the ANSI-accredited standard and serve as an official “industry standard practice.”

The Guidelines embody the flexibility that builders need to achieve efficiency and conservation goals without meeting costly national or state-wide mandates. Local adoption of the Guidelines allows builders to more appropriately address regional and local environmental concerns, properly assess life-cycle costs based on local building codes and climate zones, and encourage innovation to meet higher and

broader energy efficiency objectives. Simply, there is no one size-fits-all green building standard. Alaska, North Dakota, Florida, and Maine all have different efficiency needs and requirements based on their climate and builders need the flexibility of a program like the Guidelines to reach those goals.

One popular green building standard that is being considered as a requirement throughout the country, particularly at the state and local level, is the Leadership in Energy Efficient Design (LEED), sponsored by the U.S. Green Building Council (USGBC). Due to its success at mandating LEED-NC programs for many government facilities, USGBC is currently offering a pilot program, LEED-H for homes, to further encourage the penetration of the LEED brand into the private sector.

While many state and local governing bodies have mandated the use of LEED, some local leaders, e.g., in Boston, have recognized an important fact that many builders also recognize: the LEED-H program is costly, requires many mandatory provisions, offers little flexibility, and contains extensive implementation fees that could cost a builder, and ultimately the public, from \$12,000 to \$15,000 extra per home. A close analysis of NAHB's Model Green Home Guidelines and USGBC's LEED-H for homes is attached.

Overall, at a time when housing needs the most innovation and most resources spent on achieving resource and energy efficiency, builders should not be forced to use those resources for certification and implementation fees just to comply with costly mandates for programs like LEED-H. Builders need many options and methods for achieving strides in energy efficiency and will be sidelined with requirements, for LEED or otherwise, by any government—state, local, or federal.

TAX INCENTIVES FOR ENERGY EFFICIENT HOUSING

Finally, another crucial way to encourage energy efficiency in housing is by extending and expanding tax incentives that passed as part of the Energy Policy Act of 2005. Unlike spending programs or one-size-fits-all rules, tax provisions allow market participants—builders, homeowners, and homebuyers—to marry the energy incentives with market-determined supply and demand.

For example, the newly established New Energy Efficient Home Credit (Section 45L of the Internal Revenue Code) provides a \$2,000 tax credit for the construction and sale of a new home which reduces energy use by 50% or more. This program provides benefits to home buyers and communities by facilitating the construction of new property that takes advantage of the latest technology—and in a manner that will work in the marketplace. Rules that simply eliminate the market for new homes or other property through unreasonable restrictions do not encourage the adoption of energy efficient property. In fact, they do the opposite. They encourage retention of older, less efficient property.

Other examples of new energy tax incentives are the energy efficient commercial building deduction (Section 179D), the existing homes tax credit (Section 25C), and the solar credit for residential property (Section 25D).

Congress could improve the efficiency of these programs by making them permanent. Presently, these tax incentives are scheduled to expire over the 2007 and 2008 period. This limited duration reduces the effectiveness of these programs as home building in many cases takes months or even a year or more to complete.

CONCLUSION

A directed national effort must be initiated immediately to address the global issue of unsustainable energy consumption and its many effects. Buildings, land development and related infrastructure, including electrical generation, transportation, water and wastewater systems are major factors to consider. Applied research and demonstration projects are very necessary components for identifying and developing technologies and strategies that will move toward effective solutions. The direction the nation takes is dependent on the quality and application of that research. Through a collaborative approach involving industry and the marketplace, financial incentives, federal and state regulatory agencies, and most importantly each individual's commitment, we can make a positive change. The United States must lead this effort by example to the rest of the world. This is an opportunity for the nation to come together. For the first time there is general agreement about the impacts of unrestrained energy use and a real concern for the future. This issue can galvanize us as a nation around a common goal for the common good. CCHRC and the building and research communities of Alaska are prepared to embrace that movement. It is our hope that we can be a valuable part of that solution.

Senator DORGAN. Mr. Hébert, thank you very much. You've traveled a long distance to be with us today and we deeply appreciate

that, appreciate the unique message you bring. Mr. James Rogers is chairman of the Edison Electric Institute. He's also chairman, president and CEO of Duke Energy Corporation in Charlotte, North Carolina. Mr. Rogers, it's nice to see you again, welcome.

**STATEMENT OF JAMES E. ROGERS, CHAIRMAN, CEO, AND
PRESIDENT, DUKE ENERGY CORPORATION, CHARLOTTE, NC
AND CHAIRMAN, EDISON ELECTRIC INSTITUTE**

Mr. ROGERS. Thank you. Chairman Dorgan, Chairman Bingaman, Senator Murkowski, good afternoon. I want to thank you all for inviting me to testify today on behalf of Duke Energy and the Edison Electric Institute, the Association of Shareholder Owned Electric Utilities. I believe that energy efficiency is central to achieving this country's environmental goals meeting the growing demand for electricity as well as achieving our energy security goals. It is also a critical component in advancing our technology future.

Duke serves approximately 3.9 million customers in North and South Carolina, Ohio, Indiana and Kentucky. Leading a large energy company means that I have a duty to both our customers and shareholders to understand what the future holds, in terms of economic and environmental pressures. Even though prices for electricity have been declining in real terms for a decade and a half, prices have started to rise driven by escalated fuel costs, greater environmental expenditures, and America's insatiable appetite for all things electronic, stimulating the need to build new plants and make other infrastructure improvements. These forces pressure consumers with higher electric bills. Consequently, we recognize the need for our industry to mitigate these pressures.

I also believe that many of our energy efficiency programs of the past were in need of an extreme makeover. My co-chairmanship of the National Action Plan on Energy Efficiency—which was supported by the EPA and DOE—played a great role in understanding the potential for the makeover. The results of phase 1 of this process are eye-opening; the National Action Plan report envisioned taking effective efficiency programs currently underway in this country, and expanding them to all 50 States. Such an ideal model could result in savings that top \$20 billion annually, along with a deferral of as many as 40 new 500 megawatt power plants over the next 10 to 15 years. Even though historically utilities have offered a variety of low-saving programs to customers, collectively if you added it all up you could power 74,000,000 average-sized homes for each year. It is clearly not enough; however, I believe that even with the recognition that we need to do more, a genuine paradigm shift must occur if we're to realize the full and total potential of this resource. This shift must occur on three fronts. First: in the way State regulators treat the business of energy efficiency. Second: in the way utilities develop and deliver efficiency programs. Third: in the way consumers learn to manage their energy use.

Energy efficiency is an actual source of supply. I call it the fifth fuel. It is as important as any power plant generated by coal, nuclear, natural gas or renewables. Wise energy use programs can deliver at a cost below that of a nuclear power plant and in less time. Energy efficiency is also the basic building block to cost-effectively

help utilities meet their greenhouse gas reduction goals, but treating efficiency as a generation resource means that we also need to treat it as a business resource. I recently challenged the Duke team to add 600 megawatts of energy savings in the Carolinas on top of the 700 megawatts already committed. These savings will help us shut down the older coal units. If we can put saving energy on the same level playing field as generating energy, then we will witness a significant growth in this sustainable resource.

EEL is already examining ways of making energy-saving business models for consumers and investors. We expect to issue a report later this year evaluating several business and regulatory models. There is no one method appropriate for all utilities or all States. We believe this report will form what we hope is a beginning of a robust dialog with utility regulators. Duke is investigating its own "Sav-A-Watt" model to address energy and environmental savings in one efficiency package. We believe that this prototype coupled with new technology deployment carries the potential of transforming our business so we can provide—and this is an important point—customers with universal access to energy efficiency, and with that the paradigm shift begins to occur. Utilities can increase their offers of sustainable energy savings and consumers will broaden their knowledge of how to "Sav-A-Watt."

Congress can help us meet these objectives and assure that energy efficiency produces a meaningful imprint on our society. Already begun from programs authorized by the Energy Policy Act of 2005, it is imperative that Congress fund all energy efficiency initiatives. In addition, tax incentives should be re-examined and re-authorized. Congress must address building codes because buildings consume—and my number's a little different than the gentleman before—approximately 68 percent of the electricity produced in the United States, and that's according to DOE.

Finally Congress can help to further technology advances. Modernization of the electric grid from advanced distribution transformers to advance meters must be deployed to help us achieve energy use reductions. These meters and grid technologies reduce energy losses. Incentives to advance the application of these technologies can further the goal of avoiding new power plants. I believe that through the proper architecture the potential for energy savings will bring with it a transformation of how we meet the needs of an increasingly electrified economy. In closing, I ask you to consider what I think should be an expanded mission for electric utilities, and that is the ability to offer all of our customers universal access to a broad range of energy savings programs and services. Getting the regulatory framework right means that we can help customers make wise choices. Utilities can deliver those wise energy choices from solar panels to advanced heating and cooling equipment to examining advanced lighting techniques. As utilities we're in the best position to help consumers "Sav-A-Watt", and only then can we adequately provide this fifth fuel to all. Thank you all very much, and I welcome your questions.

[The prepared statement of Mr. Rogers follows:]

PREPARED STATEMENT OF JAMES E. ROGERS, CHAIRMAN, CEO AND PRESIDENT, DUKE ENERGY CORPORATION, CHARLOTTE, NC AND CHAIRMAN, EDISON ELECTRIC INSTITUTE

Good afternoon. My name is Jim Rogers and I am Chairman, CEO and President of Duke Energy. Duke serves approximately 3.9 million customers in five states: North Carolina, South Carolina, Ohio, Indiana and Kentucky. We have 37,000 megawatts of generation, which is supplied by coal, nuclear, natural gas and hydro-power.

I am here on behalf of Duke Energy as well as the Edison Electric Institute (EEI), where I currently serve as Chairman. EEI is the association of U.S. shareholder-owned electric utilities and industry affiliates and associates worldwide.

I want to thank you for inviting me to speak today on a topic which I believe is central to achieving this country's environmental, energy security and technology goals—energy efficiency.

As the leader of a large power company, I believe it is my duty to both shareholders and customers to understand not only the basics of meeting energy demand but also to delve into the future and understand all of the pressures that will lead me to make the right economic decisions today. Expectations for electricity growth and impending environmental trends all play a fundamental role in the delivery of electricity to our customers.

Despite the fact that electricity remains a value compared to other essentials, electricity bills are rising. Fuel costs and purchased power have driven a large part of those incremental price increases—accounting for roughly 95 percent of total operations and maintenance expenditures on an industry-wide basis. But those are not the only cost pressures facing the industry. Environmental controls, particularly in coal-centric regions of the country, are driving up costs. At the same time, America's appetite for electricity is growing. A recent Consumer Electronics Association study revealed that the number of electronics products per household has doubled since 1997. We might love plasma televisions, but we need to recognize that they also love electricity! Growing demand brings with it an essential need for new power plants and transmission lines.

As part of my own effort to examine, understand and help customers manage all of these trends, I agreed to co-chair the National Action Plan on Energy Efficiency—supported by the Environmental Protection Agency (EPA) and the Department of Energy (DOE).

As co-chair with Diane Munns, then a Member of the Iowa Utilities Commission and President of the National Association of Regulatory Utility Commissioners, we worked with a Leadership Group representing over fifty utilities, utility commissions, state energy offices, consumer and environmental advocates. The resulting National Action Plan outlines benefits and opportunities for energy efficiency as well as the barriers to overcome if we are to make energy efficiency a top priority.

The first phase of this multi-year effort identified numerous examples of successful energy efficiency programs as well as the potential for energy savings across the U.S. In addition, more than 80 organizations announced public commitments to advance their own energy efficiency activities.

The NAPEE report suggested, for instance, that if the dollars spent and the megawatts saved in some areas of the country were broadened to the country as a whole, savings could top \$20 billion annually while deferring 20,000 MW—the equivalent of 40 new 500 MW power plants over the next 10 to 15 years.

These figures are illustrative, of course, and are not to suggest that every utility and every state can achieve the same level of energy savings. But let me provide you with just a few interesting examples of successful programs in various parts of the country.

Black Hills Power, serving customers in South Dakota, Montana and Wyoming, offers homeowners a program that helps them monitor and control major electric appliances during periods of peak demand.

Puget Sound Energy's programs, which include cash rebates for the purchase of Energy Star appliances, are on track to save 279 MW between 2006 and 2015. That is more than the company saved between 1980 and 2004.

Southern California Edison's comprehensive portfolio of energy efficiency programs for 2006 through 2008 will produce a 3 percent average bill reduction by 2010 and 888 MW of demand savings, as well as the commensurate environmental benefits. This will occur for a cost of less than 4.1 cents per kWh.

Historically, utilities have offered a variety of programs to help customers manage their electric bills. According to DOE and the Energy Information Administration (EIA), electric utilities collectively spent over \$30 billion on demand-side management or efficiency programs between 1989 and 2005, resulting in a savings of more

than 796 billion kWh. Those savings alone could power nearly 74 million average size U.S. homes for one year.

DEVELOPING A NEW VISION

While those numbers are impressive, the industry recognizes that we can achieve much more. But, I believe that a genuine paradigm shift is necessary if we are to realize the full potential of this resource. That shift must occur in the way regulators treat the business of energy efficiency, in the way utilities develop and deliver programs, and in the way in which we appeal to consumers to manage their energy use.

Another huge accomplishment emanating from the NAPEE process was the recognition by this broad group of utility commissioners, customers and consumer groups that sound business practices can remove barriers for enhancing utility investments in energy efficiency.

Energy efficiency should be considered a fuel choice—the “fifth fuel” if you will in addition to traditional generation resources of coal, nuclear, natural gas and renewables.

Efficiency programs can deliver at a lower cost than new power plants, we can deploy them faster than new power plants and they can provide savings over relatively short periods of one to three years, as well as over the longer term.

From an environmental perspective, we should view energy efficiency as a basic building block in reducing the industry’s emissions profile. In 2004 alone, efficiency programs in place saved more than 29 million metric tons of carbon equivalent greenhouse gas emissions.

From a state’s perspective, energy efficiency can be a key to economic development activities. Greater efficiency investments can build jobs and improve state economies. These programs can also create long lasting infrastructure changes to buildings, and property improvement delivering long-term economic value.

And finally, energy efficiency brings with it its own energy security benefits. Again, according to the NAPEE report, by reducing the level of U.S. per capita energy consumption, we also decrease the vulnerability to the economy and individual consumers from potential energy price disruptions erupting from natural disasters or escalating prices of imported fuel. The less electricity used, the less impacted consumers are by fuel cost increases. And despite the fact that natural gas for the most part is a domestic resource, it increasingly is tied to the cost of foreign oil and will be supplemented in the future by imports of liquefied natural gas.

But if we are to treat efficiency as a resource, we must consider it a resource from a business perspective as well.

For instance, I recently directed my staff to expand Duke Energy’s efficiency program in the Carolinas to reach a goal of saving an additional 600 MW of energy beyond the 700 MW already committed.

However, that action is not without its own concerns. These energy savings will enable Duke to shut down several older coal plants in our region, resulting in significant environmental benefits. But, under our current regulatory model, the program also will result in significant lost revenue.

Eliminating power plants, while adding new ways of saving energy, without a plan for placing energy efficiency into the traditional utility business model can make expanding programs a tough sell. However, we can change the utility regulatory paradigm to put saving energy on the same level playing field as generating energy.

I believe that there are energy saving business models that work for customers and for utility investors. Edison Electric Institute is in the final stages of a study analyzing various ways of ensuring that energy efficiency can stand alone as a business. These models would work for utilities in both regulated and unregulated states. While no one version may work for every utility and every state, a variety of models exist that can and must be explored if we are going to achieve energy efficiency goals that will make meaningful imprints on our society. Once completed, this document will be a useful tool for exploring enhanced efficiency programs with our state public service commissions.

Some of these prototypes include methods of sharing energy savings with consumers and shareholders; others simply treat energy efficiency like any other expenditure such as power plants or other infrastructure improvements. Duke, in fact, is exploring its own “Sav-A-Watt” model, which addresses the energy and environmental savings achieved via efficiency programs in one package.

Customers win because new plants are avoided, environmental benefits are expanded and creative methods of providing sustainable efficiency programs mean savings on monthly bills. We believe this model, coupled with new technology de-

ployment, has the potential to transform our business and enable us to give our customers universal access to energy efficiency.

This paradigm shift at the regulatory level will open up a host of opportunities to reshape how utilities offer efficiency to consumers. Without the threat of a lost revenue stream, utilities can develop programs that they take to consumers, instead of waiting for consumers to sign up to generic offerings. That in itself can go a long way in broadening wise energy use patterns.

I do not believe that Congress can or should dictate a specific model to states. However, speaking for Duke, I think that Congress can examine methods of ensuring that states consider these new regulatory frameworks to ensure that efficiency measures are sustainable over the long term. I am certain that there are other options of encouraging this transformation, but I must again emphasize that making efficiency a business is critical if we are to realize its true potential.

THE ROLE OF CONGRESS

Congress did make huge strides in advancing energy efficiency when it passed the Energy Policy Act of 2005 (EPAAct). We encourage the Committee to review the progress of EPAAct 2005 and ensure funding for all energy efficiency provisions.

Congress can also play an essential role in furthering efficiency through a variety of additional mechanisms.

Strict building codes, utilizing energy efficiency models, alone can go a long way toward achieving real energy savings in the same way that appliance efficiency standards have broadened the reach and potential for savings to consumers. According to the Department of Energy, buildings consume approximately 37% of the energy and 68% of the electricity produced in the U.S. annually.

SC Johnson recently designed its new headquarters building in Racine, Wisconsin, and studies project that its gross annual energy consumption will be approximately 60% less than the average for similarly sized buildings. This reduced energy consumption will save the company nearly \$100,000 per year. Imagine translating similar savings to every new building in the country.

Congress can address that potential through building code requirements and essential tax incentives for buildings and appliances.

Additionally, many other tax incentives provided for in EPAAct 2005 are set to expire at the end of this year. Yet, incentives for commercial buildings are still awaiting final rules. And, while some EPAAct 2005 incentives are set too low to effectively influence consumer buying decisions, others are too high. The industry would like to work with this Committee and its Members who also sit on the Finance Committee to review the variety of tax incentives earmarked for efficiency programs and suggest methods to adjust and expand them appropriately.

Congress can also play a role in furthering technology advances. Modernization of the electric grid is a significant element of the efficiency picture. From advancing more efficient distribution transformers to accelerating the development of advanced metering technologies, the electric industry has identified these and other technology advances as essential tools in the efficiency kit. These new meters in many ways are more similar to computers than the electro-mechanical machines utilities historically deployed.

Smart grids can expand information exchange between customers and their utility while also supporting demand-side measures such as real time pricing. Imagine a day when smart technologies and appliances will be able to make decisions about when to operate and could even “learn” how to combine efficiency, cost, comfort and convenience for customers. Duke likes to refer to these new technology advances as the “Utility of the Future.”

Yet the depreciation rates for smart meters are 20 years—the same rate for distribution property. Reducing that rate to 5 years, while also exploring additional methods of funding this important technological transformation will hasten the transition to an efficient future.

The technology revolution is no longer limited to traditional utility delivery systems. Our industry is supporting additional Congressional funding to research and bring closer to deployment technology to make plug-in hybrid vehicles a reality. Plug-ins not only enhance energy security options, they offer the potential to utilities as a way of evening out demand. Imagine a future when these vehicles can charge at night while demand is lower, and send electricity back to the grid during the day when demand is high, offering yet another source of offsetting the need for new power plants.

And those overseeing the budget process can ensure that programs such as Energy Star, which help provide the tools for increased efficiency, and a consumer effi-

ciency education campaign authorized in the Energy Policy Act receive the funds to make them work.

I believe that through the proper architecture, the potential for energy savings will bring with it a transformation in how we continue to meet the needs of an increasingly electrified economy. The industry has embarked on this journey to build the utility of the future and with your help, we can achieve this goal sooner rather than later. I don't believe we can wait. The combination of environmental pressures, new technologies on the horizon and rising electric prices are each chapters in a story describing how we can harness the power of a watt that is saved. I hope that Congress will take this opportunity to expand on the work begun in EPAct 2005 to find valuable mechanisms that encourage and expand energy efficiency for decades to come.

In closing, I believe that electric utilities should have an expanded mission. We should be able to provide our customers with universal access to a broad range of energy efficiency services and technologies. As we work to get the regulatory framework "right", we will be in the best position to cost effectively Sav-A-Watt. Only then will utilities adequately be able to provide this fifth fuel to all.

Senator DORGAN. Mr. Rogers, thank you very much for being with us today. Our final witness today is Kateri Callahan, and Kateri is president of the Alliance to Save Energy. As I indicated earlier, that's an organization of which all of us are very familiar, and we appreciate your being here. We appreciate the work the Alliance has done over all these years. You may proceed.

**STATEMENT OF KATERI CALLAHAN, PRESIDENT, THE
ALLIANCE TO SAVE ENERGY**

Ms. CALLAHAN. Well thank you, Mr. Chairman, and I would like to start by thanking you and Senator Bingaman for all your years of service—not just as board members which you currently serve on for the Alliance, but also your past chairmanship. I'd also like to note that the gentleman to my right, Jim Rogers, is the current industry co-chair of the Alliance to Save Energy, and we appreciate his leadership as well.

As we've heard today buildings are a major factor in the linked problems of energy prices, national security, and global warming, and we've made very great strides in the last 30 years in making that built environment more efficient. But there's a study that's been done by the National Labs that suggest that we still have an opportunity to reduce U.S. energy use in residences and in commercial buildings by about 20 percent over the next 20-year time span. This is important because what that means is, we could essentially reverse the growth and demand for energy from that sector of our economy. We believe there are several important areas where the Congress and Federal Government can help to ensure we meet this very important goal, but in the interest of time I'm going to summarize my 20-plus pages of testimony and recommendations and just highlight a few of those in three areas. First, recommendations for building codes; second, utility efficiency programs—and Jim did a good job of covering that, so I don't have a lot to add there; and finally, the appliance standards. One of the most important opportunities for reducing energy use and cost is to design and construct the buildings the right way to begin with, and that's something Mr. Stewart alluded to earlier.

As we've heard today there are key decisionmakers in that sector that are making bold commitments to energy efficiency in buildings. We think that the Congress can support and encourage those initiatives with a few specific actions. First, we would like Congress

to direct DOE to establish a national goal for continuous improvement in model-building codes. We're suggesting something that's not as aggressive as AIA has in place, but a target of 30 percent improvement in efficiency within 10 years, and another further 50 percent improvement within a 10- to 15-year horizon for both homes and commercial buildings.

Second, while maybe not in the jurisdiction of this committee, we would ask Congress to require HUD to immediately strengthen the energy-efficiency standards for manufactured housing, which is largely bought by those that can least afford to pay high energy bills. The HUD code is so antiquated that a manufactured home in North Dakota or Minnesota or Alaska only has to meet the insulation requirements for a home built in Miami, Florida.

Third, the Federal Government is embarking on a military housing program that going to result in construction of about 185,000 homes for military servicemen and women and there are currently no uniform energy standards for those homes. We would like Congress to require that such privatized housing units be built to be Energy Star home criteria.

Finally, the Federal Government we believe needs to substantially increase its financial commitment to creating the technologies and the knowledge that will allow us to get to net zero energy buildings in the future. If we invested just the equivalent of 12 hours of commercial building energy cost in this country, we would generate \$135 million, and we think we could meet a goal with that of getting to carbon neutral buildings in the near future, which is what every one of us is striving for here today.

In the utility industry arena, they have proven to be a very important key, as you know, to driving energy efficiency. Many utilities, as Jim alluded to, have found that it's actually more cost-effective to help their customers to save a kilowatt hour than it is to actually generate and deliver that kilowatt hour to their customers. A very important mechanism is demand-side management program or DSM programs. Over the last two decades we've saved the equivalent of 100 power plants by putting in place DSM programs. The bad news is that the investment in demand-side management programs waned when they deregulated—or began to deregulate—the utility industry, and still today we have a recovered investment up to the level of the mid-1990's.

To help drive greater utility investment in these programs, we would ask that this committee work with the appropriators to fund the \$25 million program authorized in EPAct to create utility State pilot programs that have attached to them an annual reduction in electricity and natural gas use. We also urge this committee to explore establishment of a Federal energy efficiency resource standard or an EERS, which would require electric and natural gas utilities to implement energy efficiency programs to achieve a specified amount of reduction in electricity or natural gas. We want these to be flexible to reward utilities in meeting standards. Programs have been set up in some of the States that achieve these energy efficiency reform and performance standards, most notably in Texas. Finally, in the area of appliance standards, these have proven to be one of our country's most effective tools in delivering energy efficiency, yet they're not fully tapped.

Right now, thanks to the standards that you all have put in place, by 2010 we will save \$234 billion in avoided energy costs. We have a couple of specific requests for the Congress in this area. One is to make sure that you monitor carefully DOE's rulemaking process on the overdue standards that are in the hopper now, and future products, to ensure that they issue the strongest standards that are cost-effective and that they do so in a timely manner. Second, we would like you to look at adequately funding and updating the Federal appliance standards and testing program. Finally, as we work with manufacturers to develop consensus standards, we hope that as we bring those forward to you later in the year, that you will be able to expeditiously enact those into law so we can get to the energy savings that they promise as soon as possible.

So, in conclusion, we've made important strides in the building sector, but much more is required, and we believe with the policies and tools that we've recommended in our testimony, and are highlighted today, that working with you we can get to a point where we can essentially reverse the growth in energy demand in the built environment in the years ahead. Thank you.

[The prepared statement of Ms. Callahan follows:]

PREPARED STATEMENT OF KATERI CALLAHAN, PRESIDENT, THE ALLIANCE TO SAVE ENERGY

BUILDING ENERGY EFFICIENCY AND UTILITY ENERGY-EFFICIENCY PROGRAMS

INTRODUCTION

The Alliance to Save Energy is a bipartisan, nonprofit coalition of more than 100 business, government, environmental and consumer leaders. The Alliance's mission is to promote energy efficiency worldwide to achieve a healthier economy, a cleaner environment, and greater energy security. The Alliance, founded in 1977 by Senators Charles Percy and Hubert Humphrey, currently enjoys the leadership of Senator Mark Pryor as Chairman; Duke Energy CEO Jim Rogers as Co-Chairman; and Senators Jeff Bingaman, Byron Dorgan, and Susan Collins along with Representatives Ralph Hall, Zach Wamp and Ed Markey, as its Vice-Chairs. Attached to this testimony are lists of the Alliance's Board of Directors and its Associate members.

The Alliance is pleased to testify at a hearing on policies and programs to improve the energy efficiency of buildings, in particular by encouraging utility energy-efficiency programs.

THE POTENTIAL IMPACT OF ENERGY EFFICIENCY IN BUILDINGS

Natural gas prices have doubled in the last few years, and electricity prices also reached all-time highs. Including gasoline as well, recent energy price increases cost American families and businesses over \$300 billion each year. The president recognized energy security as a major issue in the State of the Union message. And the world's scientists just reaffirmed the urgent need to reduce global warming. These problems are not going to go away—electricity use in the United States is projected to grow by half by 2030. Such growth will lead to higher prices, greater volatility, and increasing dependence on foreign natural gas as well as foreign oil.

Building energy use is a major factor in these linked problems of energy prices, energy security, and global warming, and must be a major part of their solution. More than one-third of all energy used in the United States, and more than two-thirds of electricity, goes to heat, cool, and power buildings. Just over half of that is for homes, the rest for a wide variety of commercial buildings.

Great strides have been made in improving the efficiency of appliances, heating and cooling systems, equipment, and the building envelope (walls, windows, doors, and roofs). At the same time the growing size of homes and appliances, and the growth in electronic equipment have overwhelmed the efficiency savings. An even greater savings potential remains—a 2000 study by several national labs estimated that energy-efficiency policies and programs could cost-effectively reduce U.S. energy use in residential buildings by 20 percent and in commercial buildings by 18 percent

over a 20-year span, essentially reversing the growth they projected in building energy use.

A combination of several policies and programs have made a real impact on saving energy in buildings, including appliance standards, building energy codes, labeling programs, tax incentives, and research and development of new technologies—I will talk about some of these later in the testimony. But one of the most effective approaches has been utility energy-efficiency programs, and I will start with these.

UTILITY ENERGY-EFFICIENCY PROGRAMS

Why should utilities reduce their sales by helping their customers reduce energy consumption? Many utilities have found that helping their customers to save a kilowatt-hour of electricity is cheaper and easier than generating and delivering that kilowatt-hour. Energy efficiency is a key energy resource.

As California found out in 2001, a slight excess of demand for electricity over available supply can cause blackouts, massive price spikes, and economic turmoil. Small increases in demand have doubled retail natural gas prices nationwide over the last few years, resulting in plant shutdowns and home foreclosures. Energy-efficiency programs are the cheapest, quickest, and cleanest way to respond to these challenges. In California an aggressive campaign reduced peak electricity demand by 10% in less than one year, and thus helped avoid further shortages.

These demand-side management (DSM) programs use measures such as rebates for efficient appliances, commercial lighting retrofits, and energy audits to help their customers use less energy. The cost to the utility for the energy savings is often around 2-4 cents per kilowatt-hour (kWh), much less than the cost of generating and delivering electricity. Such efficiency investments save consumers money, increase consumer comfort, reduce air pollution and global warming, enhance economic competitiveness, and promote energy reliability and security.

Over the last two decades, states worked with regulated utilities to avoid the need for about one hundred 300-Megawatt (MW) power plants. However, utility spending on DSM programs nationwide was cut almost in half as the electricity industry was partially deregulated in the late 1990's. In the last couple years there has been a resurgence of interest in electricity and natural gas energy-efficiency programs, with new programs in states such as Georgia and Arkansas, and added funding in leaders like California and Vermont. Some states have also chosen to run similar demand reduction programs themselves.*

UTILITY SECTOR ENERGY-EFFICIENCY POLICIES

Recommendation.—Fund the Energy Efficiency Pilot Program authorized in Section 140 of the Energy Policy Act of 2005, and require states to consider adopting policies to promote utility energy-efficiency programs.

Several major new reports have focused in part on the need for new policies to promote utility energy-efficiency programs, including:

- The National Action Plan for Energy Efficiency brought together more than 50 organizations, co-led by Jim Rogers, who joins me on this panel. They seek “to create a sustainable, aggressive national commitment to energy efficiency through gas and electric utilities, utility regulators, and partner organizations.”
- The Western Governors’ Association Clean and Diversified Energy Initiative set an ambitious goal of a 20 percent increase in energy efficiency by 2020 in the West; the Energy Efficiency Task Force Report examines how to achieve it.
- The U.S. Environmental Protection Agency’s Clean Energy-Environment Guide to Action details many policies and practices states are adopting to manage their energy needs and air quality.
- The Department of Energy, under section 139 of the Energy Policy Act of 2005, was supposed to issue a report last August on state and regional policies that promote utility energy-efficiency programs, in consultation with the National Association of Regulatory Utility Commissioners and the National Association of State Energy Officials.

Together these reports set forth policies needed to help utilities create effective energy-efficiency programs. These policies include:

Adopt energy efficiency goals, requirements, or commitments, with reporting on progress and oversight. For example, California conducted a study of the potential savings from cost-effective energy-efficiency programs in the state, set targets for each of its regulated electric and natural gas utilities, required each utility to sub-

*Graphic has been retained in committee files.

mit plans to meet those targets, and approved \$2 billion in funding for the planned programs over three years.

Use energy efficiency as a priority resource when planning to meet customer needs. As utilities in some regions plan to build the first new generating plants and transmission lines in years, they are showing more interest in alternatives. For example, Georgia Power in its most recent Integrated Resource Planning (IRP) process agreed to initiate the first energy-efficiency programs in a decade.

Provide robust and stable program funding. Funds can be provided as part of utility rates or through a small surcharge on utility bills (a public benefits fund or system benefits charge). For example, Wisconsin recently increased its public benefit fund and protected it from raids to pay for state deficits.

Set rates to incentivize utilities and customers. Typically utilities earn more by selling more energy. It is important to “decouple” utility revenues from sales, or to provide utilities with performance incentives for effective energy-efficiency programs, in order to align utility benefits with customer benefits. For example, Northwest Natural, a natural gas utility in Oregon, has a “conservation tariff” that helps it promote energy savings rather than sales.

Carefully evaluate energy-efficiency programs, with measurement and verification of energy savings and appropriate cost-effectiveness tests, so all stakeholders can rely on the energy savings. For example, in Texas savings estimates used to meet the state peak load reduction requirements are verified by a contractor to the Public Utility Commission of Texas.

These policies are typically set at a state level, by public utility commissions or sometimes by state legislatures. However, as there are compelling national interests that cannot easily be addressed by individual states, federal action is needed. While most individual states are not large enough to affect the shortage of natural gas that has driven up prices, concerted federal action could have an impact. In addition, the grid failures that blackened much of the Midwest and Northeast in 2003 showed that reliability issues are not confined within state lines.

As a focus for federal policy, the energy efficiency resource has several advantages:

- It is readily available in all parts of the nation,
- It is available for direct natural gas use as well as for electricity,
- It is cost-effective today, and
- The potential savings are enormous.

The Senate recognized the potential of utility energy-efficiency programs, and the need for a federal role, in its 2005 energy bill. In addition to the required report in Section 139, Section 140 authorized \$5 million a year for five years to create state pilot programs designed to achieve 0.75% annual reductions in electricity and natural gas use. In the Senate version of the bill, Section 141 would have required state public utility commissions to consider policies to promote utility energy-efficiency programs. The Alliance urges appropriation of funds to implement Section 140, which was enacted, and thanks the Senate for including funds in its appropriations bill last year. We also strongly support enactment of Section 141. But we believe more concerted federal action is needed.

ENERGY EFFICIENCY RESOURCE STANDARD

Recommendation.—Enact a federal energy efficiency resource standard for electric and natural gas utility energy-efficiency programs, coordinated with any renewable electricity standard.

Several states are already developing innovative policies to set performance standards for utility energy-efficiency programs alongside standards for generation from renewable sources.

Like a renewable portfolio standard (RPS), an energy efficiency resource standard (EERS) is a flexible performance-based and market-based regulatory mechanism to promote use of cost-effective energy efficiency as an energy resource. An EERS requires utilities to implement energy-efficiency programs sufficient to save a specified amount of electricity or natural gas, such as 0.75 percent of the previous year’s sales. Note that an EERS is not a requirement that the utility’s sales decrease in absolute terms or a limit on its sales at all; it is a performance requirement for the utility’s energy-efficiency programs.

An EERS gives utilities broad flexibility about how and where to achieve the energy savings. Utilities can meet an EERS through the kinds of effective demand reduction programs that have been conducted in many states for years. They can implement their own programs, hire energy service companies or other contractors, or pay other utilities to achieve the savings by buying credits. The program savings

are independently verified. Usually, the costs of the energy-efficiency programs must be recovered from energy customers through utility rates, but the savings from avoided energy supply are greater than the efficiency cost.

According to the American Council for an Energy-Efficient Economy, a national 0.75% EERS would by 2020:

- Save 386 billion kWh of electricity (8 percent of total use) and 3600 billion cubic feet of natural gas (14%) each year,
- Reduce peak electric demand by 124,000 MW (avoiding about 400 power plants),
- Save consumers \$64 billion (net after investments), and
- Prevent 320 million metric tons of carbon dioxide greenhouse gas emissions each year.

An EERS and an RPS may be used in combination. Renewable and efficiency requirements reinforce each other in several ways in the states:

- Texas has separate renewable and efficiency requirements. The efficiency targets focus on peak demand—utilities are required to avoid 10% of the expected increase in electric peak demand through efficiency programs. They have easily exceeded these targets.
- Connecticut added to its RPS a separate tier under which utilities are to save 1 percent of electricity use each year through residential and commercial programs and combined heat and power. Pennsylvania includes energy efficiency with certain other resources in one tier of its alternative energy portfolio standards.
- Hawaii and Nevada added efficiency resources as options in their portfolio standards—with higher overall targets—after utilities claimed to have difficulty meeting renewable targets (Nevada caps the amount efficiency can contribute).
- California has a “loading order” that sets efficiency as the preferred resource; once cost-effective efficiency measures have been exhausted, utilities are to use renewable sources, and only then traditional sources. The PUC sets targets for utility energy-efficiency programs based on a study of their potential savings.

While there are many ways to structure an EERS, here is one approach. The EERS would apply to utilities that distribute either electricity or natural gas. Distribution utilities are regulated even in restructured markets. A size cutoff excludes very small utilities.

The EERS would have savings targets that ramp up to require new electricity savings each year equivalent to 0.75% of utility sales, and natural gas savings equivalent to 0.5% of sales. The best state energy-efficiency programs currently meet these targets.

Utilities would be allowed to achieve the required savings through a combination of customer energy-efficiency programs, customer combined heat and power, and reducing energy losses in the distribution system. Utilities also could be allowed to buy credits from other utilities, other companies with similar energy-efficiency programs, or the government. Any funds the government collects could then be reserved for state energy-efficiency programs.

The Department of Energy (DOE) would be required to issue regulations on eligible measures and on how to count the savings. States would be given the option to verify and enforce compliance or to have DOE assure compliance. Funding for the required programs would be generated from a small surcharge on utility bills, under state regulation. Under this proposed approach, it will be most important for states to set rates in a way that utilities are not financially penalized for reduced sales due to effective energy-efficiency programs.

APPLIANCE ENERGY-EFFICIENCY STANDARDS

Recommendations for appliance efficiency standards.—Strengthen appliance efficiency standards by:

- (1) adopting additional standards based on negotiated agreements,
- (2) directing DOE regularly to review and update both test methods and standards to keep pace with rapidly changing technology, with accelerated consideration of the products with the greatest energy savings,
- (3) clarifying DOE’s authority to set standards that best serve the public interest, including multiple specifications for a single product, and regional standards,
- (4) clarifying that federal preemption does not apply to products for which there is no federal standard, and
- (5) providing adequate and stable funding for the DOE program.

Appliance standards have been one of the most effective energy-efficiency programs. Standards in place today are expected to save 7 percent of U.S. electricity use and reduce greenhouse gas emissions by 65 million metric tons by 2010, and are expected to save consumers \$234 billion (this is net savings—after repaying any increased first-cost for more efficient appliances). Energy efficiency advocates and states have identified at least 15 appliance types with significant energy savings opportunities but no federal efficiency standards at present. Adopting efficiency standards for these 15 products alone could save 52 TWh of electricity and 340 billion cubic feet of natural gas annually by 2020, and save consumers \$54 billion in energy costs between now and 2030. Even more could be saved by updating existing federal standards.

In recent years the Alliance and other energy-efficiency advocates have focused much of our attention on lengthy delays and lack of progress at DOE in setting required appliance standards. Due to a provision in EAct 2005—and a lawsuit—last year DOE set an explicit schedule for appliance standard rulemakings, which was later adopted in a court order. So far, they have met that schedule. However, the two new DOE-proposed standards (on distribution transformers and residential furnaces) were far weaker than we and many others believe is required by federal law, justified by DOE's own data and analysis, and needed in order to meet the energy needs of our nation.

We urge you to monitor carefully both DOE's adherence to its regulatory schedule and the actual outcome of the rulemaking process. In addition, Congress should take additional steps to strengthen the federal appliance standards and testing program and assure that it is adequately funded.

First, since EAct 2005 we have reached additional consensus agreements with product manufacturers on new and updated standards. DOE believes it does not have the authority to adopt one of them, for residential boilers. In addition, efficiency advocates and industry groups are currently in negotiations on several other products. We urge Congress to act promptly to enact into law all negotiated agreements that are reached.

Second, at present, there is no requirement for DOE regularly to review and update all existing standards and test procedures. The existing law does require a limited number of reviews for some products, but subsequent reviews are discretionary. In addition, Congress should establish a general requirement for periodic review of all standards and test procedures every 5 to 7 years, updating them if justified, and should provide funding for DOE to maintain this schedule. In particular, DOE test methods for a number of products are seriously lagging the pace of technology development, thus preventing effective standards for those products (examples include tankless water heaters, products that use standby power even when turned "off," and many appliances with advanced electronic controls). If DOE fails to keep its standards up-to-date, Congress should consider allowing states to act to limit the demands on their energy systems from those products.

In addition, DOE has limited its schedule for setting appliance standards to congressionally mandated rulemakings with a date certain. This narrow approach has delayed consideration of some standards with the greatest potential energy savings. For example, DOE has identified furnace fans and residential refrigerators as two product standards that offer the potential for very large energy savings, but the agency has yet to even schedule these rulemakings. Congress should direct DOE to begin these two important rulemakings as soon as possible and to complete them no later than 2011.

Third, Congress should allow DOE to consider alternative approaches in setting appliance standards where these better serve the intent of the law: to maximize cost-effective energy savings. We offer several examples:

- DOE has taken a very narrow view of the statutory language regarding standards it can set. Congress should clarify that DOE may include two or more specifications for different features of the product that all contribute to energy efficiency. One example is the authority for DOE to set standards for air conditioners in terms of both average efficiency, which reduces consumer bills, and performance during the hottest summer days, which provides added benefit by easing the strain on electric utility systems during peak demand periods. A second example is the ability to set efficiency requirements for both direct electricity use and consumption of (heated) water in the case of a dishwasher or clothes washer.
- Congress should explicitly authorize DOE to set regionally-appropriate appliance standards for climate-sensitive products such as furnaces, boilers, air conditioners, and heat pumps, since regional weather conditions can significantly affect the feasibility or cost-effectiveness of a given technology or efficiency

measure. In addition, in northern states colder inlet water temperatures can greatly reduce the capacity (but not the efficiency) of certain classes of water heaters, and also affect the cost-effectiveness of some efficiency measures. The implications of these regional factors for truly comparable water heater ratings should be studied by DOE.

- In addition, expedited procedures for consideration of consensus standards proposed to DOE may speed up adoption of non-controversial standards.

Finally, Congress should make it clear that federal law does not preempt states from setting their own appliance standards, in the absence of a federal standard in place. This principle has generally been upheld in interpretation of the federal appliance standards laws, but in some cases it has been argued that the mere authority for DOE to set standards should preempt the states, even if DOE fails to exercise that authority. If DOE fails to act, or if it establishes a “no standard” federal standard, a state should be able to adopt its own energy-saving standards for that product.

BUILDING ENERGY CODES

One of the most important opportunities for reducing energy use and costs is by designing and constructing a new building to be energy-efficient from the start. Every new building that is not efficient represents a lost opportunity—one that will likely be with us for another 30-50 years or longer, a time frame that will almost certainly see much higher prices and much more intense concern over energy supplies, air pollution, and greenhouse gas emissions.

There is cause for optimism in the growing interest shown by builders and developers in green buildings and rating systems such as the U.S. Green Building Council’s LEED; the bold new policy commitments to energy efficiency targets by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the American Institute of Architects, and the U.S. Conference of Mayors; and the federal government’s own commitment (in EPAct 2005) to design new federal buildings to be 30% more efficient than current practice. But a great deal of work remains to be done. Congress can support and encourage these broader initiatives with specific actions that take best advantage of federal leverage in building codes and federal financing for home mortgages.

Recommendations for assisting state energy-efficient building codes.—

(1) Congress should direct DOE to support a process of continuous improvement in the model energy codes for both residential and commercial buildings, targeting a 30 percent reduction in new building energy use beginning in 5 years and 50 percent savings within 10-15 years.

(2) To make sure that energy codes are not just a paper exercise, Congress should fully fund the programs for state code compliance and training authorized in Section 128 of the Energy Policy Act of 2005.

Present law requires that DOE review any updates in residential or commercial model building codes, to determine if the revision improves energy efficiency. Following that determination, each state is required to review and, for commercial buildings, update its own building code to meet or exceed the model code. However, there is no penalty for a state that fails to comply.

Two changes are needed. First, DOE should set a goal for continuous improvement of the model building codes. Rather than wait passively for action by others, DOE should instead take the initiative to engage with organizations such as ASHRAE and the International Code Council to advance the model codes steadily toward specific targets: 30 percent efficiency improvement beginning in 5 years, for both residential and commercial model codes, and at least 50 percent improvement in 10-15 years or less. ASHRAE has already adopted a similar goal, but there is no similar urgency for residential buildings, and it is hard to move diverse, consensus-based organizations to take ambitious action. DOE support is needed both for technical underpinnings and to represent the national interest in reduced energy use and greenhouse gas emissions.

Second, the federal government should adopt stronger incentives to assure state action in updating and achieving full compliance with the energy codes. States should be required to adopt strong codes for residential as well as commercial buildings. And in a recent review of residential energy code compliance studies from a dozen states, compliance rates were found to vary widely, but the average was far below 100 percent, and typically closer to 40 to 60 percent. A number of studies have pointed to the constraints, including staff time and expertise, facing many local code enforcement agencies in making sure that energy code requirements are met,

both at the design and permit stage, and in verifying actual construction and installation practices on-site.

The code compliance program authorized under Section 128 of EPAAct 2005 is a small but important step toward providing an incentive for states to adopt and enforce up-to-date energy codes; it should be fully funded. In addition, DOE has not made the required determination of energy savings on any recent code updates: the 2003, 2004, or 2006 residential IECC or the 2001 or 2004 ASHRAE commercial standard. Congressional oversight is needed to ensure DOE meets its important duty.

Recommendations for federal standards for manufactured homes and buildings funded by the federal government.—

(1) Congress should require HUD to strengthen the national energy efficiency standards for manufactured housing to the same levels required by the model building code for site-built homes.

(2) Congress should require that federally insured mortgages be available only for homes that meet or exceed model energy efficiency codes.

(3) Congress should require that all DoD Privatized Military Housing not yet constructed be designed to meet or exceed the current efficiency levels for an Energy Star home.

About one in 12 new homes in the United States is a manufactured housing unit (147 million in 2005). Because these homes are factory-produced with many standardized components, manufactured housing units should be inherently more energy-efficient than their site-built counterparts. For example, it is much easier and more cost-effective to achieve an air-tight duct system in the factory than on a construction site. Instead, manufactured homes are generally much less efficient than site-built homes, due to poorly insulated walls and roof, single-pane windows, and inefficient heating and cooling systems. A 2004 Pacific Northwest National Laboratory report found that improving the energy efficiency of a manufactured home, not even to the current IECC, would save an average of \$150-\$180 per year. The initial cost would be about \$1,000 to \$1,500.

Congress directed that the manufactured housing efficiency standards be based on life-cycle cost analysis, but HUD, which is responsible for adopting the Manufactured Housing Construction and Safety Standards (MHCSS), has not updated these standards to keep up with changing energy prices and advances in energy-saving materials and equipment. As a result, the “HUD-code” standards are now well below the comparable energy efficiency code requirements for new site-built homes. For example, a new manufactured home built for Minnesota today is required to have only as much wall insulation as a site-built home in Miami—and the ceiling and floor insulation levels required by HUD code for that Minnesota manufactured home wouldn’t even meet the site-built model code requirements for Miami.

Many of these manufactured units are sold to low and moderate income families—those who can least afford to pay the rising utility bills for gas, electricity, and in some cases propane heating. And often taxpayers end up subsidizing the ongoing costs to operate these inefficient housing units through the Low-Income Home Energy Assistance Program (LIHEAP) or through the Low-Income Weatherization Assistance Program, which helps pay for energy-saving retrofits. It is far easier and cheaper to make these manufactured homes more efficient in the first place.

To qualify for a federally insured mortgage, a new home should be required to meet or exceed the efficiency levels of the model energy code (currently the 2006 IECC). This will assure that federal taxpayer funds are not used to underwrite inefficient new homes with higher utility bills—a different kind of hidden, long-term “mortgage.” Updated standards would affect a lot of housing: a 2003 U.S. Census Bureau survey found, for homes constructed in the previous four years, 486,000 FHA mortgages, 225,000 VA mortgages, 29,000 USDA mortgages, and 38,000 public housing units.

Current law requires HUD and the Department of Agriculture (USDA) to set energy-efficiency standards for:

- Public and assisted housing,
- New homes (other than manufactured homes) with mortgages insured by the Veterans Administration and Federal Housing Administration, and
- New single-family homes with mortgages insured, guaranteed or made by USDA.

However, the agencies have never changed the standard from the legislated backstop of the 1992 Model Energy Code (the predecessor to the IECC) and ASHRAE Standard 90.1-1989. EPAAct 2005 only required public and assisted housing with HOPE VI grants to meet the 2003 IECC.

In order to move military service members and their families out of outdated housing units, Congress authorized the Department of Defense (DoD) to enter financial partnerships with builders to construct an estimated 185,000 homes using joint funding. DoD is leasing the homes for up to 50 years, and will pay the energy bills through utility allowances to the military personnel. DoD imposes many standards on these units, and energy efficiency criteria are established for some projects, but there are no uniform energy standards applied to all Privatized Housing projects.

If these homes are built to ENERGY STAR® Homes criteria, each military family—and ultimately the federal taxpayers—will save an average of \$300 a year in energy bills. The added initial cost of Energy Star homes is about \$1,500 to \$3,000.

ENERGY EFFICIENCY TAX INCENTIVES

Recommendation for energy-efficiency tax incentives.—Provide long-term extensions, with improvements, of tax incentives for highly efficient new homes, home improvements, commercial buildings, and appliances.

Other important measures to save electricity and natural gas are outside the jurisdiction of this committee. But the Alliance will not let an opportunity go by to emphasize the importance of extending and building on the tax incentives for energy-efficient new homes, home improvements and heating and cooling equipment, commercial buildings, and appliances that were in EAct 2005. These incentives have great potential to transform markets for energy-efficient technologies, but they are in effect for too short a time. A large commercial building initiated when the bill was signed last August will not be finished before the commercial buildings deduction was set to expire in December, 2007. While it was extended late last year, a building initiated now could not be finished before the new expiration date in 2008. The Alliance strongly supports long-term extensions of the tax incentives, with some improvements that have been worked out with other stakeholders—notably a performance-based incentive for whole-home energy-efficiency retrofits that picks up where the current home improvements credit leaves off.

INCREASING ENERGY EFFICIENCY IN FEDERAL FACILITIES

When working to address inefficient energy use, the federal government needs to look no further than its own buildings to start reducing wasteful energy consumption. The Alliance to Save Energy estimates that the federal government wastes one billion dollars a year in its buildings alone through inefficient energy use. This occurs despite long-standing executive orders and federal legislation. The problem is three-fold:

- The federal agencies do not have sufficient appropriations to make the necessary upgrades to reduce building energy use. Because of this historical problem, the unique Energy Savings Performance Contracts (ESPC) were created. With an ESPC, a federal agency can contract with a private energy service company to have the facility efficiency improved without any up-front cost to the federal taxpayer because the contractor pays the initial cost and is repaid out of guaranteed energy savings provided by the improvements. Unfortunately, this program authority lapsed in 2003-2004, and, while now reinstated, agencies are not taking full advantage of these contracts, leaving needed improvements lingering.
- The federal agencies do not have adequate oversight and pressure to meet their statutory energy saving goals. While the federal agencies are required by law to reduce their energy use, they are not held to task by the White House or by Congress. The missions of the agency are always paramount; however, a concerted commitment from the President and his cabinet is needed so that the agencies will place enough focus and priority on achieving energy savings in their facilities.
- The Department of Energy's Federal Energy Management Program (FEMP) is the primary resource for federal agencies to turn to for technical guidance and assistance with energy improvements. Unfortunately, the FEMP program continues to receive funding cuts although its mission and responsibilities were increased in EAct 2005. Congress and the administration need to recognize the benefits of FEMP and provide the much needed funding increases.

TECHNOLOGIES AND INTEGRATED SYSTEMS FOR LOW-ENERGY, HIGH-PERFORMANCE BUILDINGS

Recommendation for a buildings RD&D program.—Establish and fund a program to develop and establish in the market net-zero energy buildings, with an emphasis on commercial buildings.

To create the technology and knowledge base needed to achieve the long-term goal of net-zero energy (“carbon-neutral”) buildings, the federal government needs to make a substantially greater commitment—in close partnership with states, utilities, and the private sector—to a comprehensive, multi-year program to transform building technologies and practices. This transformation must go well beyond individual technical measures to include a design process that integrates sustainability from the start, and effective means of managing construction and building operation to assure continued high performance over the lifetime of the building and systems.

The need is especially acute in the commercial buildings sector, where the challenge of maintaining performance, comfort, occupant health, and amenities while radically reducing energy consumption or significantly increasing costs is even greater than for smaller residential buildings. Yet it is “net-zero energy homes” rather than commercial buildings which have received the lion’s share of funding and program attention to date by DOE, utility and state programs, and private partnerships.

Investing 1/10 of one percent of the \$135 billion in annual energy costs for all U.S. commercial buildings would represent a substantial increase over the current federal efforts by DOE and all other agencies. But this is the equivalent of less than a half-day (12 hours) of energy costs for the nation’s commercial building stock—a reasonable price to assure that we really have the technology to cut energy use by more than half over the next two decades. To be effective, these funds would need to be directed toward a well-orchestrated plan to address innovation in technology and practices, strategic and well-monitored demonstrations of these new methods, and paths to effective large-scale deployment in new and existing commercial buildings.

Such an integrated strategy requires careful preparation and broad engagement of the building industry, the design professions, financial institutions, government policy-makers, and private owners and developers. There is growing interest in sustainable design but the industry is fragmented, risk averse, and driven largely by short term economic interests. By itself the federal government cannot create the needed technologies, nor force the market to accept them. But it can and should be the catalyst in partnering with industry, states, and utilities for these essential steps.

CONCLUSION

The Energy Policy Act of 2005 included some important measures to reduce building energy use, including new appliance standards and tax incentives. But, while helpful, they were not aggressive enough to address the critical energy issues facing our nation. In the last year and a half, concern about the linked issues of energy prices, energy security, and global warming has only grown. There are measures we could and should take, such as consumer education, that would have an immediate impact. But polls also show that a large majority of Americans are rightly more concerned that Congress find long-term energy solutions than that Congress quickly address current prices. There is an opportunity now to enact significant energy-efficiency measures that will benefit the economy, the environment, and energy security for years to come. The buildings being designed and constructed today will determine our energy use for decades to come. The Alliance urges you to seize the opportunity to reduce energy waste, supply shortages, price volatility, pollution, and global warming, to transform energy crises into economic opportunities.

Senator DORGAN. Ms. Callahan, thank you very much. I know that the Chairman of the full committee, Senator Bingaman, has to leave so I want to call on him for questions first, so that he’s able to ask them prior to his departure.

The CHAIRMAN. Thank you very much, Mr. Chairman. I thank all the witnesses for the excellent testimony.

Let me ask Jim Rogers if I could, just about something that Kateri has in her testimony here. You say in your written testimony that we should set rates to incentivize utilities and customers, and then you go on to say typically utilities earn more by selling more energy. It’s important to decouple utility revenues from sales or to provide utilities with performance incentives for effective energy efficiency programs, in order to align utility benefits with customer benefits. For example Northwest Natural, a natural

gas utility in Oregon, has a conservation tariff that helps it promote energy savings rather than sales.

It seems to me that utilities are in the best position to encourage and help consumers to save energy, and one of our big problems is this exact one here, which is that for utilities to do that under the current rates that are in place in most States, it's a way of cutting their revenue. We have got to figure out a way to deal with that. I wonder what you think Congress or the Federal Government or any of us could do, to encourage these rates to be rewritten, so that there's a coincidence of interest between the utility and the consumer in saving energy.

Mr. ROGERS. Thank you, Senator. There are several ways to approach this. First of all, California's the only State that's actually decoupled earnings from sales on the electric side. There's been a movement across the country with gas distribution companies to do the decoupling. I think that has occurred in seven to eight States. In fact, in Ohio and North Carolina for the gas distribution companies they have considered that, so decoupling is one way. I think there are many ways for this to happen and from a congressional standpoint, I think it would be very important to encourage the States—specifically the State utilities who have the primary jurisdiction over this—to address the regulatory model and ask them to report back to Congress after a specified period of time and report on how they are addressing the issue. It's primarily tied up and related to the charter of electric utility within the State.

I firmly believe, as I said in my testimony, that utilities have a relationship with the customer. They have a lower cost of capital than most of their customers. They're used to payback periods of 15, 20 and 30 years—most businesses require paybacks of 3 to 5 years—and most importantly, they're in a position to be able to provide universal access to energy efficiency whether you're rich or poor, or on fixed income, low income, whether you are a big business or a small business. I think it's critical that utilities provide that universal access in the same way they provide access to electricity today. The way I think about it is that we get paid for producing megawatts, so we should also get paid for creating "Sav-A Watts". I think that we can get that done, but it's in the State utility commissions where it has to get done, and I think that would lead to a significant increase in energy efficiency.

The last thing I would say, and I think is important, I just learned the other night having dinner with my energy efficiency team. They said that mainly energy prices, when they survey customers, are in back of mind, not top of mind. To get customers to make choices about energy efficiency, you often have to move it to top of mind, and because cell phone bills and cable bills are usually much higher than electric bills, it's hard to move it to top of mind, but one of my team said something that was really eye-opening to me. He said maybe what we ought to do is push it further to back of mind, and the thought here is to change our concept of standard service. Today to go to a green tariff, or use energy efficiency programs, customers have to elect into it. Maybe to change the paradigm is that our standard service becomes the green service and the one with the devices to control their energy and they have to default out of that standard service into what today is our standard

service, so just that change could translate into dramatic change in the utilization of new technology in the energy efficiency area.

The CHAIRMAN. Since I've got 1 second left, right, or I did when I started to talk: let me just ask what's your reaction to this energy efficiency resource standard idea? Should we be adopting a Federal energy efficiency resource standard as Kateri recommends?

Mr. ROGERS. I think it's a good idea but it wouldn't be the first thing I would focus on. I think within the concept of renewable portfolio standards because different parts of the country have different generation mixes, I think an energy efficiency requirement, not so much a requirement, because a requirement said in itself are difficult. Some parts of the country are growing 6 percent; other parts are growing at 1 percent; some are having decline in demand. I think the important thing is to get it right at the State level and then make sure at any national portfolio standard, we include conservation as something that you could do to hit your goals. Then over time Kateri's idea ought to be reviewed and analyzed and looked at closer, but I think it's a series of things that need to get done, and my only difference with Kateri's is the order.

Ms. CALLAHAN. Senator, can I take 1 second of your time to add something? It was too difficult to try and summarize in the statements, but we were asking that you explore energy efficiency resource performance standards. I also just want to say that to be something you look at, renewable portfolios standards, as Jim mentioned. We'd like to see energy efficiency to be considered as one of those resources that allow you to comply. That is an approach that has been taken by a number of different States—probably most notably Pennsylvania and Nevada—but that is something that we would like you to consider as you may move forward with an RPS.

The CHAIRMAN. Thank you.

Senator DORGAN. Senator Bingaman, thank you and thank you for joining us today.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman. I appreciate the testimony of all of you here today. I think it's been very, very helpful and very interesting.

You mentioned, Mr. Rogers, in order to bring it to front of mind, you have to pull it back up. Well, I can say in Alaska, we're paying \$4 a gallon. Actually, I was talking to a constituent this afternoon and I've got some villages up north that weren't able to get the diesel into their communities this winter because of low rivers, and they're paying \$8-plus. It's a tough winter for them out there, so it's definitely front and center in their minds, but it brings me to the issue of cost. We all want to think we are being more efficient but boy, that expensive hot water heater or the technology I have to put in, it doesn't make any difference if it's in a commercial building or into a residential building, it really does come down to the cost aspect.

Mr. Stewart, I want to start off with you. You had some very interesting statistics, and I think some very ambitious goals as to how we get there, but you do acknowledge that we've got an impediment to energy efficiency based on the perceived cost. How do we let people know that you might be paying up front but your sav-

ings overall—as we saw with Wal-Mart—can be recouped, and in relatively short order? How much counseling, if you will, do you give to those in both the private and public sector to encourage the right move?

Mr. STEWART. Thank you, Senator. That really is one of the biggest impediments we do have. What we find is that most clients for the policies—and it's prevalent in the private sector, as it's typical mandated in the governmental sectors—differentiate between capital expenditures and operations and maintenance budgets. So while we're working with the design team to initially build the building, the first cost issues and then the long-term tail of 30-, 40-, 50-year life of the building and its energy use doesn't come into play. The folks who are overseeing the production to the building up front aren't really paying attention and often times the folks who will be running the building aren't at the table with us as we're doing the design work. So, I think that one of the educational things that we all need to undertake is to understand it's that long-term life of the building, not the little part that we do up front and the design exercise, that has the biggest impact.

Senator MURKOWSKI. Mr. Zimmerman, from Wal-Mart's perspective, you've looked at that long-term picture, and as a company you've made a decision that you're going to invest up front to save later. You mention that you were giving tours to some of the other companies in the business. Is it you being a leader that's making a difference, or are we still going to be struggling with the reality that the capital construction costs just don't allow for this new technology to come into play?

Mr. ZIMMERMAN. You know I'd like to say that the message is getting out there, but I'm not quite sure it is. A lot of the people, as Mr. Stewart mentioned, involved in the core business, the facility managers, the energy managers, they know that these investments result in immediate positive cash-flow. I've actually had them come to me, like from some of our retail competitors, and say, "Would you share your message with our CEO, because we can't convince them." So the message is getting to one level of the organizations, but not necessarily to the other. But these paybacks are so phenomenal, it's just mind-boggling that it isn't catching on quicker than it should.

Senator MURKOWSKI. And how do we do it at the residential level? Mr. Hébert and Mr. Christianson, from two different States—here both northern States—where are you struggling with this? How do we convince the consumer who's either building a new home or looking to do some remodeling that they're going to be saving money here, Jack?

Mr. HÉBERT. We have a little different situation in Alaska because as I believe we're different than the rest of the Nation. Most of our electric companies are cooperatives owned by the members, so in our case the electric cooperative—rather than build a new power plant because of increased consumption—it's a better investment for them to have incentives to the builders and the homeowners to use less energy. For instance, Golden Valley Electric in Fairbanks has a program called Builder Sense". You get a credit; your customer will get a credit off of their future electric bills for any electric fixture that's put in that is highly energy efficient, as

simple as a fluorescent rather than an incandescent light. It's \$25 dollars a fixture. So in the end when you sell that home to your customer, they don't have an electric bill for a couple of years.

The other piece that Golden Valley Electric is doing is they have a program that we call SNAP. It was developed by a green power group of citizens—sustainable, natural alternative power—and we're trying to embed these systems into the house so that the house is actually producing electricity when it can. For example, on the photovoltaic side, even though there's 3 months of the year where our photovoltaic energy isn't high, if you embed photovoltaic systems in the house, you can sell back the energy for a credit to the electric cooperatives, so that in the months that you don't produce electricity you get that credited back. It's this cooperation thing.

Senator MURKOWSKI. My time is up, but Mr. Christianson, did you want to add anything?

Mr. CHRISTIANSON. Just very briefly, I mentioned that that obviously is a key issue, especially with new housing construction. I have friends actually building a house right now, and they did decide to put a ground source heat pump system into their home, even though the capital cost was significantly higher than a regular high efficiency gas system. They plan on staying in that house for a length of time, and they'll see the payback on that over the time that they're in the home. What we are doing is trying to work closely with the utility companies in the State to provide an educational program to prospective homeowners.

Senator MURKOWSKI. Thank you. Mr. Chairman.

Senator DORGAN. Senator Murkowski, thank you very much. First of all, let me thank all of you. I think you've all contributed to an interesting discussion about the issue of efficiency. Efficiency is always regulated, or generally speaking "regulated" is something of lesser importance than production and some of the other enterprises, but I think you've brought an interesting perspective to us.

A couple of things, Mr. Zimmerman. Your testimony is very interesting, and what your testimony seemed to say is that it made good business sense to do what you're doing. You talked about a payback of less than 2 years. If that is the experience of your business, why is that not the experience of all business who might look at these issues—to say it's a very quick payback in our business with respect to energy efficiency methodology?

Mr. ZIMMERMAN. Well, as I talked to a lot of our competitors, they know within the facilities group, the engineering groups, that those paybacks are achievable; they just have a very hard time freeing up the first cost capital from their senior executives. It's just the fact that most building enterprises are so focused on first cost the paybacks just really don't enter into the discussion, unfortunately.

Senator DORGAN. You're showing them how but you're not loaning them the money.

[Laughter.]

Mr. ZIMMERMAN. But we are sharing with them the vendors we're using, and the real-life experiences, to hopefully convey that this isn't just theory.

Senator DORGAN. But I think the point you've made today is a very important point. If in fact there is a relatively short-term payback for these efficiency strategies and technologies, there ought to be ways for us to tip the balance, even with just some minor incentives. A number of us have disagreements with the marketing strategies of Wal-Mart—you're familiar with all that national debate—but there's no question that Wal-Mart is an unbelievable merchandiser and a very savvy business competitor. If you, with that savvy judgment, can take a look at efficiency and say, "This makes good business sense for us. This not only justifies the investment. This compels the investment because of the short-term payback," it ought to be a lesson for others in terms of what they can do and what they should do, looking at efficiency. So your message today is very helpful.

Mr. ZIMMERMAN. Well, Mr. Rogers and Edison Electric Institute had me as their speaker to their major customer forum, I think it was called, where the La Quinta's, the Marriott's, the Walgreen's—all of those major users were there. That's where I was approached by so many of them saying if only our CEO's could hear this message.

Senator DORGAN. Let me ask Mr. Rogers a question, because in some ways it's counterintuitive. I think you've already answered the question, but I want you to answer it again. Here's a company that makes money presumably with every kilowatt hour of electricity you sell. Why is it in your interest to suggest people use less or purchase less from you?

Mr. ROGERS. Well, I think there are a couple of reasons that make sense. When we look at the growth and demand in this country, the demand for electricity is going to be up 50 percent—some are projecting by 2030. When we look at this tremendous growth and demand, you have to have the mindset that energy efficiency is a fifth fuel. You need to use it, and when we do our planning to meet that demand, we use it as a fifth fuel. But I think this discussion that I've been listening to really makes the point that that is the business we should be in. For instance, if you have 3 million customers, then you have the capability to put a device in a refrigerator and turn it off for 2 hours for the peak time or to recycle an air conditioner for 2, 3 hours, and you can do that across your system. It would have a dramatic impact on the amount of power you would need during that peak period. That's an example of getting major buy-in by all the residential customers, because the peakiest part of our load is residential. You talk about making investments, it's a natural thing. Our company has a capital program where we'll spend over \$10 billion in the next 3 years.

For us to invest that money in energy efficiency investments, in homes and in businesses, is an extension of what we do today. I think that if we get the rules right and we go down that road, when somebody has discretionary income of \$300—will they go put a device in their refrigerator or will they put a device to recycle their air conditioning? Probably not, but if we as a supplier are prepared to spend that \$300 and put those devices in, I think that's where our role with our customer can make a difference.

I also have found in our customer surveys that our customers are happier and more satisfied with us when we're also delivering ways

for them to reduce their usage. So to stay in business, you need customers that are satisfied with what you're doing. This natural extension of what we do today will translate into more satisfied consumers in the future, and will help us achieve national goals, both energy and environmental goals.

Senator DORGAN. So there's actually—and I don't say this in a pejorative way—but there's actually a commercial side to efficiency from your standpoint. There are technologies that you can market to customers.

Let me ask you a question about the future. Is there a future in which at some point a customer, any customer of yours, perhaps can take a look at what is the temperature in these three rooms? I left the lights on in these two rooms and using a computer, turn the temperature down in those areas of the home, those zones and turn the lights off? There was a little company in Fargo, North Dakota called Beathome.com—and they were so successful, of course, they were purchased by another company—but the point of it was, that they use sensors in a home in a very sophisticated way to maintain the electric usage and the HVAC system. I was really impressed. I have no idea what it costs, but my guess is that at some point in the future virtually every home will give every homeowner an opportunity to go to a computer anywhere and turn down the temperature in their home. Is that something that you see?

Mr. ROGERS. That technology is available, actually. There's a little company in California called DUS that is developing the sensors that can be used to help pick up and send the signal. The other thing that's going on, in addition to this development technology: we've changed how we think about our meters. We view our meters as really computers, and in a sense they have the ability to do two-way communication—whether it's through the internet or through the broadband over the power line. So the sooner we can create these communication channels, the better able you would be able to control your energy use.

Senator DORGAN. Thank you. Mr. Christianson, the President has recommended some budget cuts in the programs you talked about, especially in your State Energy Program—the SEP—and the weatherization program. You're involved in both of those. Also there are budget cuts in LIHEAP, which is a different program to help low income folks. I assume that your organization for whom you testify today is not supportive of those budget cuts in weatherization and the State Energy Programs. Is that a correct assumption?

Mr. CHRISTIANSON. That would be correct, yes.

Senator DORGAN. And why do you not support the budget cuts?

Mr. CHRISTIANSON. Well, we feel that with both programs again we've used those programs as kind of the foundation of our efficiency efforts in our State. We leverage a great deal of other money through those programs and we've done a variety of very innovative and successful efficiency efforts with those. The weatherization program: we weatherized about 1,300 homes per year in North Dakota, and obviously with our climate there for those low-income residents that's extremely important.

Senator DORGAN. But it is a contribution to efficiency. I mean I've been to the sites where weatherization is taking place. It seems to me to be an enormous contribution to efficiency.

Mr. CHRISTIANSON. Absolutely.

Senator DORGAN. And finally, Mr. Stewart, help me understand something. Carbon neutrality by 2030: how would we achieve carbon neutrality as long as we—and this is a very fundamental question, you probably think why on earth would he ask it—have to heat all these buildings?

Mr. STEWART. We begin to look at the sources of energy, Senator, and start to utilize not only what we can do with the design of a building, its placement, its orientation, the way its constructed, but also we have some of our members who are beginning to work at designing into the building energy sources that don't rely on fossil fuels, designing new photovoltaic systems. Technologies now exist where rather than panels, vision glass can be used. We're also at the point where we're integrating wind turbines and other things like that, so the opportunities exist with emerging technologies.

Senator DORGAN. It sounds like we have to rehabilitate our buzzers here.

[Laughter.]

Senator DORGAN. Thank you again for your testimony, Mr. Stewart. I think the perspective from the architects of our country is a very important perspective, and you offer those who are producing buildings expertise on technology on how to reduce the cost of heating and cooling and providing electricity to those buildings. We appreciate that perspective. Senator Murkowski.

Senator MURKOWSKI. Just a follow up on that. I had a meeting with several Alaskan architects last week and they were talking about some of the things we can do with construction, but they also reminded me of just the little day-to-day things. I keep my Blackberry charger plugged into the wall, and then when I want to charge my Blackberry I plug it in. But while it's sitting there in the wall, it's sucking juice. It's the little things we don't even think about. So we all need to further our education efforts.

Jeff, I wanted to give you an opportunity to just brag a little bit on the cold climate housing facility that we have up north, because we do have those sensors built in that will tell you—well, you tell them—what goes in within the individual rooms. It's pretty amazing.

Mr. HÉBERT. Well we're working with a small company called Siemens—

[Laughter.]

Mr. HÉBERT [continuing]. And they're a partner in this building. We are doing everything from measuring the occupant load by the amount of respiration to measuring the outside air quality. We have a lot of outdoor air quality issues related to smoke and wild fires: one hundred times what is considered healthy air, we had 2 years ago, outside in our natural environment. So in any case, this system is measuring everything from outside air to inside air to the ambient light, as was explained before, so that when the room isn't occupied or the ambient light is high enough, it goes down.

We also want to develop nanosensors that can be embedded in the building itself to tell what's going on. Where we'd like to go

eventually—as we all know cars are complicated: we used to all work on them, but now you basically have a computer that plugs in to see what’s wrong. In a home there’s a lot of issues with not just indoor air quality but the efficiency of your boiler, if you’re building up any kind of moisture in the walls, these kinds of things. Nanosensors can go to a central computer—again, expensive now, but on a mass scale wouldn’t be—so you would basically sign up for a service. This computer would dial the service company when your boiler needed to be tuned so it was at maximum efficiency. If the systems weren’t working in the house, you’d know those kinds of things. These are the kinds of things that are possible with research that will have huge impacts. So if you’re using too much energy and there’s nobody in the house, the house doesn’t have to be operating all its systems. We all know that, and it could automatically shut down. These are just some of the things that we’re doing.

Senator MURKOWSKI. It’s pretty amazing. I just wanted to give you an opportunity to speak to that. I have one last question and I’ll just deliver it to all of you. There’s been a repeated reference to the Energy Policy Act of 2005 and all the good things that were contained in it, but I think that we recognize that there are many aspects of it that either have not been funded or perhaps been underfunded.

The question is: do we need to be providing more incentives in other areas, or do we just need to adequately and appropriately fund those things that we have authorized under EAct?

Ms. CALLAHAN. I’ll take a stab at that. First, I want to invite Senator Dorgan over to our new offices, because we can control the lighting from all of our individual computers tops. So you can come see how it works, if you like. I think that the threshold industry issue, funding the programs authorized, there’s a critical need there. The funding for the Department of Energy’s energy efficiency programs has seen a real fall of over one-third since 2002. The authorities would create new programs and make existing programs more robust, so for our part that is an essential first ingredient.

Also extending the tax incentives that are there for homeowners to improve their homes—new home construction, new commercial building construction—those are just imperative. You mentioned getting to consumers. There is a \$450 million program for education and outreach to consumers that is authorized in the Energy Policy Act and not one dime been appropriated, so that’s—starting there is a very, very good first start.

Senator MURKOWSKI. Anybody else?

Mr. STEWART. I would just add support for the tax credit extension and increase. Both of those options are things we’re talking about with various Members of Congress now.

Senator MURKOWSKI. Good, I appreciate it, thank you.

Senator DORGAN. Senator Murkowski, thank you. One last question to Ms. Callahan. The alliance has been at the forefront for pushing efficiency standards for appliances for a long, long time. I know some looked at that with raised eyebrows, thinking, “This is sort of the edgy extreme—why on earth should we impose regulations on those that are producing air conditioners?” and all the sort of things that we expect, when these proposals are made. Tell us

if you would, at this point since a substantial amount of progress has been made in respect to refrigerators and HVACs, and a lot of appliances have dramatically improved standards: is there any other low-hanging fruit with respect to appliance efficiency?

Ms. CALLAHAN. That's the beauty, we think, of energy efficiency. It's the gift that keeps on giving. The advocates have identified about 15 products that if we were to put in place standards on those, or update standards that are just old, we could save the equivalent of \$54 billion by, I think, the year is 2030, in avoided energy costs. So there is a lot that can be done. We are working with the other energy advocates right now and appliance manufacturers to try to negotiate standards. Then we can deliver appliance standards to the Congress and say, "Look, the manufacturers have agreed—they can meet these standards if imposed by 'X' date," and have those modified so we can shorten the regulatory process to get them in place. So the simple answer is yes. There are a lot of products and we keep inventing new products, large-screen plasma TVs, things like that, where we're going to have to continue to update and invent new standards.

Senator DORGAN. But some consider that government interference, right? I mean, I remember the SEER 13 debate on air conditioners.

Ms. CALLAHAN. I think that's true. My hope is that we're gaining a growing awareness that these can be done in a way that manufacturers can accept them. One of the things on which we're working with the manufacturers right now, Senator, is to try and look at a package. That is not only just standards, but it's early tax incentives, to help them make the changes that they need in their product line-up and their manufacturing to actually get us those. So we are really trying to work collaboratively. These are the basics, in a sense; we're not going to do any worse than this. There are a lot of programs to try to get above the standard level, whether it's Energy Star or tax incentives, and we advocate those as well. It seems to make manufacturers more receptive to allowing efficiency standards to be put in place.

Senator DORGAN. And so the technology exists in many cases to improve efficiency but the balancing act is between technology and cost in some cases, correct?

Ms. CALLAHAN. That's absolutely right, Senator.

Senator DORGAN. Let me ask you, if you would—just as a last point of this committee—describe for all those who may not know the Energy Star program.

Ms. CALLAHAN. Well the Energy Star program is a voluntary program. It's managed by EPA and DOE and certifies products as being more energy-efficient than the standard models on the marketplace. It's available on a number of different products. Actually there are Energy Star labels now for new construction of new homes. There are Energy Star performance guidelines for existing homes. So it really is a program that is a voluntary labeling program that lets consumers, if you will, know through a label that they're buying the most efficient energy product available on the marketplace in that category.

Senator DORGAN. Thank you very much, and I think it's a very successful model. Let me thank all of you. Often the issue of effi-

ciency becomes an orphan in the debate on energy. There's so many other things that are the sexy items of discussion on energy policy, that efficiency is often ignored, but it should not be. Mr. Rogers you describe it as a fifth fuel, which is probably an appropriate description today. I think all of you have brought really interesting information to the committee, and as we work through these issues, that information will be a part of our progress in trying to approach how to better achieve a greater energy efficiency in this country. Thank you very much. This hearing is adjourned.

[Whereupon, at 3:50 p.m., the hearing was adjourned.]

APPENDIX

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

STATEMENT OF STEPHEN R. YUREK, PRESIDENT, AIR-CONDITIONING AND REFRIGERATION INSTITUTE (ARI)

Thank you for the opportunity to testify before the Committee regarding efforts to improve the energy efficiency of buildings. My name is Stephen R. Yurek, and I am the President of the Air-Conditioning and Refrigeration Institute, or ARI. ARI is the trade association representing manufacturers of more than 90 percent of North American produced central air conditioning, and commercial air conditioning and refrigeration equipment. Today, I am speaking on behalf of the U.S. air conditioning and refrigeration industry to express our support for federal tax policy that will accelerate the changeout of older, inefficient commercial heating and cooling equipment with newer more efficient products that employ the latest energy efficiency technology.

Currently, the federal tax code for the depreciation-holding period for commercial heating, ventilation, air conditioning, and refrigeration (HVACR) equipment is 39 years. ARI would appreciate the committee's support for a legislative proposal to modify the federal tax code for HVACR equipment to reduce the depreciation period to 20 years as a meaningful way to improve the energy efficiency of buildings. This change would contribute significantly to the improvement of the environment by reducing energy demand and eliminating the use of CFC refrigerants, while at the same time reducing energy costs for building owners. Specifically:

- Accelerated replacement of HVACR equipment is projected to save 137 trillion Btus per year, enough to power 1.4 million houses in America. It would also reduce carbon dioxide emissions by 95 million metric tons by 2015, approximately the equivalent of the CO₂ emissions released by approximately 16.5 million passenger vehicles.
- Reducing the depreciation period for HVACR systems would provide an incentive for building owners to upgrade to more efficient equipment by allowing them to expense more of the cost of the system each year. By replacing the building's existing HVACR units, building owners and managers could lower energy costs and reduce energy demand. For example, today's chillers are 35 to 40 percent more efficient than chillers installed 20 years ago.
- Accelerated depreciation would provide an incentive for the replacement of over 35,000 CFC-based chillers still in use as of January 1, 2004. New uses of CFC refrigerants have been banned in the United States due to their impact on the stratospheric ozone layer.
- The U.S. air conditioning and refrigeration industry employs more than 150,000 workers and contributes \$17 billion annually to the U.S. economy. The HVACR industry exports \$4.7 billion in products annually, providing an industry trade surplus of more than \$2.1 billion. Lowering the depreciation period would encourage building owners to invest in new systems, thereby creating business for American manufacturers and contractors.

Representative Peter Hoekstra has introduced legislation H.R. 345 in the United States House of Representatives, H.R. 1241 that would modify the tax code for this equipment. This legislation has received significant bi-partisan support, with members of both parties applauding the environmental benefits of removing CFC refrigerants, increasing efficiency, and reducing electricity demand. The 200 member companies of ARI urge the Senate to consider supporting similar legislation to promote protection of the environment while improving the overall energy efficiency of buildings.

Thank you for the opportunity to provide testimony. I would welcome any questions the Committee might have regarding the impact of this legislative proposal.

STATEMENT OF PETER A. DARBEE, CHAIRMAN, CEO AND PRESIDENT, PG&E CORPORATION

Chairman Dorgan, Senator Murkowski, and Members of the Committee, I am pleased and honored to submit this testimony representing my company, PG&E Corporation.

PG&E Corporation is an energy holding company headquartered in San Francisco, California and is the parent company of Pacific Gas and Electric Company. Pacific Gas and Electric Company is California's largest utility, providing electric and natural gas service to more than 15 million people throughout northern and central California. PG&E is a recognized leader in energy efficiency and has among the cleanest electric delivery mix of any utility in the country.

PG&E Corporation is a member of the U.S. Climate Action Partnership, also known as U.S. CAP, which is a coalition of leading businesses and environmental nongovernmental organizations (NGOs), including Alcoa, BP America, Inc., Caterpillar Inc., Duke Energy, DuPont, Environmental Defense, FPL Group, General Electric, Lehman Brothers, Natural Resources Defense Council, Pew Center on Global Climate Change, PG&E Corporation, PNM Resources, and World Resources Institute. U. S. CAP has come together based on a shared understanding that climate change is an urgent issue, and that the United States both has a responsibility and opportunity to act now, act aggressively, and enact policies to stabilize and reduce greenhouse gas emissions, enhance energy security, and create economic opportunity by developing and deploying new technologies.

U.S. CAP has recommended a set of public policy principles and a legislative framework for Congress and the Administration, which will accomplish these goals. We developed this framework and these recommendations by putting the tough issues on the table. We challenged each other with hard questions. We debated. And we came together to move forward in those areas of common ground. This is difficult to do. It takes tenacity. And most of all, it takes mutual respect, humility, patience, compromise and a willingness to take the long-term view.

The members of U.S. CAP are committed to working with Congress and the Administration to do the same. I believe that this dialogue will help to forge the kind of understanding needed to tackle these challenging issues.

THE CHALLENGE

As the head of a major energy company—and also as an American and a great believer in our nation's unique place in the world—I believe the United States has a responsibility to be at the forefront of addressing global climate change.

If you look at U.S. greenhouse gas emissions compared with other nations, the level of emissions from sources in the U.S. is vastly disproportionate to our population. Our emissions are higher than those of China and India combined, where the population is more than 2.5 billion people.

If you look at our wealth and prosperity relative to other nations, it's clear that we can afford to make a difference.

And, if you look at our tremendous capacity for innovation, it's clear that we have the human capital to develop the solutions. By signaling to the market that we're serious about making progress on clean energy, we can stimulate investment and engage our best and brightest minds in this effort.

The longer we wait, the costlier the solutions will likely become. On the other hand, by acting now, we preserve valuable response options. We narrow the uncertainties. And we avoid the economic and social dislocation of drastic changes later.

DEVELOPING A RESPONSE

So, in the face of this challenge, where do we start? U.S. CAP has provided a roadmap for developing the kind of comprehensive approach that will be necessary to address global warming. At the core of the recommendations is a national, mandatory, market-based approach to reducing greenhouse gas emissions—a so-called "cap and trade" program—that establishes clear short-, medium-, and long-term goals and unleashes the power of the market to get the job done. In addition, U.S. CAP identifies action that should be pursued aggressively in advance of the implementation of a national cap-and-trade program, including a full court press on energy efficiency.

Taking this approach will create clarity for business; create consistency, by avoiding a state-by-state patchwork of emissions trading markets; create focus for a comprehensive national energy strategy; and allow us to begin to change the U.S. emission trajectory today.

OVERVIEW OF U.S. CAP RECOMMENDATIONS

U.S. CAP provides recommendations on all the major components of legislation that could be developed to address this challenge, and many of these recommendations are focused on making the U.S. economy more energy efficient than it is today. In brief, these recommendations include the following:

- Policies and measures to facilitate the development and deployment of advanced transportation, power generation, and energy efficient technologies;
- Cost control measures, including the use of greenhouse gas emissions offsets, banking, borrowing, a strategic allowance reserve, and preferred allowance allocations;
- Inventory and registry so that we can identify both the most energy-intensive parts of our economy and where the most cost-effective reductions can be achieved;
- Credit for early action, to both recognize actions already taken and encourage others to step up today; and
- Sector-specific policies and measures, to complement an economically sound cap-and-trade system to create additional incentives to invest in low-GHG approaches in key sectors, including energy efficiency. These measures will be particularly necessary where near-term price signals are insufficient to deploy existing energy-efficient technologies or other market and regulatory barriers exist that impede their introduction or utilization.

In addition to outlining these major recommendations from U.S. CAP, I would also like to spend a little time addressing three key elements that provide the foundation for many of the recommendations—the importance of improving energy efficiency, the need to develop a “smart grid” for delivery of electric power to consumers, and the important role that decisions on electric power generation and fuel diversity play in the climate change equation.

ENERGY EFFICIENCY

A recent McKinsey study said that, through energy-efficiency, we could reduce the growth rate of worldwide energy consumption by more than 50 percent over the next 15 years. And McKinsey said we can do this using the technology we have available today.

A major step toward unleashing this opportunity in the U.S. would be federal action making it easier for utilities to actively advocate energy efficiency. PG&E has been doing this for three decades. Our energy efficiency programs, both electric and natural gas, have already prevented 125 million tons of greenhouse gas emissions. These programs also helped California escape the need to build 24 additional large power plants, and they’ve saved customers more than \$9 billion.

And we are doing even more. Between 2006 and the end of 2008, we will invest an additional \$1 billion in energy efficiency, avoid the need for another 600 megawatts (MW) of electric power, and save customers another \$1 billion. In fact, in 2006, we exceeded our targets and saved more than 160 MW of power and 10 million therms of natural gas.

The reason we can do this is that, under state law, our revenues are set at a fixed level by regulators. We collect what we need to run the business and provide a fair return to investors. Any overruns go back to customers. Any shortfalls are recovered later. This is known as “decoupling” and it means our financial health doesn’t depend on selling more energy. So it eliminates the financial disincentives that otherwise stand in the way of encouraging customers to use less of our products. Experience shows that this empowers utilities to become some of the most effective advocates for energy efficiency. This is especially true when you package this policy with incentives for utilities. Utilities should be provided an opportunity to earn a return on investments that save energy, just as they do when they invest in a new power plant, and that earnings opportunity should be tied directly to how well utilities help customers reduce their bills.

A number of states are already moving in this direction. U.S. CAP recommends that Congress bring all 50 states on board by either incorporating this policy into federal law or taking steps to strongly encourage states to do so. We also need stronger energy efficiency codes for whole buildings, equipment and appliances. PG&E has worked for decades to help both state and federal authorities set better energy efficiency standards. Progress at the federal level has lagged recently, however, and we urgently need to reinvigorate it. And finally, it may be necessary to provide incentives for entities to go even further to seek energy savings.

Aggressive standards and incentive programs are a big reason that per capita energy usage in California has remained flat over the past 30 years, while the rest

of the nation has increased its per capita usage by 50 percent. During this time, California was the epicenter of the hi-tech and bio-tech revolutions—with many of the market leaders being energy efficiency pioneers themselves. Raising the bar at the national level will lead to new investment in next-generation energy efficient technologies and spark growth opportunities in other sectors.

For example, recognizing the intense and persistent energy use of computing equipment, airflow management, and power conditioning systems in data centers, PG&E worked with Sun Microsystems to develop an incentive program for energy-efficient servers, garnering attention from a growing number of other major computing equipment manufacturers, who are also qualifying their premium performance equipment for incentive programs.

PG&E also announced the first-ever utility financial incentive program to support virtualization projects in data centers. Virtualization technology enables customers to consolidate their data centers and thereby significantly reduce their energy use. One major software firm, for example, was able to consolidate workloads from 230 servers onto just 13, representing an energy cost savings of more than \$100,000 per year. This same company is now creating a new product based on this approach.

Many regions across the U.S. are experiencing new demands for electric infrastructure as data center operators construct new facilities. Data centers can use up to 100 times the energy per square foot of typical office space, so efficiency opportunities are significant. We are now working to expand the gains we've made, by leading a coalition of U.S. utilities to capture energy efficiency in data centers. Participants include the Northwest Energy Efficiency Alliance, TXU Energy, the New York State Energy Research and Development Authority, and NSTAR.

Our efforts do not stop in the U.S. We recognize that climate change is a global problem requiring a global solution. And, while we do not believe that U.S. action should be contingent upon global action, we do recognize that in order to make progress, all major emitting economies will need to contribute equitably. That is why PG&E is working cooperatively with the Natural Resources Defense Council, the State of California, and others as part of the U.S.-China Energy Efficiency Alliance. The Alliance works to exchange information and facilitate technology deployment, ultimately helping China reduce the energy intensity of its economy and providing economic opportunity and advantage to those that supply these energy efficient technologies and facilitate best-practice programs. A climate program therefore must build off of efforts like this and the Asia-Pacific Partnership in the near term, and create additional international linkages going forward.

And, finally, we are supporting the development and deployment of new energy efficient technologies and call on Congress to do the same. We implemented several emerging technologies projects in 2006, including integrated daylighting in schools and automated demand response controls. These projects set the stage for significant energy savings in the future and for creating economic opportunities for manufacturers and vendors.

In our state and for our company, energy efficiency is the “first energy resource.” That is, before we look to add generation, we see what we can do to reduce demand. I believe the U.S. should make energy efficiency the nation's first resource as well, and U.S. CAP's recommendations will go a long way toward achieving that.

SMART GRID

Maximizing the potential for energy efficiency, as well as distributed generation and some advanced transportation technologies, will require a “smarter” energy grid, one that provides for two-way communication between energy consumers and energy providers. PG&E is installing 10 million Smart Meters™ throughout our service area to provide the infrastructure that will eventually support these technologies and offer new capabilities. Tax incentives and reform measures will be needed to advance these efforts nationally.

One example of a technology which would benefit from a “smart” grid is plug-in hybrid vehicles (PHEVs). Vehicle-to-grid technologies have the benefit of reducing oil use, enhancing the power grid, and reducing greenhouse gas emissions. For example, when the cars are not in use, energy from the batteries could be uploaded back to the system, reducing the need for peak power generation. This is important, because peak power often comes from the least efficient and least clean resources on the grid. And, PHEVs facilitate more efficient use of the electric grid, as these vehicles will mainly charge at night, when demand is otherwise low. And, in our state, this is also when some of our lowest emitting resources are powering the electric system.

POWER GENERATION AND FUEL DIVERSITY

In addition to using energy more efficiently and reducing demand, and implementing “smart grid” strategies, a significant emphasis and focus of any greenhouse gas reduction program must be on ensuring an affordable, reliable, and diverse supply of electricity from low-greenhouse gas (GHG) emitting sources. As with energy efficiency, the latest research suggests we can be doing a lot more with what we have available today.

For example, currently, the U.S. is getting about 9 percent of its electricity from renewable sources. Excluding hydroelectricity, that figure is a little more than 2 percent. A number of states have set targets for increasing the supply of renewable energy. In California, our target is to deliver 20 percent of our energy from renewable sources by the year 2010, excluding large hydroelectric sources. PG&E is on track to meet this goal.

But the federal government can make a tremendous contribution here. One major positive step would be the extension of production and investment tax incentives for renewable energy sources for more than one year at a time. This would provide much-needed certainty for investors, reduce the cost of technology development, and encourage fuller deployment.

Washington can also play a leading role in researching and developing next-generation renewable power sources. I’m particularly intrigued by solar thermal technology. PG&E is also exploring the possibility of tidal and wave power off the coast of California. And, the sooner we can develop a good understanding of their viability, and their relative costs and benefits, the sooner we will be in a position to move forward.

It’s also critical that we implement policies and initiatives to facilitate the development and deployment of lower GHG-emitting conventional power sources. A strong place to start would be increasing the efficiency of natural gas fired turbines. And, I personally believe we need to facilitate development of both new supplies and new infrastructure. For example, biogas from methane digesters is an opportunity we are pursuing to supplement natural gas supplies for our customers. Again, federal investment and policies that support efforts in these areas would be very positive.

We are also hearing the beginnings of a national conversation about the future of nuclear power in our country. The advantages of nuclear power in a carbon-constrained world are considerable and must be acknowledged. But nuclear power also faces considerable challenges that must be addressed. It is an option that should be on the table.

Finally, we must address the issues surrounding the use of coal. About 40 states rely heavily on coal for their electric power and, nationally, the electricity mix is currently more than 50 percent coal. So it is critical that we accelerate efforts to deploy advanced coal technologies that have the capability to cost-effectively capture and store carbon dioxide. Right now, carbon capture and storage technology is expensive and questions remain. I am cautiously optimistic that the challenges facing this important fuel source can be addressed. And the federal government can help us get the answers we need more quickly and help drive down cost. Policy makers should fund at least three large-scale development and demonstration programs, to account for a diversity of locations, coal types, and storage formations. The U.S. should also establish the rules as soon as possible for how carbon dioxide must be captured, transported, and stored. Without these rules, it will be difficult for investments to be made on the scale necessary to achieve our GHG reduction targets.

THE TIME IS NOW

Our country has a historic opportunity to change the way we produce and use energy in ways that will lower the threat of climate change and improve our environment. The optimist in me is certain that we’re going to achieve this goal over the course of the next generation. But the realist in me knows that we can’t take this outcome for granted. Achieving it will be a very substantial challenge. And that is why we have to come together as pragmatic, responsible participants in this effort.

On behalf of PG&E, I want to thank you for the opportunity to submit this testimony. I appreciate the commitment of this Committee to addressing these critical issues and I pledge my cooperation and support as this Committee and Congress moves forward.

Thank you.

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