CLIMATE BENEFITS OF IMPROVED BUILDING ENERGY EFFICIENCY

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND AIR QUALITY

OF THE

COMMITTEE ON ENERGY AND COMMERCE

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CLIMATE BENEFITS OF IMPROVED BUILDING ENERGY EFFICIENCY

TUESDAY, JULY 17, 2008

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND AIR QUALITY,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 10:05 a.m., in room 2322 of the Rayburn House Office Building, Hon. Rick Boucher (chairman) presiding.

Members present: Representatives Boucher, Barrow, Inslee, Matheson, Matsui, Upton, Shadegg, Walden, and Burgess.

Staff present: John Jimison, Laura Vaught, Chris Treanor, Rachel Bleshman, Erin Bzymek, and Mills Forni.

OPENING STATEMENT OF HON. RICK BOUCHER, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF VIRGINIA

Mr. BOUCHER. The subcommittee will come to order. In the next Congress, this subcommittee will initiate legislation to reduce greenhouse gas emissions between 60 and 80 percent by the year 2050. A portion of that goal we intend to meet through a cap-and-trade regulation on large-scale stationary sources and on transportation. But to achieve the goal fully, other steps will also be required.

Last year's energy law began that process with a landmark measure to enhance the efficiency of a broad range of household appliances. It also encourages a smart electricity grid and a capture of waste heat from industry. By 2030, last year's law will reduce greenhouse gas emissions by that year through a cumulative total of 10.6 billion tons. And in that year alone, the annual reduction will be 700 billion tons, equal to about one-half of the emissions of all of the vehicles on America's roads today. So it truly was a landmark efficiency measure.

Another key step will be making America's buildings more efficient. The energy they consume accounts for approximately 40 percent of total U.S. greenhouse gas emissions. Some experts believe that it would be possible to apply affordable solutions to reduce CO_2 emissions attributable to our Nation's buildings by more than 60 to 80 percent by the year 2050, suggesting that achieving those efficiencies will have to be a key ingredient in our overall greenhouse gas reduction strategy.

These may be among the least expensive reductions that we achieve. It is estimated that new building efficiencies cost approxi-

mately 3 cents per kilowatt hour to install, while the consumption of energy is at best 5 cents per kilowatt and typically somewhat higher. These savings are effective immediately with no lead time. They are permanent. They are free of environmental negatives, and they are not attended by the large infrastructure cost that new electricity generation requires. They deliver their full benefit, unlike new electricity generation which, on average, delivers about 30 percent of the fuel input as usable energy.

These realities suggest that making buildings more efficient is truly the low-hanging fruit in the CO_2 reduction effort. Last year this committee passed and this committee proposed and the House passed section 431 to present to the States a new recommended building code to advance the efficiency of energy use in buildings.

That section was deleted because of Senate action and was therefore not a part of the bill that was signed into law by the President in December. The provision would have left to the States the ultimate decision regarding whether to adopt the recommended building code, but financial assistance was offered through that provision to the States that decided to do so. The debate on that provision will emerge again next year, and it will be a topic of our discussion this morning.

Also emerging next year will be proposals to enhance weatherization assistance and making more stringent the standards for the Energy Star Program for buildings.

Today's witnesses will comment on these and other approaches that we should consider taking to advance building efficiency, and by doing so also advance our overall goal of reducing greenhouse gas emissions. I want to welcome our witnesses and thank them for taking time with us this morning.

Mr. BOUCHER. And I am now pleased to recognize the ranking member of this subcommittee, the gentleman from Michigan, Mr. Upton.

OPENING STATEMENT OF HON. FRED UPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. UPTON. Well, thank you, Mr. Chairman. Our hearing today on energy efficient building standards is yet another on our long list of climate change hearings. And before I begin, I would like to submit a letter from the Advanced Building Coalition for the record. I agree with the Advanced Building Coalition that energy conservation measures are important, but they must take into account safety, must be cost effective, and should not promote an anti-competitive marketplace.

Pilkington North America, a member of the coalition, has a facility in my district where they recently added 100 new jobs. As I have said many times during these hearings, I support reducing greenhouse gas emissions, but it must be in a way that protects our economy, jobs, and energy security. And if done correctly, increasing the energy efficiency of buildings will in fact reduce energy costs for consumers, help the environment, and have a positive economic impact. And these benefits can be gained without necessarily a cap-and-trade program.

According to recent estimates, buildings consume 40 percent of the energy used in the United States. And I don't think it will be

any dispute today that by improving the energy efficiency of buildings, we can, in fact, save energy and reduce greenhouse gas emissions.

The question is what should the Federal Government's role be to create the incentives for more efficient buildings? In my district, public and private sector entities alike are turning towards architectural designs and technologies that are both environmentally sensitive and economically sensible.

Earlier this month, the new radiology center opened in downtown Kalamazoo, emerging as the first health care facility in southwest Michigan to seek LEED certification.

The benefits of green construction have also been recognized by educational institutions at the primary, secondary, and university levels. For example, public schools in the village of Madawan in my district have earned the EPA's prestigious Energy Star rating, the national symbol for protecting the environment through superior energy efficiency. And this designation reflects the fact that Madawan schools are now using 20 to 30 percent less energy than the average public building, all the while continuing to provide a very good quality education in a comfortable living environment. Additionally the schools have lowered the energy cost by nearly 25 percent, allowing funding to be reallocated to other valuable school resources.

In addition, Western Michigan University has seen substantial reductions in energy use, saving annually about $250,000 because of what they have done on light bulbs as well as different electrical designs where they can actually monitor heat and cooling in all of the university's some 54 buildings.

These energy efficiency buildings in my district would not achieve the same energy savings if they were built to the same specs as in Texas, Florida, or even in Virginia. Building codes are best determined at the local level and should not be determined, I don't think, by the Federal Government. Buildings are designed to a specific location, thus this is not an area where uniform national standards will necessarily pay off. Each State and region has different needs. Our national policies need to reflect that. And, Mr. Chairman, I yield back the balance of my time.

Mr. BOUCHER. Thank you very much, Mr. Upton. The gentlelady from California, Ms. Matsui, is recognized for 3 minutes.

OPENING STATEMENT OF HON. DORIS MATSUI, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Ms. MATSUI. Thank you, Mr. Chairman. I am very pleased to be here today, and thank you for calling this hearing. I would also like to thank today's panelists. The expertise you share will us will be useful throughout the Committee's process in crafting thoughtful legislation.

Improved energy efficiency will be an essential element of any climate change solution. Buildings in our country are responsible for more greenhouse gas emissions than any other sector. Heating, cooling, and lighting our buildings as well as powering our appliances requires vast amounts of energy.

But thankfully, we currently possess the technology and knowledge needed to address nearly a quarter of our Nation's carbon

emissions. My district of Sacramento, California has been a leader in adopting green building practices.

We have the first "Leadership in Energy and Environmental Design" platinum certified office building in the country and the second most LEED certified square footage of any city. We have a growing number of solar and energy efficient homes and a wide variety of efficiency initiatives which are making Sacramento a clean and efficient energy laboratory.

Furthermore, federal programs such as Energy Star and Building America are expanding technologies and giving us concrete ways to confront climate change. Non-governmental organizations like the U.S. Green Building Council are also providing necessary savings to consumer choice and market leadership.

I recently introduced a measure to assist homeowners across the country with energy efficient landscaping practices. Even changing something as simple as how our buildings get sunlight can make a big difference in how much energy they consume.

I am eager to hear what our panelists can tell us about approaches they are taking and approaches this committee can take to improve building efficiency and address climate change beyond simply cutting carbon, building green cuts consumer costs, increasing a building's value and improve the health and well-being of the occupants.

I look forward to working with my colleagues on this subcommittee to examine and promote energy efficiency or helping our constituents to do the same. By saving people money and reducing our carbon emissions, energy efficiency is truly a win-win proposition.

Once again, I thank you, Mr. Chairman, for highlighting this important issue, and I yield back the balance of my time.

Mr. BOUCHER. Thank you very much, Ms. Matsui. The gentleman from Texas, Mr. Burgess, is recognized for 3 minutes.

OPENING STATEMENT OF HON. MICHAEL C. BURGESS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. BURGESS. Thank you, Mr. Chairman. Every year I try to do an energy efficiency and conservation summit in my district, and earlier this month we did it in Denton, Texas. I try to hold it to highlight some of the proactive steps that citizens can take to conserve energy and ultimately save money. It is very difficult for the average citizen to have much of an impact on what to do about speculation, or what to do about drilling in the Outer Continental Shelf. But, they certainly can affect the energy that they use and thus affect that end of the supply/demand equation.

At this year's event, we were very grateful to have a representative from the Department of Energy, the Renewable Energy Undersecretary at the event. At this year's event, we had a panel of commercial residential building experts and they discussed a lot of the topics that we are going to hear about today. And several expressed the importance, or stressed the importance, of having the air conditioning designed for the house. That is, the right size air conditioner for the home. And inspecting ducts and intakes for leaks came up several times as being one of the most, probably one of the most important things a homeowner can do. And, quite hon-

estly, you get 200 people to show up at 9:00 on a Saturday morning early in July in Denton, Texas, that shows the thirst and the hunger for this type of information that exists in the minds of American families.

Saving energy is not equal to adding additional energy, and until we can produce more energy or find adequate alternatives, it is to our advantage to make sometimes very simple personal choices to conserve energy and save hard-earned dollars. Certainly I try to do that in my own life.

I have a hybrid car. My wife, who is an architect, when we built a house a couple of years ago, I said, "well, I want solar panels and windmills and want to live off the grid." And she said, "well, why don't we do things that are basically a little more mainstream so the house will actually have some resale value?"

So doing things like Energy Star appliances, the low E glass, foam insulation in the walls, high efficiency air conditioning units, the efficient attic system, which in Texas is so important because that attic air can get up to about 190 degrees by 9:00 in the morning. A tankless hot water heater, which I would have never considered as being as big an energy saver as it was.

Our energy bills the year that we moved into that house, which was 2 years ago in a very hot summer in Texas, our energy bills were about half of what they were the summer before. So it was very dramatic to me that with relatively modest changes in building techniques, big benefits can occur. So personal choices are an important part of energy efficiency because mandates are restrictive. Mandates are expensive, and mandates, because they limit our freedom, are not things that we should encourage in a free society.

The people in my district are still talking about eventually losing the right to purchase inexpensive, mercury-free incandescent light bulbs. And, yes, I do have two light bulbs with Chinese mercury in my home, and I use them very sparingly.

I support energy conservation and the technology that regulates energy when it is not needed, but I am hesitant to support—what works in Texas may not work in Massachusetts and vice versa. So federally mandated building standards I am going to approach very, very carefully.

When this subcommittee discussed regional appliance standards, we discussed the wide range of consumer preferences and the needs around the country. Because we do have a diverse climate full of building preferences and choices, a federal building standard would be difficult and intrusive to implement, costly to inspect, and would add an extra burden to residential and commercial construction in an industry that, quite honestly, right now is facing significant hardship.

So I believe the local government in cities in my district are more than capable of establishing their own building standards. And really that is where I think the true value in establishing standards but making them available at the local level and then letting the local standards be enforced and propagated are really likely to lead to much more value. Thank you, Mr. Chairman. I will yield back the balance of my time.

Mr. BOUCHER. Thank you very much, Mr. Burgess. The gentleman from Georgia, Mr. Barrow, is recognized for 3 minutes.

OPENING STATEMENT OF HON. JOHN BARROW, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF GEORGIA

Mr. BARROW. Thank you, Mr. Chairman, and thank you for calling this hearing. You know probably the hardest thing in the world is to try and persuade folks to spend a little bit more money on the front end in the expectation you will save a whole lot more money at the back end. Hardest thing in the world to do to adopt that long-range point of view especially when your short-range practice is going up in your cheap energy.

But the irony is that the folks that are most victimized by this short-sighted approach, or doing things the way we have always done it, are those who can least afford it. They are the ones who have the highest bills over the lifetime use of the buildings they occupy. So it is really imperative we think and try and find ways of building smart.

Back home in Georgia, I had a colleague I served with on county commission, a guy named Carl Jordan, who was just passionate about this sort of stuff, and he would talk about it to the point where our eyes would glaze over. But he was trying to change the way we were doing things at the local level over a dozen years ago, long before it was on the congressional agenda.

And I just want to thank you all, the insight you all are going to contribute to help us figure out how we can do this in a constructive way, one that isn't overbearing in its approach toward this but does help us figure out that oftentimes the smart way of doing things is the cheap way of doing things in the long run. So thank you all for your participation and, Mr. Chairman, thank you for your leadership in calling this hearing. And I yield back the balance of my time.

Mr. BOUCHER. Well, thank you very much, Mr. Barrow. We welcome now our panel of witnesses, and we will turn to them for their testimony. Mr. David Rodgers is the Deputy Assistant Secretary for Energy Efficiency with the Department of Energy. Mr. Brian McLean is the Director of the Office of Atmospheric Programs for the Environmental Protection Agency. Mr. Marshall Purnell is the President of the American Institute of Architects. Mr. Matt Belcher is a representative of the National Association of Home Builders and the owner of Belcher Homes in St. Louis, Missouri. Mr. Thomas Gentry is an Assistant Professor at the School of Architecture at the University of North Carolina at Charlotte. Mr. Richard Weiland is the Chief Executive Officer of the International Code Counsel. Mr. William Fay, Director of the Energy Efficient Codes Coalition, and Mr. Brad Heavner is State Director for Environment Maryland in Baltimore, Maryland.

We welcome each of our witnesses and without objection, your prepared written statement will be made a part of our record. We would welcome your oral presentation and since there are fully eight of you, we would ask that your oral presentation be kept to approximately 5 minutes. Mr. Rodgers, we will be pleased to begin with you.

STATEMENT OF DAVID RODGERS, DEPUTY ASSISTANT SECRETARY FOR ENERGY EFFICIENCY, DEPARTMENT OF ENERGY

Mr. RODGERS. Thank you, Mr. Chairman, members of the committee, thank you for this opportunity to testify on how building efficiency programs and the Office of Energy Efficiency and Renewable Energy are addressing a triple threat: energy security, climate change, and economic competitiveness.

Despite today's logical concerns about the cost of fuel in our vehicles, Americans will be spending virtually their entire week working, eating, study, recreating, or sleeping in a residential or commercial building, which, as you have noted, represents 40 percent of our Nation's primary energy consumption, 72 percent of our electricity, 55 percent of our natural gas, exceeding greenhouse gas emissions of any other sector of the U.S. economy.

We must address building efficiency now and with a sense of urgency because the median lifetime for our buildings is very long. A commercial building will last 65 to 80 years. If we do not address cost effectiveness and enhance building energy performance now, these inefficient buildings will be with us for many years.

The good news is energy efficiency is the quickest, least costly, lowest-risk path to achieving sustained reductions in greenhouse gas emissions. And a 2007 report by the McKinsey Global Institute identified that energy savings from currently available, existing technologies with an internal rate of return of more than 10 percent are sufficient to cut the growth of global energy consumption by more than half over the next 15 years.

The Department is very pleased to put forward a broad portfolio of programs, research, development, and demonstrations. Our fiscal year 2009 budget request will deliver programs that can reduce carbon dioxide emissions by 500 million metric tons cumulatively by the year 2020 or two billion or two gigatons carbon dioxide emissions by the year 2030.

Our investments are designed to deliver and promote reliable, market-available policies, practices, and life cycle cost effective technologies that will permanently reduce a trajectory of U.S. energy demand growth and carbon footprint of the built environment while maintaining strong economic growth.

Our efforts are focused in several key areas. First, a solid basis for energy efficiency improvements in the building sectors, while working to develop model building codes that are cost effective, regionally specific, and will be adopted at the State and local level.

We are working closely with industry representatives on codes that are 30 percent more efficient than today's codes for both residential and commercial applications.

We also recognize and support builders who are ready to move beyond codes. In February of this year, Secretary Bodman launched the Builder's Challenge, a voluntary national energy savings program, partnering with U.S. homebuilders to identify homes that can achieve 30 percent more efficiency on a whole house basis. Each home that is in the program will proudly display the Energy Smart home scale, which I have here on a poster, which is like a fuel economy label for your home, that we are encouraging to be used and adopted across the country by local governments.

Our second area is to ensure that consumers and businesses have energy efficient choices for appliances and lighting. I am proud to say that under the leadership of Secretary Bodman, we have met 100 percent of our appliance standards rulemaking targets since we published our schedule more than 2 years ago. Appliance standards already on the books will avoid more than 140 million metric tons of CO_2 annually by the year 2030. The bipartisan act, Energy Independence and Security Act of 2007, EISA, passed in December, will avoid an additional 70 million metric tons of CO_2 annually from appliance standards and lighting alone.

Furthermore, in addition to codes and standards, we work with our partners at the Environmental Protection Agency, EPA, to promote voluntary adoption of the Energy Star Program of superior energy efficient products. Just this year, we rolled out Energy Star criteria for water heaters, which consume more than 17 percent of a home's energy. In the last 2 years, DOE has updated or promulgated new Energy Star criteria for clothes washers, dishwashers, refrigerators, and CFLs. We have published and finalized the first ever criteria for solid state lighting based on industry-developed test procedures at luminare efficacy performance metric. We believe solid state lighting has the potential to reduce lighting energy consumption by 50 percent when fully penetrated into the marketplace.

Solid state lighting is only a sample of the research and development efforts that we are pursuing across the board leading to net zero energy buildings.

In addition, we have established numerous partnerships with industry under the new EISA requirement for zero net energy commercial buildings initiative located in sections 421 and 422. We are pleased to be partnering with Wal-Mart, Whole Foods, McDonald's, Home Depot, and many others to support the rapid deployment of energy efficiency in commercial buildings.

Additionally, we are focused on broad public education and outreach efforts through our innovative partnerships such as those with Walt Disney, the Ad Council, and others to promote the adoption of energy efficiency products. Last year, through the efforts of many, more than 300 million compact fluorescent lights were sold in the United States, breaking a record.

In addition, we work with local communities and school systems to introduce sufficient technologies through our Energy Smart Schools Program. And, of course, we work to adopt best practices and policies with our utility partners to help utilities profit from energy efficiency, demand-side management at least as much as they profit from adding new generation capacity.

In conclusion, we have developed a comprehensive program within the department which we believe can lead to dramatically improved energy efficiency in buildings through low-cost solutions while greatly reducing CO_2 emissions. This concludes my remarks. I will be happy to answer your questions.

[The prepared statement of Mr. Rodgers follows:]

INSERT

Mr. BOUCHER. Thank you very much, Mr. Rodgers. Mr. McLean.

STATEMENT OF BRIAN J. MCLEAN, DIRECTOR, OFFICE OF ATMOSPHERIC PROGRAMS, ENVIRONMENTAL PROTECTION AGENCY

Mr. MCLEAN. Good morning, Chairman Boucher and members of the subcommittee here today. I am Brian McLean, the director of EPA's Office of Atmospheric Programs, where EPA's energy efficiency and climate programs reside. I am pleased to testify today on the climate benefits of improved building energy efficiency.

Energy and air pollution are inextricably linked. The energy we use causes the majority of our Nation's air pollution and greenhouse gas emissions. Commercial and residential buildings in particular are responsible, as has been said, for about 40 percent of the carbon dioxide emissions from fossil fuels used in this country, more than the emissions from either the industrial sector or the transportation sector. And these emissions are growing.

Addressing the energy use in these buildings is important to a least cost approach to limiting greenhouse gases. Studies show that targeted energy efficiency policies and programs could cut in half the expected growth in electricity demand over the next 20 years at costs that are about half those of building the new energy supply we would otherwise need.

Targeted policies are necessary for new construction of commercial and residential buildings and for the existing building stocks. Each of these markets is subject to market and policy barriers such as split incentives between builders and buyers, and landlords and tenants, lack of information, high transaction costs, and utility regulations that sometimes financially penalize utilities for helping their consumers save energy.

These barriers stop many of the available low-cost improvements from occurring. EPA now has more than 15 years of experience addressing the market and policy barriers to energy efficiency in our buildings as part of this country's efforts to limit greenhouse gas emissions. Our primary focus is market-based solutions. A leading example is the Energy Star Program, which is delivering significant results. As of 2007, EPA's efforts with Energy Star are helping Americans avoid the greenhouse gas emissions equivalent to those of 27 million vehicles while saving $16 billion on energy bills.

EPA's efforts complement many other Federal and State policies and programs such as building codes, applying standards, research and development, energy efficiency in public housing and DOE's efforts in the Energy Star Program.

Based on our experience, I would like to outline six priority areas where the Federal Government could capture low-cost greenhouse gas reductions through increased investment in energy efficiency. First, engage the consumer in reducing their own energy use and carbon footprint through the Energy Star Program. Education linked to reliable energy efficiency solutions for the consumer is powerful. The consumer makes the decisions about the household, and currently they can save about 30 percent of their energy bills or $600 annually on average if they choose Energy Star products from the more than 50 product categories where Energy Star options are now available.

Second, provide Energy Star New Homes as a beyond-code opportunity for builders and update these requirements as feasible. Over

the past 12 years, the EPA Energy Star New Homes Program has grown to encompass more than 5,000 builders. They qualified about 12 percent of new homes nationally last year. That is Energy Star and market penetrations of 20 percent or more, and many areas indicated likely further growth.

These Energy Star homes are 20 to 30 percent more efficient than the standard home built today. This beyond code program is an important part of mainstreaming new building practices.

Third point is to expand partnerships with utilities and other State and local energy efficiency program sponsors to increase consumer access to best practice energy efficiency improvement programs for existing homes and commercial buildings as well as new construction. These organizations have established track records in delivering efficiency programs, and some of them are using new whole building approaches to deliver deeper energy savings per building.

The whole building retrofit programs are particularly important for existing buildings because they can address the critical barrier of lack of qualified contractors who are essential to improving our Nation's homes, particularly those constructed before codes were even in place.

Fourth, we should expand the ability to rate the energy use of Nation's buildings using standardized measurement systems and promoting the value of this information. As David mentioned also, knowing the equivalent of a mile per gallon rating of a building is powerful information. EPA's building rating system has been used to rate the energy use of about 15 percent of commercial square footage as of 2007, and this is growing dramatically each year. This system is now being integrated into a variety of building services and policies, and its expansion will be important to building efficiency efforts.

Fifth point I wanted to make is to work with State policymakers on effective State policies with delivering energy efficiency across the building sector as we have tried to do through the National Action Plan on Energy Efficiency and our State partnerships and engage local governments in the role they can play with their facilities and with their communities. State and local policies are some of the most pivotal ones in the country in determining the level of investment in energy efficiency and the effectiveness of that investment. Effective approaches need to then be documented and shared.

And the sixth and final point is to focus on improving practices for evaluation, measurement, and verification of energy efficiency programs to improve the ability of energy efficiency to compete with energy supply options and deliver greenhouse gas reductions.

In conclusion, there is an important federal role in developing standard approaches but also in assisting key players and capturing the energy efficiency potential in our Nation's buildings and helping meet greenhouse gas emission reduction roles. Many of these efforts will likely become more important should energy prices rise in response to climate legislation. Thank you.

[The prepared statement of Mr. McLean follows:]

TESTIMONY OF

BRIAN MCLEAN
DIRECTOR, OFFICE OF ATMOSPHERIC PROGRAMS
OFFICE OF AIR AND RADIATION
U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE SUBCOMMITTEE ON ENERGY AND AIR QUALITY
COMMITTEE ON ENERGY AND COMMERCE
U.S. HOUSE OF REPRESENTATIVES

July 17, 2008

Good morning, Chairman Boucher and members of the Subcommittee. Thank you for the opportunity to testify on behalf of the Environmental Protection Agency concerning the climate benefits of improved building energy efficiency. My name is Brian McLean and I am Director for the Office of Atmospheric Programs within EPA's Office of Air and Radiation, the office that oversees EPA's energy efficiency programs.

Overview

The EPA is here testifying today because energy and air pollution are inextricably linked. The combustion of fossil fuels to produce the energy we use across the economy causes the majority of our nation's air pollution and emissions of greenhouse gases (GHGs). Commercial and residential buildings, in particular, are responsible for roughly 40%[1] of the carbon dioxide (CO2) emissions from fossil fuel use in the country – more than the emissions from either the industrial or transportation sectors – through their consumption of electricity as well as their direct combustion of natural gas and oil to meet the energy service needs of their occupants. Further, buildings offer significant opportunities for low cost greenhouse gas reductions.

[1] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006 (US EPA, 2008)

However, a pervasive set of market barriers limit the ability to capture these low cost reductions, so targeted policies and programs continue to be necessary. Unfortunately, there is no single policy solution as these low cost opportunities are present in millions of different locations across the country and require changes in decision-making that go into the design, construction, and operation of our buildings and the energy-using equipment they contain. Also, we believe that many of these market barriers will still exist even if climate legislation is passed as many of the barriers are not changed by the higher costs of energy that would likely result from such legislation.

EPA has more than fifteen years of experience working to address many of the barriers to energy efficiency and is achieving important results. Our focus is on market-based solutions such as voluntary and partnership programs with key stakeholders. These efforts complement the many other important energy efficiency policies undertaken throughout the Federal government such as building codes, appliance standards, R&D, and energy efficiency in public and federally-assisted housing, where rising energy costs impose a special burden on low- and moderate-income families. These efforts also form a critical part of the Administrator's new strategic approach to green building at the Agency.

I am happy to testify from the perspective of these programs. I would like to address three topics:

- The importance of energy efficiency in buildings to cost-effectively reduce U.S. greenhouse gas emissions,

- EPA's ongoing efforts and accomplishments in this area, and
- Our priorities as we look ahead.

I will limit my remarks to energy use in residential and commercial buildings, with the understanding that energy efficiency also has an important role in the industrial sector and in energy supply, transmission, and distribution and that my office has efforts underway to advance energy efficiency in these areas as well.

The Importance of Energy Efficiency in Buildings to Cost-Effectively Reduce U.S. Greenhouse Gas Emissions

We believe that improving the energy performance of residential and commercial buildings in the United States offers a particularly large and low-cost opportunity for realizing greenhouse gas reductions in both the near and long terms. These buildings currently represent about 40 percent of the nation's CO2 emissions from fossil fuel use and their energy consumption is expected to grow in the coming years on the order of 1% [2] or more per year through 2025 and beyond.

Recent studies at international, national, and state levels have shown that buildings offer significant opportunities for low cost greenhouse gas emissions reductions. One study, the 2007 IPCC 4th Assessment Report, concluded that the residential and commercial buildings sector offered the highest cost-effective potential to reduce greenhouse emissions by 2020 from all sectors they evaluated. They characterized this conclusion as being supported by "much

[2] Annual Energy Outlook 2008. (EIA, 2008)

evidence" and with "high agreement" from the studies reviewed. This holds for both developed and developing counties.

Another widely cited 2007 study by the consulting firm McKinsey & Company, "Reducing GHG Emissions: How Much at What Cost?" focused on GHG mitigation opportunities in the United States and reached very similar conclusions: that large opportunities for low-cost greenhouse gas reductions exist in the U.S. buildings sector.

Studies at the state level are also highlighting this opportunity. Studies have been completed in States such as California, Connecticut, Georgia, New Mexico, and Utah, which highlight significant potential for energy savings and greenhouse gas reductions in the buildings sector[3]. For example, California's June 2008 Draft Scoping Plan, which lays out a suite of recommendations for achieving reductions necessary to meet the economy-wide targets established by state law, relies on energy efficiency policies targeting residential and commercial buildings for over 10% of these economy-wide reductions in GHG emissions.

These are just the most recent set of such studies; some of the earlier studies provided the basis for the energy efficiency programs at the EPA. These studies have also identified why the cost-effective energy efficiency improvements do not happen purely as a result of market mechanisms. These market barriers include:

[3] National Action Plan for Energy Efficiency (2007). Guide for Conducting Energy Efficiency Potential Studies. Prepared by Philip Mosenthal and Jeffrey Loiter, Optimal Energy Inc. www.epa.gov/eeactionplan, Table 2-1 and Table 2-2.

- "Split-incentive" barriers, which limits home builders' and commercial developers' motivation to invest in energy efficiency for new buildings because they do not pay the energy bill; and
- Imperfect information, such as lack of information on energy saving opportunities.

In addition to these market barriers, other factors continue to limit the realization of these identified low-cost GHG mitigation opportunities in the buildings sector. These include:

- Public policy barriers, which can present significant disincentives for utility support and investment in energy efficiency in many cases;
- Utility, state, and regional planning barriers, which do not allow energy efficiency to compete equally with supply-side resources in energy planning; and
- Energy efficiency program barriers, which limit investment due to lack of knowledge about the most effective energy efficiency program portfolios, the best program design , and/or the energy performance of available technologies.

EPA now has more than 15 years experience in designing and implementing strategies to address many of these barriers to the cost-effective adoption of energy efficiency in buildings. These efforts constitute a major portion of EPA's responsibilities within the Administration's climate strategy to significantly reduce U.S. greenhouse gas intensity. Beyond the contribution to U.S. climate policy, EPA's energy efficiency programs provide the added benefits of helping to reduce criteria air pollutants like nitrogen oxides and sulfur dioxide, as well as contributing to improved national energy security.

EPA's Efforts and Accomplishments in Improving Energy Efficiency in Residential and Commercial Buildings

I would like to provide an overview of EPA's efforts in three areas that have an important role in advancing energy efficiency and reducing GHG emissions in the buildings sector:

- the ENERGY STAR program,
- the National Action Plan for Energy Efficiency, and
- the State Clean Energy-Environment Program.

EPA introduced **ENERGY STAR** in 1992 as a voluntary labeling program to reduce greenhouse gas emissions by identifying and promoting energy efficient products.[4] Since then, the program has grown to offer energy efficiency solutions across the residential, commercial, and industrial sectors and grown to not only promote efficient products but also energy efficient management practices and services across these three sectors. In each sector, the ENERGY STAR strategy is to dismantle identifiable and pervasive market barriers limiting investment in energy efficiency and bring practical solutions to the residential, commercial and industrial sectors.[5]

The results from the ENERGY STAR program for the products and services that EPA manages are substantial. In 2007, Americans with the help of ENERGY STAR, prevented 40 million metric tons of greenhouse gas emissions—equivalent to the annual emissions from 27 million vehicles—and saved more than $16 billion on their utility bills[6]. And these benefits are on

[4] EPA signed an MOU with DOE in 1996 making ENERGY STAR a joint effort with each agency handling a set of products, with EPA handing ENERGY STAR new homes and EPA handling commercial building efforts.
[5] ENERGY STAR and Other Climate Protection Partnerships: 2006 Annual Report (US EPA, 2007)
[6] ENERGY STAR Overview of 2007 Achievements (US EPA, 2008)

track to nearly double[7] in 10 years as more households, businesses, and organizations rely on ENERGY STAR for guidance on investing in energy efficient products, practices, and policies.

Further, we have developed a national platform for energy efficiency that has strong public recognition, is positively influencing many consumer decisions, and is a platform that can continue to expand and achieve greater results. Recent surveys show[8]:

- More than 70% of U.S. households recognize the ENERGY STAR label and understand its purpose;
- More than 35% of households knowingly purchased at least one ENERGY STAR qualifying product in the last twelve months, and more than 70% of them reported that the label was influential in their purchasing decision.; and
- Eighty percent of purchasing households say they are likely to recommend ENERGY STAR to others showing that ENERGY STAR is positioned for continued growth.

I would now like to address the role that ENERGY STAR is playing in some of the key program areas across residential and commercial buildings.

Products

EPA now offers the ENERGY STAR label across about 50 product categories, and DOE offers the ENERGY STAR label for almost ten additional products categories. The EPA-managed product categories include heating and cooling equipment, consumer electronics, office equipment and lighting. ENERGY STAR identifies efficient products above federal minimum efficiency standards, where they exist; however, for many of the product categories, there are

[7] Ibid.
[8] National Awareness of ENERGY STAR for 2007: Analysis of 2007 CEE Household Survey. (US EPA, 2008)

no federal or state minimum efficiency standards. Many ENERGY STAR qualifying products offer consumers savings of 30 to 60%, relative to typical models, and up to 30 percent savings, or $600 annually, in a household using all ENERGY STAR products.[9]

To establish the eligibility criteria for an ENERGY STAR product category, EPA consistently follows a set of guiding principles that have proven to address existing market barriers and lead to significant results. ENERGY STAR is designed to be easy for consumers as a binary (yes/no) label and is technology neutral across a product category to avoid picking winners and losers. The criteria are established so that ENERGY STAR products will not sacrifice performance or quality and will offer energy savings with attractive paybacks to the buyer -- such as two years or less -- if there are higher initial first costs.[10] Currently, two-thirds of the product categories under ENERGY STAR are offering efficient products with no price premium – a real win for today's consumers, and these product categories are providing the majority of the energy savings from the product labeling part of the ENERGY STAR program.

As part of its ENERGY STAR product labeling responsibilities, EPA routinely engages in

- Technical work to establish test procedures to facilitate product labeling and revisions of specifications as the market share of ENERGY STAR products increases,
- Consumer education,
- Partnerships with manufacturers, retailers, utilities, state and local governments and others,

[9] ENERGY STAR and Other Climate Protection Partnerships: 2006 Annual Report (US EPA, 2007).
[10] Building a Powerful and Enduring Brand: The Past, Present, and Future of the ENERGY STAR® Brand (Interbrand, 2007)

- Activities to protect the integrity of the ENERGY STAR label,[11] and
- Work with 7 international partners (Australia, Canada, the European Union, Japan, New Zealand, and Taiwan) who are implementing the ENERGY STAR program in their own countries and regions.

A number of the product categories that EPA addresses such as consumer electronics and office equipment are quickly evolving, so considerable effort is made to develop and keep specifications up to date. For example, EPA has recently completed work with the International Electrotechnical Commission on an internationally approved, technology-neutral testing procedure for testing "on mode" energy consumption in TVs which helped pave the way for the launch of a new comprehensive ENERGY STAR specification that becomes effective later this year and addresses plasma, LCD, rear projection, and CRT television technologies.

EPA adds 2 product categories to the ENERGY STAR program on average each year and is currently working on enterprise servers and commercial food service equipment and is scoping a variety of other products for future years.

New Homes

EPA has managed the ENERGY STAR program for new homes since 1995. Today, ENERGY STAR qualified homes are typically 20 to 30 percent more efficient than standard homes. It is important to note that while ENERGY STAR is defined as being 15 to 20 percent better than

[11] Maintaining the Value of the ENERGY STAR: 2006 Report (US EPA, 2007)

the national energy code, EPA requires additional specifications that are not addressed by the code, such as improved practices for ensuring the thermal integrity of the home and matching the size of the air conditioner to the demands of the home, that provide additional savings beyond that 15 to 20 percent.

This program provides consumer education and helps overcome the split incentive issue in the new construction market place by helping builders differentiate and sell more efficient, higher value homes. ENERGY STAR qualified homes can include a variety of energy efficient features, such as effective insulation, high performance windows, tight construction and ducts, efficient heating and cooling equipment and ENERGY STAR qualified lighting and appliances. ENERGY STAR promotes the best available, off-the-shelf technology as well as effective construction practices known to the building industry.

Significant numbers of new homes are being built to ENERGY STAR requirements. More than 12 percent of housing starts were ENERGY STAR qualified in 2006. There are 10 states and more than 20 metropolitan areas with 20 percent or more market penetration of ENERGY STAR qualified homes[12]. By the end of this calendar year, we expect that 1 million homes will have been built to ENERGY STAR requirements. To date more than 5,000 builders have partnered with EPA, and as interest in ENERGY STAR grows, we are developing the next generation of ENERGY STAR specifications that will make these homes even more efficient.

EPA is also working with HUD and others to bring ENERGY STAR to all of HUD's major affordable housing programs, particularly public housing. HUD data show that in 2007 alone, there was an estimated $33 million in energy savings as a result of these and other conservation

[12] ENERGY STAR and Other Climate Protection Partnerships: 2006 Annual Report (US EPA, 2007).

efforts. HUD now provides bonus points through its competitive grant programs for use of the Energy Star label, both for products and new homes, and is also seeing success in local communities adopting the ENERGY STAR label for its formula grant programs as well. We have also worked with 21 state housing finance agencies (HFAs) to promote ENERGY STAR products and homes in their funding criteria for housing projects. More than 30 HFAs give preference to projects that include ENERGY STAR products and guidelines, and five states (Delaware, Nevada, New Jersey, Utah, and Washington) require all new homes funded with housing tax credits be ENERGY STAR qualified.[13]

Existing Homes

In terms of opportunities for reducing emissions of greenhouse gases, we cannot overlook the more than 100 million existing homes in this country. Many of these homes present opportunities for low cost greenhouse gas reductions, particularly the more than 40 million homes that were constructed before the existence of modern energy codes[14]. These homes have inadequate insulation, high levels of air infiltration, inefficient heating and air conditioning, as well as inefficient water heaters and appliances. A ten percent reduction in energy use in existing homes would generate a savings of some $20 billion, and reduce greenhouse gas emissions equivalent to annual emissions of 25 million vehicles.[15].

To address this opportunity, EPA, working with DOE, developed Home Performance with ENERGY STAR as a whole-house retrofit program that provides homeowners with guidance and services for going beyond the purchase of efficient products and helping them tap into the

[13] ENERGY STAR Overview of 2007 Achievements (US EPA, 2008).
[14] U.S. Census Bureau. American Community Survey (2006).
[15] See Partnerships for Home Energy Efficiency, July 2005, at www.energysavers.org

low cost efficiency improvements in their homes. EPA has now partnered with 20 State and local program sponsors of Home Performance with ENERGY STAR. EPA estimates that these programs can help homeowners save 20 percent on average on their energy bills.

In addition, to address another important issue in the residential market place, EPA has helped complete two pilot programs for ENERGY STAR proper installation of heating and cooling equipment, setting the stage for a national program this year. Heating and cooling typically represent almost 50 percent of a household energy bill, and studies indicate that more than half of our central air conditioners may be improperly installed, leading to lower efficiency and higher demand on peak energy days[16].

Commercial Buildings

EPA has managed energy efficiency programs in the commercial sector since 1991 and now works with thousands of public and private organizations to advance superior energy management at the organizational level, provide a range of technical resources and trainings, and help organizations achieve energy savings of 10 to 30 percent across their entire suites of buildings.

An important foundation of the ENERGY STAR program is a standardized building energy performance rating system. In the mid-1990's, EPA determined that not knowing whether a building was efficient or inefficient was a key barrier to building owners and operators improving the energy efficiency of their buildings. Building energy use can vary by a factor of 10 or more (on a per square foot basis) and is not closely tied to the age of the building or the

[16] ENERGY STAR Overview of 2007 Achievements (US EPA, 2008).

presence or absence of newer technologies. To address this obstacle, EPA developed a standardized measurement approach for building energy use, like the miles per gallon rating for vehicles, which compares the energy use of an individual building against the national stock of similar buildings using a 1 to 100 point rating system. This system enables building owners and managers to measure how well building systems are integrated, operated, and maintained and to set and measure progress toward energy performance goals.

EPA's energy performance rating system has grown so that it can address more than 70 percent of the commercial square footage across the country, with the inclusion of retail space just last year, and the rating system is experiencing tremendous growth in use. Building owners and operators have now used the system to rate the energy efficiency of 62,000 buildings or about 15 percent of commercial square footage in the country[17], including

- 55% of hospital space (acute care),
- 52% of supermarket space,
- 31% of office building space,
- 24% of school space, and
- 24% of hotel space across the country.

Further, EPA is engaging the public and private sector in its ENERGY STAR Building Challenge which calls on U.S businesses and institutions to reduce energy use in their buildings by 10% or more as measured with this rating system. Almost 800 organizations and individuals—including more than 150 local governments—have now joined the Challenge.

[17] Ibid.

This includes influential government associations such as the National Association of Counties and the U.S. Conference of Mayors.[18]

EPA also offers the ENERGY STAR label to the most efficient of these buildings across the country, those that rate in the top 25 percent on the energy performance rating scale, so that the market place can find energy efficient buildings and appropriately value them for their lower energy bills. More than 4,000 buildings have earned the ENERGY STAR label and these buildings are using about 40% less energy than average ones[19]. Achieving the label is becoming increasingly important. For example, recently CoStar, the leading multiple listing service for U.S. Commercial real estate properties, now shows which buildings for lease or sale have earned an ENERGY STAR label, and the Minnesota Governor called for the achievement of 1,000 ENERGY STAR buildings across the state by 2010.

Small business

EPA also provides technical assistance to small commercial customers. They make up a significant portion of overall utility energy demand and can benefit from purchasing ENERGY STAR qualifying products, as well as building tune-ups and other efficiency upgrades. On a per-square-foot basis, small customers can achieve the same energy savings as large customers with an attractive return on investment. EPA offers such tools as a free guide to help small business understand energy efficiency opportunities and prioritize projects; a tool to help them understand their energy intensity; and specific resources targeted to small business sectors such as grocery and convenience stores, congregations, lodging, home-based businesses, and

[18] Ibid.
[19] Ibid.

restaurants. More than 1800 small businesses and congregations participate in the ENERGY STAR network.[20]

The **National Action Plan for Energy Efficiency**, begun in 2006, is an EPA and DOE facilitated private-public initiative established to create a sustainable, aggressive commitment to cost-effective energy efficiency investments. A Leadership Group directs and oversees the work of the Action Plan and is comprised of more than 60 leading privately, publicly, and cooperatively owned electric and gas utilities, utility regulators, state agencies, large energy users, consumer advocates, energy service providers, and environmental and energy efficiency organizations. The Action Plan is co-chaired by Marsha Smith, a Commissioner with the Idaho Public Service Commission and current President of the National Association of Regulatory Utility Commissioners, and Jim Rogers, President and CEO of Duke Energy.

The Action Plan is structured around five key policy recommendations and a suite of supporting materials have been developed to help parties overcome the barriers to energy efficiency and advance their own commitments to energy efficiency. These resources address the critical "nuts and bolts" of building best practices in policies and programs at the state or utility level in order to aggressively support adoption of economically attractive energy efficiency investments. These resources include:

- a guide for evaluating, monitoring and verifying the results of energy efficiency programs,
- a guide for conducting energy efficiency potential studies,

[20] ENERGY STAR and Other Climate Protection Partnerships: 2006 Annual Report (US EPA, 2007)

- guidelines for developing and implementing energy efficiency programs, and
- a paper addressing options for aligning a utility's financial incentives with the achievement of real energy savings through energy efficiency programs.

To date, over 120 organizations across 49 states have made commitments under the Action Plan and even more are turning to the Action Plan for fact-based, objective information on policy and programs.

Most recently, the Action Plan has put forth a Vision for 2025 – an Implementation Framework for state-specific policies and programs to achieve all cost-effective energy efficiency by 2025. If implemented, this could be expected to reduce the growth in energy use by 50 percent or more by 2025[21]. This framework offers a way to engage in the important dialogue of how to increase investment in energy efficiency, pull from experiences around the country, and improve our thinking as we move forward. To facilitate this dialogue, the Leadership Group will also be measuring progress towards the Vision through policy and program steps, as well as quantitative metrics.

Important outcomes of this effort, as reflected in the metrics the group is tracking, will be increased funding for energy efficiency programs at the state level as well as increased measurable savings from energy efficiency. Currently, states leading on energy efficiency are spending about 3 to 4 percent of energy revenues on energy efficiency and if this were to be nationwide, funding would be 4 to 5 times current levels[22,23].

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[21] National Action Plan for Energy Efficiency (2007). *National Action Plan for Energy Efficiency Vision for 2025: Developing a Framework for Change.* <www.epa.gov/eeactionplan>
[22] National Action Plan for Energy Efficiency (2006). *National Action Plan for Energy Efficiency.* <www.epa.gov/eeactionplan>

EPA's State Clean Energy-Environment Program helps states develop clean energy policies and programs, including those intended to improve energy efficiency in buildings. The program was launched in 2005 to provide states with proven, cost-effective best practice strategies for implementing energy efficiency (and other clean energy) policies and programs across their states and within their own operations. The program has issued a number of guidance documents, including the well-regarded Clean Energy-Environment Guide to Action: Policies, Best Practices and Action Steps for States. The Guide to Action describes 16 clean energy policies, many of which are focused on improving energy efficiency in buildings, including energy efficiency portfolio standards, public benefits funds for energy efficiency, building codes, appliance standards, government "lead by example" programs, and policies to support small scale distributed generation at the building level. The Guide to Action is a tool to help state policy makers zero in on the most proven strategies, learn how these have worked in other states, and gain information on how to go about designing, implementing and evaluating the effectiveness of the different approaches.

In addition to issuing guidance, the State Clean Energy-Environment Program provides technical assistance to states, hosts numerous peer exchange opportunities, and supports a number of key analytical tools. The State Clean Energy-Environment Program also includes 16 formal state partners who receive direct policy and analytical support through EPA and represent about half the population, energy use and greenhouse gas emissions in the United States.

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[23] National Action Plan for Energy Efficiency (2007). *National Action Plan for Energy Efficiency Vision for 2025: Developing a Framework for Change.* <www.epa.gov/eeactionplan>

EPA's Priorities for Continuing to Improve Energy Efficiency in Residential and Commercial Buildings

With that overview of EPA's key efforts, I would now like to outline some of EPA's current priorities. Important areas that we see for continuing to capture low-cost greenhouse gas reductions through energy efficiency include:

- Engaging the consumer in the role they can play to reduce their own energy use and carbon footprint through the ENERGY STAR program.
- Partnering with utilities and other state and local program sponsors to offer energy efficiency improvement programs for existing homes as well as existing commercial buildings and new construction.
- Providing ENERGY STAR new homes as a "beyond-code" opportunity for builders interested in differentiating themselves by offering homes with significant savings over code-built homes.
- Expanding the ability to rate the energy use of the nation's buildings using standardized measurement systems and promoting the value of this information.
- Working with state policy makers on effective state policies for delivering energy efficiency across the buildings sector through the National Action Plan and State Partnerships, and engaging local governments in the role they can play with their facilities and within their communities.
- Focusing on improving practices for evaluation, measurement, and verification of energy efficiency programs to improve the ability of energy efficiency to compete with energy supply options.

Conclusion

Improving energy efficiency in residential and commercial buildings is an important opportunity to cost-effectively reduce GHG emissions in the near and longer term. Significant progress has been made in identifying the barriers limiting greater adoption of cost-effective technologies and practices and in designing and implementing policies and programs to address them. EPA's market-based programs play an important role. Moving forward, the continued provision of a platform for energy efficiency at the Federal level that will assist key players in capturing the energy efficiency potential is important to meeting GHG emission reduction goals at lower cost. Many of these efforts will become more important as energy prices may rise in response to climate legislation. Energy efficiency programs such as ENERGY STAR will be important in helping consumers and public and private organizations lower their costs and in providing technical assistance to states, utilities and other energy efficiency program administrators as they ramp up investments in energy efficiency programs across the country.

TESTIMONY OF BRIAN MCLEAN, EPA – KEY POINTS

July 17, 2008

- Commercial and residential buildings are important to address as part of a least cost, comprehensive strategy to limit emissions of U.S. greenhouse gases (GHGs).
  - Commercial and residential buildings are responsible for roughly 40% of the CO2 emissions from fossil fuel use in the country – more than the emissions from the industrial or transportation sectors – and these emissions are growing at ~1% annually.
  - Buildings offer significant low-cost GHG reductions for meeting 2025 and 2050 GHG reduction targets from the deployment of technologies and practices in existence today.
- Targeted energy efficiency policies and programs are necessary to capture the low cost GHG reduction in the nation's buildings.
  - Market and policy barriers limit the ability to capture these low cost GHG reductions
  - Policies and programs are necessary for new construction and existing buildings, the latter offering the larger opportunity in the next 20 years due to their number.
  - Higher energy prices will spur some greater investment in energy efficiency but, alone, are unlikely to overcome many of the barriers that hinder adoption of energy efficiency.
- EPA has fifteen-plus years of experience developing programs with stakeholders throughout the economy to address the market and policy barriers and is achieving important results.
  - Federal programs such as ENERGY STAR, Clean Energy-Environment State Partnership, and the National Action Plan for Energy Efficiency have made important contributions and will continue to be important.
  - Providing states with the tools, resources, best practices needed to ramp up, run, and measure successful energy efficiency programs will be an essential part of capturing the low-cost GHG reductions from the nation's buildings.

Mr. BOUCHER. Thank you very much, Mr. McLean. Mr. Purnell.

STATEMENT OF MARSHALL E. PURNELL, FAIA, PRESIDENT, AMERICAN INSTITUTE OF ARCHITECTS

Mr. PURNELL. Chairman Boucher, Ranking Member Upton, and members of the subcommittee, good morning. I am Marshall E. Purnell, FAIA, president of the American Institute of Architects, and I am the design principal with Devrouax and Purnell Architects and Planners PC here in Washington and originally from western Michigan.

On behalf of AIA's 84,000 members, I would like to thank you for the opportunity to appear today to share our thoughts on the potential for energy savings and reductions in greenhouse gas emissions that can be achieved through greater efficiency in our Nation's buildings.

According to the Department of Energy, as has been stated, buildings and their construction are responsible for nearly half of all the greenhouse gas emissions produced in the U.S. every year. DOE's 2007 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, and that buildings are responsible for 71 percent of U.S. electricity consumption.

More importantly, building in the United States alone account for 9.8 percent of carbon dioxide emissions worldwide. In fact, U.S. buildings account for nearly the same amount of carbon emissions as from all sectors of the economies of Japan, France, and the United Kingdom combined. So when Congress talks about greenhouse gas reduction, buildings must be a part of the discussion.

As this committee has explored this issue through white papers and hearings, one theme has remained constant: any legislation addressing climate change must result in significant greenhouse gas reductions with minimum economic disruption. Improving the energy efficiency in our Nation's buildings offers the greatest potential for reducing carbon emissions at the lowest cost.

A December 2007 report by McKinsey and Company found that energy efficiency improvements in residential and commercial buildings, including the appliances inside, make up the largest cluster of negative cost debatement opportunities, meaning building efficiency improvements generate positive economic returns through reduced energy costs. The McKinsey report notes that if most cost-effective building energy efficiency investment were encouraged through policy changes, it is realistic to predict a 710-megaton reduction in greenhouse gas emissions by 2030.

As an architect, I work every day to design spaces that maximize energy efficiency, and I can personally report that architects across the country are creating buildings that achieve energy savings that in many cases are far beyond what current building codes require.

Architects and engineers achieve energy efficiency through lighting retrofits, improve heating, ventilation, and air conditioning systems, building envelopes, and building control systems. Architects utilize design practices that integrate built and natural systems that enhance both the design quality and environmental performance of buildings.

We are making great strides in reducing the carbon footprint of the built environment, but there is much more we can do. This is a national priority, and it demands a national response. Climate change legislation affords a once-in-a-lifetime opportunity to make major gains in building efficiency.

What can Congress do? First, it can encourage the development of stronger energy building codes. We support a proposal that was in the House version of last year's energy bill that would have set efficiency targets for residential and commercial codes and would have directed DOE to propose amendments to those codes to reach such targets if they fail to do so.

Some have claimed that this would, in essence, establish a national building code. What it would do is empower States and local governments to implement the codes that achieve greater energy efficiency.

Second, Congress can provide incentives and technical support to States, localities, utilities, building owners, and design community to help foster the design, construction, and renovation of energy efficient buildings. Such support would go a long way in helping those who deal with buildings every day and make a measurable difference in energy consumption.

Climate change legislation presents an unprecedented opportunity to make significant and lasting reductions in greenhouse gas emissions from the built environment. This is no easy task, and some will worry about the cost of these actions. But the cost of inaction is even greater. The world we design today is the one our children and grandchildren will inhabit tomorrow.

If we want that world to be a healthy, sustainable, and prosperous place, then we owe it to the future generations to take these steps today. We look forward to working with you to ensure that any climate change legislation to emerge from this subcommittee encourages greater energy efficiency in our Nation's buildings.

I thank you and welcome any questions from the subcommittee.

[The prepared statement of Mr. Purnell follows:]

AIA

THE AMERICAN INSTITUTE OF ARCHITECTS

STATEMENT OF
MARSHALL E. PURNELL, FAIA
PRESIDENT

"Buildings and Climate Change Legislation"

United States House of Representatives
Committee on Energy and Commerce
Subcommittee on Energy

-

July 17, 2008
2322 Rayburn House Office Building

The American Institute of Architects
1735 New York, Ave, NW
Washington, DC 20006
(202) 626-7507
govaffs@aia.org
www.aia.org

Introduction

Chairman Boucher, Ranking Member Upton, and Members of the Subcommittee — good morning. I am Marshall E. Purnell, FAIA, the President of the American Institute of Architects and design principal of Devrouax + Purnell Architects and Planners PC here in Washington.

On behalf of the AIA's 84,000 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 our thoughts on the potential for energy savings and reductions in greenhouse gas emissions that can be achieved through greater energy efficiency in our nation's buildings.

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 2007 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]

Most of these emissions come from the combustion of fossil fuels to provide heating, cooling, and lighting and to run electrical equipment and appliances. When combined with other GHG impacts of buildings—such as emissions from the manufacture of building materials and products, the transport of construction and demolition materials, and the passenger and freight transportation associated with urban sprawl—the result is an even larger GHG footprint. Any effective U.S. climate change strategy must consider options for reducing the GHG emissions associated with building construction, use, and location.

Therefore, if we in the United States want to be serious about improving energy efficiency and reducing our nation's greenhouse gas emissions, buildings *must* be a significant part of the discussion.

The data shows that the building sector is only going to become more critical to the debate over climate change. Annual U.S. energy consumption is projected to increase by 32 percent over the next twenty five years[4]. The AIA believes strongly that <u>now</u> 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, 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 nation's buildings use energy.

Reducing the Carbon Footprint of the Built Environment

To reduce energy consumption in the building sector, the AIA believes that architects must advocate for the sustainable use of our planet's resources through their work for clients. To support this principle, in 2005 the AIA adopted a position stating that all new buildings and major renovations to existing buildings should 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.

I am happy to report that in the 2007 energy bill (Energy Independence and Security Act of 2007, P.L. 110-140), Congress included a provision mirroring this AIA policy. As a result of the law, all new and significantly renovated federal buildings will be designed to

meet strict energy efficiency and energy use guidelines. By 2030, the vast majority of our federal buildings will be carbon-neutral.

We are extremely pleased that the federal government's buildings will be at the vanguard of energy efficiency. We also are encouraged that the private sector is beginning to get into the act as well. Architects across the country are utilizing design practices that integrate built and natural systems that enhance both the design quality and environmental performance of buildings. Architects are designing green buildings today that achieve energy efficiency that is, in many cases, far beyond what current building codes require. We are doing this through the use of better planning, technological tools, more efficient building-systems and smarter material selection that incorporate natural heating, cooling, ventilation, and day-lighting strategies.

In order to help architects and the construction industry design, build and operate greener buildings, the AIA has developed a website called 50-to-50 (www.aia.org/fiftytofifty) that provides fifty common-sense methods to reduce the energy footprint of the built environment, everything from building orientation and natural ventilation to photovoltaics and smart controls. Through our "Walk the Walk" campaign, we are educating architects and the public about both the importance of building green and ways to do it.

The potential to save energy and reduce carbon emissions through more intelligent building design, construction, and operation is vast. The buildings identified by the

AIA's Committee on the Environment (COTE) in their annual Top 10 Awards for Sustainable Design on average use between 60 – 70 percent less energy then comparable, conventional buildings.[6] The sustainable design, materials, and energy efficient equipment pay back the increased capital investment in a short period of time through reduced utility bills. And perhaps more pertinent to this hearing today, these buildings produce far less carbon emissions than conventional buildings, and they do so in a cost-effective manner.

One barrier to energy efficiency is the perception that green costs a lot of green, especially in terms of initial first costs. However, studies and anecdotal evidence have shown that for many energy efficient features, the pay back is relatively short – and in fact the fiscal benefits to society as a whole outweigh the costs. A December 2007 report by McKinsey and Company, *Reducing Greenhouse Gas Emissions: How Much at What Cost*[7], found that improving efficiency in new and existing buildings offers the greatest potential for reducing carbon emissions at the lowest cost. Specifically, the study found that "energy efficiency improvements in residential and commercial buildings (including the appliances inside) make up the largest cluster of negative-cost abatement opportunities." Over the life-cycle of the building, energy efficiency improvements generate positive economic returns through reduced energy costs. Essentially, making buildings more energy efficient is a cost-effective way to achieve major reductions in GHG emissions and reducing our nation's dependence on foreign oil while enhancing economic growth.

The McKinsey report notes that if the most cost-effective building *energy efficiency* investments were encouraged through policy changes, it is reasonable to project a 710 megaton reduction in GHG emissions below the otherwise projected scenario *by 2030.*[8] These efficiency improvements can be achieved through lighting retrofits; improved heating, ventilation, air conditioning systems; building envelopes, and building control systems. It is clear that if we want to achieve significant reductions in greenhouse gas emissions, pursuing energy efficiency is a vital endeavor.

More Needs to Be Done

While it is clear that our country has made major strides towards improving the energy efficiency of our nation's buildings, there is far more that can be done. This is especially true in the residential sector, where both educating homeowners about energy efficient retrofits and providing them ready access to the capital needed to make them has been elusive. Congress can play a major role in improving residential energy efficiency by passing the Green Resources for Energy Efficient Neighborhoods (GREEN) Act (HR 6078). This legislation, introduced by Rep. Ed Perlmutter (D-CO), provides incentives to lenders and financial institutions to provide lower interest loans and other benefits to consumers, who build, buy or remodel their homes to improve their energy efficiency.

I would add that Congress can also spur energy efficiency in the built environment – right now – by extending several energy efficiency and renewable energy tax incentives that have expired or are about to expire at the end of this year. These incentives, which cover

residential and commercial buildings, help address the initial costs that have deterred many owners from making energy efficiency improvements. Legislation to extend these incentives has been stuck on Capitol Hill all year; the AIA calls on Congress to make sure they are extended before adjournment.

The fact of the matter, however, is that in many cases, states and localities have stopped waiting for the federal government to act and are taking steps to improve the energy efficiency of their building stocks. Recent studies by the AIA have shown that the number of U.S. cities that have adopted green building programs has increased by more than 400 percent since 2003, and the number of counties that have adopted green building programs has increased by nearly 400 percent as well. But the critical importance of buildings to the national climate change equation means that the federal government must act, too.

As this committee has explored the climate change issue through white papers and hearings, one theme has remained constant – any legislation addressing climate change must result in significant greenhouse gas reductions with minimal economic disruption.

To this end, the AIA strongly supports polices that incentivize the design, construction and renovation of energy efficient buildings. When the Senate debated the Lieberman-Warner America's Climate Security Act (S.2191) last month, the substitute amendment drafted by Environment and Public Works Chairwoman Boxer included provisions that would have provided approximately $51 billion from 2012 to 2050 to building owners for new or renovated energy efficient buildings. An amendment that was to be offered by

Senators Feinstein, Snowe and Collins would have complemented this language with a proposal developed by the AIA and other groups to promote smart growth and the renovation of older and historic buildings as further means to reduce the carbon footprint of the built environment. We hope that any legislation developed by this committee also will seek ways to provide incentives to green the built environment.

Second, the AIA strongly supports provisions that encourage the development of stronger energy efficiency building codes. Last year, we supported provisions in the House version of the energy bill (H.R. 6) that would have set energy efficiency targets for both the International Energy Conservation Code (for residential buildings) and ASHRARE 90.1 (for commercial buildings) and would have directed the Energy Department to propose amendments to those codes to reach such targets if they failed to do so. This language is vital for states that want building codes that save more energy than what is developed through the consensus-based processes that the ICC and ASHRAE utilize. The Alliance to Save Energy estimates that if this provision became federal law and all states implemented the advanced codes, by 2030, the U.S. would reduce overall energy use by five percent and reduce carbon emissions by about 100 million tons.[9]

There are some who have claimed that this provision would in essence establish a "national building code." This could not be further from the truth. In fact, the AIA and other supporters of this provision, such as the Alliance to Save Energy and the North American Insulation Manufacturers' Association (NAIMA), worked diligently with the ICC and ASHRAE to address their concerns about the provision and ensure that it does

not undermine the consensus-based code development process – a process that the AIA strongly backs. While this provision was approved by the full House, it was dropped from the final bill. A similar provision was in S.2191, the Lieberman-Warner climate change bill, and we hope that it would be included in any climate change bill this subcommittee develops.

Principles for Climate Change

As you work to develop legislation addressing the threat of climate change, we strongly encourage you to consider the following principles, which we believe would result in significant GHG reductions and would do so without causing major disruptions to the economy or increasing energy costs for Americans:

1. **Climate change legislation should provide incentives to states, localities, energy providers and energy consumers to make buildings more energy efficient.** These incentives should be tied to measurable targets for energy reduction, such as Energy Star or energy building codes like ASHRAE 90.1 and the IECC, and should measure actual performance, not simply design intent.

2. **Climate change legislation should address energy use among existing buildings, not simply new buildings.** Incentives for energy efficient retrofits of existing buildings in the commercial, residential and institutional sectors – including historic properties - will help homeowners, building owners and managers reduce energy

usage and avoid the energy costs of processing, manufacturing and transporting new building materials.

3. **Climate change legislation should encourage building in high density areas near public transportation.** Reducing vehicle miles traveled by siting green buildings close to mass transit provides a double benefit to the environment by reducing the carbon emissions from both the buildings themselves and from the transportation needed to move to and from them.

4. **Climate change legislation should provide incentives for state and local governments to reduce energy usage in public buildings.** The Energy Independence and Security Act of 2007 requires the federal government to meet aggressive targets for reducing fossil fuel-based energy use in new and significantly renovated federal buildings (Sec. 422). Incentives should be provided to state and local governments that institute similar requirements for their buildings.

5. **Climate change legislation should promote the research and development of energy efficient building technologies**. Funds should be made available for the design and development of high-efficiency HVAC, lighting and window systems and energy-saving building shell technologies and materials, including insulation.

6. **Climate change legislation should provide incentives for states and communities to develop and institute community planning processes and**

solutions that reduce vehicle miles traveled (VMT). Community planning that balances economic growth with sustainable development can reduce VMT, helping contribute to reductions in greenhouse gases.

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.

Climate change legislation presents an unprecedented opportunity to make significant and lasting reductions in GHG emissions from the built environment. We look forward to working with you to ensure that any climate change legislation to emerge from this committee encourages greater energy efficiency in our nation's buildings.

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

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[1] http://buildingsdatabook.eere.energy.gov/docs/1.1.1.pdf
[2] http://buildingsdatabook.eere.energy.gov/docs/3.1.1.pdf

[3] http://buildingsdatabook.eere.energy.gov/docs/3.1.1.pdf
[4] http://www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab_1.pdf
[5] http://www.architecture2030.com
[6] http://www.aiatopten.org/hpb/
[7] http://www.mckinsey.com/clientservice/ccsi/pdf/Greenhouse_Gas_Emissions_Executive_Summary.pdf
[8] http://www.mckinsey.com/clientservice/ccsi/pdf/Greenhouse_Gas_Emissions_Executive_Summary.pdf
[9] http://www.ase.org/content/article/detail/4096

Statement of Mr. Marshall E. Purnell, FAIA,
President, The American Institute of Architects
www.aia.org

"Buildings and Climate Change Legislation"- One Page Summary

The Building Sector- Energy Consumption and Green House Gas Emissions

- U.S. buildings account for 39 percent of U.S. energy consumption and 71 percent of U.S. electricity consumption;
- U.S. buildings produce nearly half of all carbon emissions in the U.S.
- U.S. buildings account for 9.8 percent of carbon emissions worldwide.

Reducing Carbon Emissions from the Built Environment

- The 2007 Energy bill requires that all new and significantly renovated Federal buildings meet strict energy efficiency and energy use guidelines;
- The AIA's 50-to-50 website (www.aia.org/fiftytofifty) provides common-sense strategies to reduce the energy footprint of the built environment;
- Buildings named in the AIA's annual Top 10 Awards for Sustainability are designed to use 60-70 percent less energy then conventional buildings.

Energy Efficiency and Carbon Emissions

- Energy efficiency improvements offer the greatest potential for reducing carbon emissions at the lowest cost;
- Efficiency improvements can be achieved through lighting retrofits; improved heating, ventilation, air conditioning systems; building envelopes; building control systems; and sustainable design.
- Over a building's life-cycle, energy efficiency improvements produce positive economic returns through reduced energy costs.

How to Encourage Energy Efficiency/Carbon Emissions Reductions

- Extend energy efficiency and renewable energy tax incentives (currently stalled in Congress);
- Further incentivize the design, construction, and renovation of energy efficient buildings;
- Encourage the development of stronger energy efficiency building codes, ensuring these codes are developed through, open, consensus-based processes;
- Include the *AIA's Principles for Climate Change* (page 10 of the attached testimony) in any legislation addressing climate change.

Mr. BOUCHER. Thank you very much, Mr. Purnell. Mr. Boucher.

STATEMENT OF MATT BELCHER, OWNER, BELCHER HOMES LLC, ON BEHALF OF THE NATIONAL ASSOCIATION OF HOME BUILDERS

Mr. BELCHER. Thank you. Good morning. Chairman Boucher, Ranking Member Upton, and distinguished members of the subcommittee, my name is Matt Belcher, and I am a homebuilder from St. Louis. I am pleased to testify today on behalf of the 230,000 members of the National Association of Home Builders.

Today's energy and climate crisis truly affects everyone including builders like me. The housing industry continues to work on solutions to address energy conservation and improve sustainability in our Nation's residential dwellings. As a builder of green homes, I have firsthand knowledge of what it takes to make a home energy and resource efficient. I also understand the dynamic interaction of the many important aspects of housing as it relates to green building: construction, technology, efficiency, and affordability.

Finally, I once served as a local building code official and can appreciate the unique nuances of both using and enforcing building codes. Unfortunately much of today's rhetoric about what can be accomplished with stricter building codes is terribly distorted. The assertion is often made that requiring all new homes, which are already dramatically more efficient than older housing, to comply with significant above code benchmarks saves massive amounts of energy and greenhouse gas emissions.

Regrettably, this is not the case as newer homes use only a small fraction, approximately two and a half percent, of total energy anyway, meaning the bulk of energy loss and thus the major opportunity for energy savings lies in the 95 million existing homes built before 1991 that use 17 percent of the Nation's energy.

Because our Nation is inherently variable in climate, State, and local governments need to be able to adopt wide ranging building code standards to address their specific geographic needs.

It is impossible and frankly inadvisable to develop one single building code or benchmark to apply to all areas of the country. Building codes and energy efficiency are naturally local. One way to support adoption and effective implementation of stronger local energy building codes is through more resources to help localities adopt and enforce meaningful and regionally specific codes and practices.

For builders like me that have been leading the way in progressive sustainability, now known as green building, energy efficient construction is the norm. In fact, with skyrocketing energy prices and despite the worst housing downturn since World War II, the demand is growing for more efficient homes. The exponential growth in green building is dramatically and rapidly changing residential construction as we know it. Consumers and builders are collectively changing the residential marketplace. However, if Congress desires a faster pace for such change, then it must make more meaningful commitments to incentives for new energy efficient homes and homeowner efficiency upgrades.

Congress has yet to pass extensions of important efficiency incentives such as the section 45L and section 25C tax credits to encour-

age efficiency in new and existing homes. Real energy savings can be achieved through meaningful incentives for energy efficiency, particularly for existing homes, education on proper home and maintenance, and the value of conservation, and even incentives to reward conservation.

Stricter building codes for new homes is a drop in the bucket compared to the energy that can be saved by teaching homeowners not to waste the over 48 percent of their energy on laundry, cooking, and electronics used in the home. Preserving housing affordability for the next generation of green and energy efficient homes is crucial, especially for the individuals with the most price sensitivity, that is moderate income, first-time homebuyers.

These homebuyers, who are among some of my customers, continue to benefit the most from the savings and healthier living environment that can be achieved through increased energy efficiency found in new homes and through improvements to existing homes.

Mandating market outcomes through stricter building codes alone will not achieve meaningful energy savings and preserve housing affordability. Homebuilders have the responsibility to drive technology and innovation into the market in a manner that is affordable for consumers so that demands for greater efficiency can continue to increase.

Congress can help by crafting meaningful incentives for existing homeowners, offering incentives for builders that truly push the envelope for energy efficiency and providing resources to local building code officials to enforce existing codes.

I thank you all for the opportunity to testify today and, of course, would be happy to answer questions.

[The prepared statement of Mr. Belcher follows:]

Statement of Matt Belcher,

On Behalf of the National Association of Home Builders

"Climate Benefits of Improved Building Energy Efficiency"

House Energy and Commerce Subcommittee on Energy and Air Quality

July 17, 2008

Chairman Boucher, Ranking Member Upton, and distinguished members of the Subcommittee, my name is Matt Belcher and I am a home builder from St. Louis, Missouri. I am pleased to present testimony today on behalf of the 235,000 members of the National Association of Home Builders (NAHB), representing every aspect of the residential construction industry – single family and multi-family builders, light commercial builders, remodelers, material suppliers, appliance manufacturers, real estate professionals, and housing finance interests. Comprising 16% of the country's gross domestic product, the housing industry plays a major role in our national economy and has a significant impact on several businesses that depend directly upon housing, including many in the energy efficiency community.

NAHB members build about 80% of all the new homes in the United States and thus have tremendous influence on the manner in which energy efficiency and sustainable technologies are introduced into our nation's housing stock. As one of the leaders in promoting sustainability, both in my personal business and as part of NAHB's national efforts, I am excited to testify today about both the challenges and opportunities facing us as we work collectively to improve efficiency in the residential sector.

Because my business is one of the largest green home builders in St. Louis, I can personally attest to the investments and processes required to deliver not only energy efficiency, but also sustainability, into the homes that I build. As a former code official, I also have a unique

perspective on what can and cannot be achieved through new building code requirements. Lastly, I am also committed to finding a meaningful way to address the energy lost in the more than 128 million existing homes upon which building code upgrades for new construction have zero impact.

Indeed, the challenge of climate change affects everyone, including the residential construction industry. NAHB members are responding in numerous ways, yet there is a perception that builders are generally doing nothing for energy efficiency. This is blatantly false. Regardless of the often deliberately misleading information attributed to our industry, builders *are* working to address today's environmental challenges and we support effective measures to promote greater sustainability and efficiency in the broadest possible manner. This written statement explains the realities of the current situation, and suggests policy changes that will encourage real energy savings while simultaneously preserve housing affordability for millions of future residents of green and energy-efficient dwellings.

Residential Energy Consumption Realities

Although the residential sector is only one part of the nation's built environment, it has been targeted as a major untapped reservoir of potential energy and greenhouse gas emissions (GHGs) savings. In 2005, the Energy Information Administration (EIA) reported that the residential sector is responsible for consuming 21.9% of the energy in the U.S. and for producing 21% of the nation's (GHG) emissions. Despite the fact that EIA typically does not report a "buildings" category, the portion of the GHG emissions attributable solely to housing is almost always combined with the commercial, and some of the industrial, sectors to form a "building" qualifier, repeatedly discussed both in policy and media circles as a singular entity. In fact, some reports show dramatically higher percentages of GHG emissions attributed to "buildings" – even as high as 50% - which, unfortunately, misrepresents the data in a way to suggest that perhaps more can probably be accomplished than is possible in terms of material results.

Nowhere is this data distortion more pronounced than in what is attributed to newer homes - i.e., homes built after 1991 – that represent the smallest fraction, 2.5%, of all the energy consumed nationally.

Energy Consumption in 2001 in Trillions of Btu

Total	**96,498**	**100.00%**
Residential Sector	**20,228**	**20.96%**
Manufactured Housing	**1,301**	**1.35%**
Fossil Fuel Used to Generate Electricity	815	0.84%
Consumed by Residence	486	0.50%
Single Family and Multifamily Built before 1991	**16,498**	**17.10%**
Fossil Fuel Used to Generate Electricity	8,743	9.06%
Consumed by Residence	7,755	8.04%
Single Family and Multifamily Built 1991-2001	**2,429**	**2.52%**
Fossil Fuel Used to Generate Electricity	1,386	1.44%
Consumed by Residence	1,043	1.08%

Sources: Annual Energy Review by the Energy Information Administration; the 2001
Residential Energy Consumption Survey, Energy Information Administration.

This fact is noted not to minimize the existing impact of these residential dwellings on GHG emissions, but to ensure against miscommunication of where substantial emissions reductions and energy savings are actually possible. For example, simply mandating that all new homes must achieve significant above-code performance will not produce the greatest energy savings because new homes are only 2.5% of the problem. Solutions to address all 21% - or both new and existing homes – is something that demands greater focus.

Information from the EIA, as reported by the Department of Energy (DOE)'s *Building Energy Data Book 2007*, shows that most (48.5%) of the energy consumed in a home is the result of the lighting, refrigeration, laundry, cooking, and electronics use by the residents.[1] This presents a substantial challenge for builders, who may otherwise have constructed a home that would meet conservation targets. Essentially, it is possible to build an efficient home that performs poorly due to improper maintenance and operation by its residents. The disconnect

[1] *2007 Buildings Energy Data Book.* U.S. Department of Energy, September 2007. Page 32, Table 1.2.3. *This number includes primary energy consumed across all fuel types. The number also includes "other," as it could possibly pertain to building envelope efficiency.*

between envelope improvements – which are primarily the responsibility of the builder and resident behavior – over which a builder has no control – is one of the major barriers to achieving greater improvements in residential energy efficiency in new homes.

Nonetheless, builders are responsible for driving technology and innovation to consistently improve the energy performance of homes. In fact, extensive gains in building efficiency have been realized over the past decade that have resulted in dramatic energy savings in newer homes versus existing homes.[2] Part of the reason for this improvement is the result of a maturing code adoption process, but it is also the product of a growing market shift in demand for more efficient homes in both new construction and for existing homes. For example, a recent survey of remodelers conducted by NAHB found that one-third of respondents reported an increase in calls for work to improve energy efficiency in an existing home within the last three months. Also, 73% of the respondents reported installing windows with low emissivity (or "low-e") glass in the past three months, 65% reported upgrading insulation, and more than 50% installed high-efficiency HVAC systems. These numbers are not necessarily surprising given the current energy crisis facing the nation, but they are dramatic examples of how changing consumer demands are ushering in a new era of residential construction generally. Saving energy and resources with an energy-efficient home is no longer just a savvy marketing technique, but it represents a financial benefit to the homeowner as well as an environmental benefit to our planet.

Data on Efficiency Improvements in New Homes

Generally, the federal government's collection of detailed information from construction and housing surveys regarding energy efficiency and cost savings is inadequate given the realities of today's emerging energy crisis. With limited funding from the shrinking budget of the Department of Housing and Urban Development (HUD)'s Office of Policy Development and Research, the Census Bureau's Survey of Construction, which generates information on the

[2] *2005 Residential Energy Consumption Survey (RECS).* Energy Information Administration. U.S. Department of Energy. *Homes constructed in the decade between 1991-2001 consumed 2.5% of total U.S. energy. Homes built before 1991 consumed 17.1% of the total U.S. energy.*

characteristics of new homes, is producing a relatively incomplete picture of changing construction dynamics that have occurred over more recent years. For example, this survey is two pages with only about three dozen questions; limiting its ability to provide meaningful information. This same scenario is true for the American Housing Survey, which is a longer and less-frequent survey that collects more detailed data on new and existing housing. The survey lacks the kind of detail about code requirements, zoning ordinances, or other regulations that exist locally and because it is conducted by the Census Bureau, it is funded out of the same shrinking HUD budget.

Although not as timely as preferred it is essentially the best available, in light of the federal government's data collection efforts in this area. Above all, in order to get more accurate information about efficiency in homes, upon which effective public policy can be created, the federal government really needs more adequate investment in this area.

That being said, the results from the 2005 RECS are summarized in Exhibit 1.

Exhibit 1. Share of Housing Units that Have Some Energy Efficiency Features

	Year of Construction								
	Total	Before 1940	1940 to 1949	1950 to 1959	1960 to 1969	1970 to 1979	1980 to 1989	1990 to 1999	2000 to 2005
Solar power usage at home									
Used as Main Heating Fuel	Used	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Used
Space Heating Usage									
Well Insulated	38.5%	26.5%	29.7%	32.0%	35.2%	34.4%	39.8%	50.9%	62.0%
Type of Glass in Windows									
At Least Double Pane	54.4%	47.6%	50.0%	46.4%	40.0%	48.7%	55.4%	71.7%	75.0%
Double-pane With Low-e Coating	7.2%	6.1%	5.4%	6.4%	4.8%	7.4%	5.4%	8.1%	16.3%
Have a Programmable Thermostat	29.8%	23.1%	28.4%	26.4%	24.8%	27.0%	32.3%	32.9%	47.8%
Home Appliances Usage									
Energy Star (Most-Used) Refrigerator**	21.5%	20.4%	21.6%	22.4%	16.8%	19.6%	19.4%	18.5%	42.4%
Energy Star Dishwasher**	14.8%	9.5%	9.5%	10.4%	10.4%	14.3%	14.0%	13.3%	43.5%
Energy Star Clothes Washer**	19.5%	17.7%	17.6%	20.0%	18.4%	15.9%	19.9%	19.1%	31.5%

*: Information on solar power is limited in the 2005 RECS. If no cases exist in the sample, then solar power usage is reported as "Not used"; if data withheld because of large RSE or because of a small sample, then solar power usage is reported as "Used".

**: The question of whether the appliance was Energy Star was asked only of those housing units having a appliance less than 4 years old.

Source: Energy Information Administration, 2005 Residential Energy Consumption Survey detailed tables.

Use of solar for heating is infrequent enough that EIA does not report actual percentages in most cells, due to large margin of errors. However, the only vintage category for which any homes reported using solar power as the main heating fuel were built in 2000 or later. It should also be noted that the insulation level reports in the RECS are entirely subjective, based upon asking respondents their opinion on how well their homes were insulated. Nonetheless, the differences in this measure are still dramatic enough to indicate that new homes are significantly better insulated. About 62% of respondents in homes built in 2000 or later reported that their homes were "well insulated" compared to an overall average of 38.5% across all decades.

By more objective measures, 75% of homes built in 2000 or later have at least double pane windows, compared to an overall percentage of 54.4% for all homes irrespective of vintage. Slightly more than 16% of homes built in 2000 or later have double-pane windows with low-e coating – more than twice the 8.1% reported for homes built between 1990 and 1999. This data shows a similar surge in the use of Energy Star® appliances in homes built after 1999. Overall, to the extent that the 2005 RECS provides information on energy-efficient construction techniques, it does demonstrate a regular pattern of greater efficiency for newer structures.

For most energy-saving features, a particularly strong increase in the use of these sustainable techniques is evident in either 1990 or 2000 – the finest detail currently available from the 2005 RECS tables. This similarly coincides with the beginning of the green building movement (discussed later in this statement) and corroborates anecdotal data that NAHB has collected from its members over time about the increasing market demand for more energy efficient features in homes.

Market Dynamics of Efficiency Features and Affordability

There are a number of factors affecting market penetration for certain home features, including energy efficiency features. Because housing markets, much like climate zones, are highly localized and impact individuals differently, it is not terribly surprising that the demand for

some efficiency features in new homes, particularly those which can be very costly, has not been higher. In this case, it is not the fault of the builder or the consumer, but is more a result of the market dynamics of affordability that can make important decisions on certain features potential constraints.

Home building is widely recognized as a competitive industry. According to a 2003 monograph by the American Real Estate and Urban Economics Association, "In the United States, as in most countries, the market for housing services per se can be approximated by a competitive market...few landlords or developers are large enough to exert significant market power."[3] In a competitive market like this, builders need to build homes with features their customers want, at a price that customers are willing and able to pay, or they will be driven out of business by other builders who can provide the types of homes demanded at the right prices. Essentially, customers ultimately determine the types of homes that get built.

Typically, if certain energy-saving features are not achieving a higher market penetration, it is most likely the result of unwillingness by the customer to pay for them. In the case of energy savings, customers are presented with the eventual savings of certain features versus the initial up-front costs. Consequently, if a particular feature costs nothing, or generates a large savings for the consumer to pay back quickly, then the market demand for such features would be incredibly high.

To be sure, it is possible that the market may occasionally fail if home buyers do not have all the information they need – for example, if they do not realize a certain energy-saving feature is possible, or if they do not fully understand how much energy it saves. In this case, greater public education would be appropriate. Yet, if the market is working and customers have enough information but simply choose not to pay for a feature at a current price, then Congress has the

[3] Richard Greene and Stephen Malpezzi. *A Primer on U.S. Housing Markets and Housing Policy. AREUEA Monograph Series No. 3*, The Urban Institute Press, Washington (2003). Richard Greene is currently Associate Dean for Graduate Programs and Olver T. Carr, Jr. Chair of Real Estate Finance at George Washington University. Stephen Malpezzi is Professor, and Lorin and Marjorie Tiefenthaler Distinguished Chair in Real Estate at the University of Wisconsin-Madison.

opportunity to alter the market outcome to achieve the broader purpose of saving energy. The best ways to approach this are through additional research into new technology, thereby lowering costs, as well as to providing incentives for efficient behavior (e.g., Section 25C, Section 45L, and Section 179D of the Internal Revenue Code). NAHB has been a strong supporter of both efforts, working alongside the federal government to maintain the Partnership for Advancing Technology in Housing (PATH), a program at HUD that drives technology innovation, as well as lobbying aggressively for tax incentives alongside many in the environmental community, including some here today.

If, however, the government instead adopts the approach of mandatory energy efficiency measures, the potential risk is the harm done to marginal first-time home buyers. These home buyers are typically characterized by lower incomes, limited up-front cash for down payments, with intent to purchase relatively modest-priced homes. These lower-income marginal buyers simply cannot afford to wait for twenty or thirty years for future paybacks from efficiency features. Academic studies may disagree in some respects, but are consistent in finding that shorter payback periods are most needed for households with lower incomes, or those buying lower priced homes.[4]

Mandated criteria that increase up-front costs for new homes in exchange for a future payback may work well at the top of the market, or even in the average case, yet have the effect of pricing out marginal first-time buyers at the lower end of the market. NAHB does not support the assertion that a broad public policy objective should be achieved on the backs of a relatively narrow segment of the market with limited resources. Nonetheless, recognizing the importance of energy efficiency, NAHB recently adopted new policy on accepting efficiency mandates that embrace a payback of ten years or less. This policy is based on the longest payback period for

[4] *The Value of Energy Efficiency in Housing: Review and Analysis of the Literature*, by David J. Dacquisto, Paul Emrath, Joseph Laquatra, and John A. "Skip" Laitner, working paper commissioned by the U.S. Environmental Protection Agency.

first-time buyers found in NAHB consumer surveys, specifically since on average, home owners only remain in a home for seven years.

Cost-Effectiveness and Technical Feasibility

In light of the need for reasonable payback periods, particularly at the lower end of the market, there are many ways to determine whether or not energy efficiency code changes are actually cost-effective in the long term. Some efficiency features are very expensive at the front end, leading some to claim that they are never cost effective. For example, in a June 2008 article for the *Journal of Light Construction* called "A Close Look at Common Energy Claims," Martin Holladay suggests that "replacing old single-pane windows with new double-pane low-e units certainly saves energy, but the cost is so high – and the amount of energy saved is so low – that window replacement is almost never cost effective." Meanwhile, installing fluorescent lighting and replacing incandescent bulbs is a modest investment with almost immediately cost-effective returns.

Some argue that building envelope improvements – often accomplished through code change requirements – are the best way to address building efficiency because it is assumed that builders will simply absorb the additional costs. The truth is that builders cannot simply push thousands of dollars of efficiency upgrades onto consumers, particularly in instances where consumers are not even demanding such features, and expect to remain competitive in the market. Builders, and homeowners, have to strike the right balance between the most appropriate efficiency features that meet the right pricing targets.

Building codes are designed to change and to improve as changes in technology and building practice grow and mature in the market. There is currently a proposed change to the International Energy Conservation Code (IECC) for the 2009 edition that seeks a 30% improvement in overall energy efficiency. However, some of the changes within this proposal have no reasonable level of cost-effectiveness. For example, one change proposes an increase in the wall insulation level (or R-value) from 13 to 16 in Climate Zone 2, which encompasses most

of Florida. The energy savings for this change is calculated at $22/year for a 2,000 square foot house with a cost of (at least) $1,600 in high wind zones; making the payback for such a feature more than 70 years. Another change proposed in Southern Florida will require a change from a single pane window to a double pane window. Computer energy simulation models show that there is actually an energy penalty of $3 for adding the second window pane at a cost of over $700 for the same 2,000 square foot house.

Implementation and Liability Problems

As with many new trends, liability for unexpected problems with a new technology or practice is a legitimate concern. There is the potential for significant problems with large energy efficiency improvements in houses and apartments that should be noted. Building scientists often discuss buildings operating as a system, meaning when one thing changes, it affects how the entire house operates. An example of this is seen in a hot humid climate where improving the efficiency of a building can challenge the performance of an air conditioner beyond its capability. Conventional air conditioners are designed to remove a certain amount of moisture, but "high performance" homes have the problem of requiring less air cooling and a similar amount of moisture removal. Current air conditioner designs will reduce the temperature and leave too much moisture resulting in a cold and clammy condition that is very suitable for mold growth.

DOE's Building America program recognizes this problem and a possible need for supplemental dehumidification equipment. However, in the Building America Best Practices Series there is very little guidance beyond, *"One Building America team recommends that all homes in the hot and humid climate call for supplemental dehumidification. Other teams call for these systems in homes where moisture proves to be a problem."* Even some of the best building scientists in the country are unable to provide a standard solution. This new technology approache may be good for cutting edge programs where the builders get free engineering support through a government-sponsored program, however, this is not appropriate if every house is required to meet stricter standards with merely a warning to builders of potential

problems. The liability and health issues associated with sweeping changes to the energy code without verifiable and rigorous research could be disastrous to the building industry.

As the demand for energy efficiency increases, the call for tighter and tighter homes continues to grow. In areas of the country where moisture and humidity are particularly problematic, tighter homes – e.g., that may be required for certain code increases – can result in a ripe environment for mold growth and other indoor health issues. In this case, the builder, not the building code, is the responsible party and could be subject to extensive litigation, despite the fact that he or she simply complied with the efficiency requirements of the code. This scenario becomes more realistic in terms of the push for national benchmarks for code changes that demand significant above-code compliance. Basically, because some construction techniques may be appropriate in some areas of the country does not mean that the same code requirements are suitable in other areas – and in some cases to the detriment of the well-intentioned builder that would have to choose between legal liability or code compliance.

The Role of Building Energy Codes

As a former code enforcement official, I can confirm that a great majority of the rhetoric that exists today relative to building codes, aimed at the public and policymaker alike, is unfortunately, terribly distorted. In some respects, certain groups appear to suggest that all concerns about the built environment and the GHG emissions attributable to it could easily be ameliorated with a few aggressive building code regulations. Regrettably, this completely misrepresents the realities of what is actually possible with changes to energy codes not only because of their irrelevance for the current inefficient housing stock, but, ultimately because the codes are only meaningful if they are actively enforced.

It is true that codes are consistently improved through a normal cyclical process whereby stakeholders from every interested party – enforcement officials, environmentalists, builders, etc. – convene to discuss the merits of certain changes, eventually producing a revised code for adoption by state or local governments. It is false to assume that just requiring states or local

governments to adopt an arbitrary above-code compliance target for all new construction is going to translate into improved enforcement of such code requirements or achieve the energy savings goals envisioned. It may be worthwhile for a state or local government to decide to adopt an aggressive energy code, but if the resources, or infrastructure, to enforce the code are not available, then the savings assumed will never materialize.

The manner in which building and energy code adoption occurs is one reason why the federal government is unique in terms of what it can "require" of state and local governments. Under the police powers of the U.S. Constitution, states are given the authority to determine appropriate building codes within their jurisdiction. Some states then defer this authority to local municipalities and consequently set up a framework whereby climate and geography concerns can be specifically addressed in an individual state or area. For example, Florida needs the flexibility to require hurricane impact resistant building standards, and similarly may require higher-efficient air conditioning equipment because these are specific geographic demands that make sense for the state. Whereas requiring the same codes in Michigan – i.e., hurricane impact resistant building standards and high-efficiency air conditioners – might be completely illogical.

Because geography, climate, and local impacts are crucial to the combined safety, soundness, and energy performance of residential structures in various parts of the U.S., it is impossible to develop a national energy code to accommodate every individual state's demands simultaneously. While it is entirely possible for the federal government to encourage above-code compliance by offering incentives to builders achieving significant savings (e.g., Section 45L New Energy Efficient Home Credit), the federal government should be careful in how much it pushes (or mandates) an individual state or local area to adopt an energy code because it could run contrary to local geography needs or supersede existing public-private programs that have produced incredibly successful conservation results, (e.g., Energy Star®). Proposals that require states to adopt above-code targets could leave those states out of compliance with federal law

should they choose not to adopt the federal benchmark. This lack of compliance potentially opens the state to a myriad of litigation, or other federal enforcement regimes.

Congress is slowly shifting focus to find ways to address these federalism barriers and improve state energy codes. H.R. 6 – *The Energy Independence and Security Act* (PL 110-140) included a provision to authorize the creation of an Energy Efficiency Block Grant program that would deliver funds to state and local governments to implement measures (and potentially offset some costs) of local efficiency needs. Also, the U.S. House recently passed H.R. 4461 – *The Building Code Administration Grant Act* to provide more resources for state and local building code departments to enforce existing codes. Lastly, Congress should require DOE to fulfill its commitment to training individuals on the energy code, as promised in various meetings with NAHB staff and members.

State and local governments need to be actively engaged in developing code requirements that are appropriate for the structures built within their jurisdictions. The federal government needs to support them with resources to enforce the codes, and must encourage them to adopt the most appropriate energy codes available while not endangering public health. Just as the federal government must encourage greater efficiency in our nation's housing stock, so too should they continue to support housing affordability in a manner that allows everyone, at all price points, to be able to enjoy a green or energy-efficient home.

Meaningful Incentives for Energy Efficiency

Congress plays an important role in developing effective ways to incent builders and homeowners to improve the efficiency of residential dwellings. One of the primary ways is to offer tax incentives to homeowners and builders that upgrade and construct highly-efficient homes. The Internal Revenue Code Section 25C – Nonbusiness Energy Credit goes directly to the homeowner for making improvements in windows, water heating, adding insulation, etc. Albeit modest (e.g., no more than $200 for windows), the credits are an important federal commitment

to promoting efficiency in existing homes. Unfortunately, these credits expired at the end of 2007 and have not yet been extended.

Similarly, the Internal Revenue Code Section 45L – New Energy Efficient Home Credit provides a $2,000 tax credit (subject to basis adjustment) for a builder who constructs a home that is 50% more energy efficient than the 2004 supplement to the 2003 International Energy Conservation Code (IECC). This credit was originally passed in the Energy Policy Act of 2005 and extended for one year, expiring December 2008. Last year, a dramatic increase in the number of homes achieving certification for this credit was reported. Over 23,000 homes were certified in 2007 versus approximately only 9,000 in 2006[5]. This nearly three-fold increase is significant, not only because it occurred amidst the most serious downturn in housing since World War II, but also because it proves that building for efficiency is growing dramatically.

Unfortunately, neither of these tax incentives has been renewed by Congress. NAHB has been lobbying aggressively alongside many environmentalists, corporations, and other trade groups to urge a quick extension of these important incentives. The House recently passed H.R. 6049 – *The Renewable Energy and Job Creation Act* that has a number of renewable energy production incentives, as well as some efficiency credits. However, the Section 45L credits were not included. Despite the fact that no one, in either Chamber or in either party, has expressed objection to Section 45L, there was a complete omission of including this incentive for residential energy efficiency. The shocking reality is that many of the incentives that Congress did include in H.R. 6049 were incredibly expensive, meanwhile a one-year extension of Section 45L is only $50 million, which, as demonstrated above, reaps tremendous efficiency benefits in the number of super-efficient homes that have been constructed under it. It is time for Congress to restore its commitment to promoting residential energy efficiency in new construction and preserve, by

[5] This figure was reported by the Residential Energy Services Network (RESNET) on June 2, 2008 – www.natresnet.org. The 2007 data comprises almost 3% of all the new homes constructed in 2007.

extending for as long as possible, the *only* federal incentive for efficiency in new residential construction – Section 45L.

In addition to incentives for new homes and existing home upgrades, Congress should also extend Internal Revenue Code Section 179D – Deduction for Energy Efficient Commercial Buildings. This provides a $1.80/sq. foot deduction for commercial buildings (or those four stories above grade – including multifamily) for achieving 50% energy savings above ASHRAE 90.1. The incentive also provides a $0.60/sq. foot deduction for buildings that achieve 2/3% of energy reductions above the same code. Because of the relatively short duration of this credit, which also expires at the end of 2008, many commercial builders have not had the opportunity to fully utilize the incentive, incorporating into long term development plans. Without a Congressional commitment to a longer incentive, it loses some of its interest because of the unpredictability of its existence. To make it meaningful, Congress must extend the tax incentive for many years – or make it permanent.

Lastly, in relationship to state and local governments, encouraging local officials to adopt expedited permitting and faster building reviews for builders that construct highly-efficient homes, or green homes, would also encourage a change in behavior locally. Inherent within many of the energy efficient homes is a requirement to conduct a plan review, contract an energy rating, wait for a code inspection, and then receive a Certificate of Occupancy. Once the new construction market recovers and the demand for homes returns, builders will be searching for ways to speed the permitting and inspection processes to get the property built and quickly ready for sale. If building green or highly-efficient homes provides access to expedited review and permitting, it will become increasingly more attractive to undertake.

The Green Building Movement

NAHB's experience and support for voluntary energy efficiency and green predates many of the available green ratings systems today. Long before green was a part of every day lexicon, NAHB members were actively engaged in building energy efficient homes and buildings, as part

of an organic process that has significantly reshaped residential construction. Aside from our members' work in efficiency programs, like Energy Star® and the Department of Energy's (DOE) Building America program, they have been long-standing pioneers in what is now known as the green building movement.

In the early 1990's, local builders began driving sustainable residential construction that incorporates a flexible framework to accommodate geography, resources, and energy efficiency. As the movement grew, NAHB members became more engaged and, in 1998, NAHB established a special subcommittee at the national level to work specifically on green building issues. By 2004, the industry, including over sixty stakeholders, was developing a set of national guidelines to direct builders how to incorporate ever-increasing sustainability benchmarks for compliance with green criteria. This became known as the National Green Home Building Guidelines. However, as the need to develop a more reliable verification methodology became apparent, the members of NAHB agreed to work collaboratively with the International Code Council (ICC) to undergo a rigorous standards-developing process that would ultimately produce the first standard submitted to the American National Standards Institute (ANSI) for green residential construction and remodeling in the United States – the *National Green Building Standard™*.

The development of the *National Green Building Standard™* is the most recent, and most robust, effort undertaken by the industry to set compliance markers for green building in the various aspects that comprise residential construction – single family, multifamily, remodeling, and land development. The process began in early 2007 when a group of 42 stakeholders convened in Washington D.C. representing federal (U.S. EPA, DOE), state, and local governments, building code officials, design professionals, building supplier manufacturers, sustainable building interest groups (including the U.S. Green Building Council), utilities, builders, and energy efficiency consultants. These experts worked together for over a year to develop rigorous, environmentally-sound, and defensible criteria for green residential construction incorporating the seven primary principles of sustainability: energy efficiency, water efficiency,

resource efficiency, lot and site development, indoor environmental quality, global impact, and home owner education. Once the group finalized the criteria, balloted appropriately, addressed all appeals and responded to over 3,000 public comments, the resulting product was presented for approval to ANSI in April of this year. When approved, the *National Green Building Standard™* will be the only standard approved by a third-party Standards Developing Organization (SDO), (i.e., ANSI), for residential construction.

The process for developing the *National Green Building Standard™* is incredibly important in order to fit within the framework of established federal law relating to voluntary consensus standards utilized by federal agencies. The National Technology Transfer Act of 1996 (PL-104-113) states in Section 12 (d)(1) that:

> *In general.--Except as provided in paragraph (3) of this subsection, all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments.*

NAHB understood the importance of providing a viable, rigorous, and consensus-based alternative to the plethora of privately developed green rating systems flooding the market as the dynamism of the green movement continues to grow. NAHB believes the federal government similarly understands the importance of this concept. By passing this law, it has appropriately identified the need to recognize those standards that have undergone the lengthy and rigorous approval procedures inherently equipped with adequate safeguards against undue private influence, confirmed by approval from unaffiliated SDOs.

One very important aspect of green building is, of course, energy efficiency. To be sure, green building embodies more than just energy efficiency, however this is a major component of building performance; primarily because of the costs associated with it, i.e., utility bills. Due to concerns about the variable of consumer behavior and how consumption habits could potentially offset some efficiency gains in the envelope, NAHB made sure to underscore the importance of

educating homeowners about maintenance and home operation with a requirement in the national program. This adds value the impact of consumer choices and informing the consumer about how personal conservation habits in the home are as important as changing the construction techniques in the structure itself.

Existing Homes & Remodeling

In addition to green building, the shift in demand for remodeling for greater energy efficiency is one of the brighter spots in the current housing downturn. In general, there are numerous ways to increase energy efficiency in existing homes and buildings. One of the most effective ways is to switch out incandescent bulbs with compact fluorescent lighting (CFLs) in areas that are lighted for extended periods of time, typically two hours or longer. CFLs are four times more energy efficient (using 50 to 80% less energy) and last up to ten times longer than incandescent bulbs. Since 11% of all energy used in a home is for lighting (*2007 EIA Building Energy Data Book*), this could reap tremendous energy savings and cost consumers very little upfront. Another measure is to install programmable thermostats to heating and cooling equipment that automatically turn on and off instead of running continuously. Also, sealing cracks with caulking and weather stripping can greatly improve energy efficiency, as could properly placing trees and shrubs to maximize the benefits of shading and protect against radiant heating from direct sunlight. Adding insulation to basements and attics, particularly when these areas are used as bedrooms or family room is also another way to improve efficiency.

Finally, replacing less efficient appliances with Energy Star® rated models can save an average of 30 percent over standard appliances. All of these measures can produce meaningful energy savings, as well as decrease utility bills for consumers. Some of the measures are more costly than others, (e.g., adding insulation versus replacing incandescent bulbs), but each has the potential to save energy for the consumer operating an existing home.

One of the major obstacles for upgrading efficiency in existing homes is the potentially-high upfront costs and sometimes lengthy payback periods. While some actions can reap short

term paybacks with very modest upfront investment, (e.g., CFLs), others can be much more expensive initially and take longer to recoup via utility savings, (e.g., installing low-e windows or major equipment replacement). Another obstacle is the lack of consumer information about the costs and paybacks associated with some of the upgrade activities, so that informed decisions can be made about what is appropriate for an individual household. Some utilities have been working on consumer education campaigns about saving energy for a long time with great success. However, a general lack of knowledge still exists for residents about the impact of certain consumption habits (laundering, cooking, electronics, etc.) in the home. This lack of knowledge on the part of the resident has the potential to offset energy savings from building envelope improvements. A conscientious effort to inform the public about conservation practices in a home is critically important to ensure that efficiency upgrades, once they are undertaken, actually perform as intended. Ultimately, operating an efficient home inefficiently serves no one.

The most effective way to encourage owners of existing buildings to upgrade their energy efficiency is through programs at local utilities and those directly linked to utility savings. This has historically been the most effective tool because it is the most immediate, and locally available, resource to drive behavior change. Providing rate breaks for owners that are operating appliances, etc. in off-peak periods may be one way to change behavior or, alternatively, charging higher rates to owners that are not operating the home in an efficient manner. Another method of shifting owners towards more efficiency or weatherization may be to provide two different billing schedules, one with an "efficiency path" and another with "standard rates" so that consumers can see potential savings from choices that can be made with respect to appliances, weatherization, and lighting, for example.

Finally, providing consumers and owners with information about peak-load demand and detailing information about when energy is the least expensive to use (i.e., during the day), may shift consumption patterns, spreading out the demand-side needs and moderating the overall use. Essentially, anything a utility offers a consumer that affects the monthly bill is going to have

the most immediate, and most profound, impact on that consumer's choices. Utilities are the ones that carry the ongoing and primary relationship with the homeowner, therefore, they have the most opportunity to change the dynamics, and the demand for energy services.

Conclusions and Recommendations

Improvements in residential energy efficiency and the growing green building movement are absolutely changing the dynamics of the housing market today, despite assertions to the contrary. In some instances, the changes and improvements may not be occurring at the pace desired by policymakers at all levels – federal, state, and local. But, to claim that nothing is happening at all to encourage improved efficiency and sustainability is entirely false. Due to the deficiency in data that the government has collected generally about various energy-saving technologies and their prevalence in the home, it is challenging to determine exactly what costs associated with improved efficiency features might be in every housing market in the U.S. To be sure, there are some standard data, mostly reported by Energy Star® that can serve as a reference point for cost-effectiveness. However, the reality is that a mix of incentives, consumer education, changes in construction technologies, and adoption of locally-enforceable and meaningful efficiency measures, is needed to drive greater efficiency in new home construction.

There are many opportunities for the government to work with home builders to achieve the goal of increased energy efficiency in the nation's residential buildings. NAHB would recommend the following to address energy efficiency in both new and existing homes:

- The government must make an active commitment to greater consumer education about energy conserving choices in home operation and maintenance. This can be accomplished through the utilities, but must be aimed directly at consumers that are using over 48% of their energy through use of appliances, cooking, laundry, and electronics.

- Congress must restore its commitment to energy incentives that help offset upfront costs of efficiency upgrades. To do this, Congress should extend, or make permanent, Section 45L, Section 25C, and Section 179D of the tax code.
- Congress should also commit appropriations for the Energy Efficiency Block Grant (EEBG) program authorized in *Energy Independence and Security Act of 2007* (PL 110-140). This gives resources directly to state and local governments that can be used to support efficiency upgrades in existing homes.
- Congress should provide direction to state and local governments to allow expedited permitting and review for builders constructing highly-efficient or green homes.
- Lastly, Congress must embrace the broadest possible green building policy and support programs and standards that have undergone the rigors of scrutiny by third-party Standards Developing Organizations (SDOs). The first-and-only *National Green Building Standard*™ (ICC700 – National Green Building Standard) for residential construction, remodeling, and land development is very near completion and was submitted to ANSI for approval in April of 2008.

Executive Summary - Matt Belcher, the National Association of Home Builders

"Climate Benefits of Improved Building Energy Efficiency"
Subcommittee on Energy and Air Quality

July 17, 2008

I am Matt Belcher, a builder from St. Louis, Missouri, presenting testimony on behalf of the 235,000 members of the National Association of Home Builders (NAHB), representing the entire residential construction industry – single family and multi-family builders, light commercial builders, remodelers, material suppliers, appliance manufacturers, real estate professionals, and housing finance interests. Comprising 16% of the country's gross domestic product, the housing industry plays a major role in the national economy and has a significant impact on several businesses that depend directly upon housing, including many in the energy efficiency community.

Although the residential sector is only one part of the nation's built environment, it has been targeted as a major untapped reservoir of potential energy and greenhouse gas emissions (GHGs) savings. In 2005, the Energy Information Administration (EIA) reported that the residential sector is responsible for consuming 21.9% of the energy in the U.S. and for producing 21% of the nation's (GHG) emissions. Despite assertions to the contrary, builders are doing many proactive things to address today's environmental challenges, which has resulted in dramatic efficiency gains in energy usage for newer homes (built after 1991) compared to older homes.

The challenges of today's energy and climate crisis are shifting the market quickly towards more energy efficiency both in existing homes, as well as in new construction. The dynamic ways that the green building movement is rapidly changing residential construction is only one example of a broader, market-determined push for greater efficiency. In the midst of the worst housing downturn since World War II, builders continue to see growth in demand for green and energy efficient homes, as well as increased requests for efficiency upgrades in the 128 million existing homes, comprising the bulk of the nation's residential energy loss.

Policies that encourage energy savings are the most meaningful at stimulating greater demand for conservation in home operation. The ability of aggressive building code mandates to achieve massive energy and GHG emissions savings is incredibly limited. The wide-ranging geographic differences in state and local climates create specific building needs making national benchmarks almost untenable. Furthermore, state and local enforcement of building codes is currently subject to resource limitations. Lastly, significant increases in costs for efficiency upgrades and the additional increase in home price to accommodate them has the potential to harm the part of the market with the least flexibility to react to price constraints: the marginal first-time home buyer.

Congress must encourage energy efficiency in the residential sector. Extending important incentives like the Internal Revenue Code Section 45L, 25C, and 179D for homeowners, builders, and developers to foster greater conservation is critical. Promoting and embracing a broad policy to support the burgeoning green building movement, and those standards that have undergone thorough review by unaffiliated Standards Developing Organizations (SDOs) is also important. Funding important local initiatives, providing resources to state and local building code enforcement efforts, and appropriating funds for the Energy Efficiency Block Grant program are also meaningful ways that Congress can further efficiency goals and create true savings.

Mr. BOUCHER. Thank you, Mr. Belcher. Mr. Gentry.

STATEMENT OF THOMAS A. GENTRY, ASSISTANT PROFESSOR, SCHOOL OF ARCHITECTURE, UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

Mr. GENTRY. Mr. Chairman, members of the committee, thank you for inviting me to speak. Today I will focus on the potential of reducing energy use and greenhouse gas emissions for residential buildings by providing brief answers to six of the questions that were in your invitation.

My background in this area is I am a recent professor in architecture, a licensed architect, did that for a while. Still continue to do that, and for 20 or more years I was a general contractor of light commercial and residential construction. I built my first solar home, energy efficient home, in the 1970s and have been doing so ever since. It is something I am very passionate about and have spent a lot of time investigating.

Starting with your first question, what reductions in energy use and greenhouse gas emissions are possible from state-of-the-art building designs that are cost-effective and do not diminish other attributes and uses? This is actually a pretty straightforward question in that there are actually quite a few state-of-the-art and also tried-and-true methods that currently exist that we can be using to reduce greenhouse gas emissions.

One example is advanced wall framing, which is a method of framing that reduces the amount of wood in the wall, exterior wall, and thereby reduces the amount of thermal bridging, which results in unwanted heat losses and heat gains.

Second question was what are the factors that have led to new residential construction falling far short of the potential to reduce energy use and greenhouse gas emissions? In a nutshell, most of the housing in this country is built as a product for market. That means short-term economic concerns tend to override long-term benefits. Developers and builders produce what the market demands. Potential owners focus more on size and finishes than they do on heating and cooling costs and environmental impact. And mortgage lenders only consider the initial price in qualifying buyers. The way out of this energy inefficiency and environmentally non-sustainable trap is for the mortgage lenders to take the lead in looking at the triple bottom line when qualifying buyers.

TBL, as it is called, looks at the financial, environmental, and social cost of values for each transaction. The approach has been adopted by several major corporations and a few financial institutions.

I did a project in Chicago with a university I used to be affiliated with there. It was a student-designed and -built project, and the bank we worked with was very proactive in TBL financing. It was the reason why that project was successful.

What can the Federal Government do to address those factors? The Federal Government has tried to address these factors in 1979 when HUD implemented the Energy Efficient Mortgage Program, which increases the amount buyers can borrow. Unfortunately, the perception is the loans are more complex to obtain than conven-

tional loans. Therefore less than 2 percent of the loans currently being made by a major federal lender are EEM loans.

Based on the limited success of this program and the regional issues which I will discuss shortly, the Federal Government should take a supportive role in helping States and municipal governments implement regional codes and guidelines for energy efficiency. To date, one of the most valuable things the Federal Government has done has been to empower States' municipal governments with information from research. This information is invaluable in formulating codes and standards.

Question four: what are my views on efforts to upgrade and provide enhanced implementation of energy efficient building codes?

Success in the implementation of energy building codes has been limited to a few States and municipalities. In 1978, California adopted title 24, part 6, of the California Code of Regulations, Energy Efficiency Standards, for residential and noncommercial buildings. Minnesota has had an energy code since 1976. More recently, the city of Chicago adopted the Chicago Energy Conservation Code. These three codes are good examples of how regional codes can yield housing that is more energy efficient than what is being built throughout most of the country.

Question five: what are market and non-market barriers that have resulted in much new home construction falling well below cost-effective levels of energy efficiency?

The Department of Housing and Urban Development lists fragmentation, risk, education, cultural values as the four barriers to innovation in housing. Looking closer at fragmentation barriers, research shows fragmentation occurs vertically, horizontally, and geographically with geographical fragmentations being due to municipal regulations, industry competition, and the predominance of small builders. What is missing from this list is regional practices. As a laborer, carpenter, and general contractor, I have built housing throughout much of the United States, and experience has shown me how regional practices vary due to differences in climate, available materials, and local skills.

Risk and education are two more barriers I have watched builders struggle with. The National Research Council summed it up nicely: "Although many effective energy efficient materials and products do not have higher first costs, builders resist implementing them because additional time is needed to train workers to install them, and until the builder gains experience with these energy efficient materials and products, they are perceived as risky."

A factor that is amplifying the severity of these barriers is the increasing practice of piecework. Builders routinely pay short-term labor by the piece, rather than by the hour, to perform specific tasks. The practice has yielded a labor force of workers that floats from builder to builder, and within the labor force, each worker typically possesses a very limited set of skills. With workers no longer employed by one builder for a significant period of time to do a wide range of tasks, there is little incentive for the builder to educate the labor force.

Question six: how should the market and non-market barriers to inclusiveness of cost effective energy efficiency in new buildings be overcome?

Organizing the barriers into two groups, those that are unique to each region, such as regional building practices, and those that are universal throughout the United States, such as risk associated with the adoption of new technology, provides some insight into how the energy code should be used to overcome these barriers. With the housing industry resistant to change, it stands to reason the less change an energy code requires, the more likely it is to be implemented. It also stands to reason more changes will be required when two or more regions with dissimilar forms of fragmentation are combined into one region as a common energy code would do.

This argues for implementation of energy codes on a regional basis, be it State-by-State or municipality-by-municipality. Thank you for this opportunity.

[The prepared statement of Mr. Gentry follows:]

Testimony of

Thomas A. Gentry AIA

Assistant Professor
School of Architecture
College of Arts & Architecture
University of North Carolina at Charlotte
Storrs Building, 124
2901 University City Blvd
Charlotte NC 28223-0001

For the Hearing on

Climate Benefits of Improved Building Energy Efficiency

Before the

House Energy & Commerce Committee

Rep. Dingell (MI) and Rep. Barton (TX) Chairs

Energy & Air Quality Subcommittee

Rep. Boucher (VA), Chair; Rep. Upton (MI) Ranking Member

July 17, 2008

Climate Benefits of Improved Building Energy Efficiency
Committee on Energy and Commerce
Subcommittee on Energy and Air Quality

Mr. Chairman and members of the committee, thank you for inviting me to speak. Today, I will focus on the potential for reducing energy use and greenhouse gas emissions for residential buildings, by providing brief answers to six of the questions presented in your invitation.

Question 1

What reductions in energy use and greenhouse gas emissions are possible from state-of-the-art building design, that are cost-effective and do not diminish other attributes and uses?

There are many state-of-the-art AND tried-and-true methods for reducing energy use and greenhouse gas emissions in residential buildings that do not diminish other attributes and uses. Some of the methods are low cost, others cost nothing, and some are cost saving.

1. Advance Wall Framing - The principle of advance wall framing is to reduce the amount of wood used in exterior walls.[1] This is desirable because the wood within the wall causes thermal bridging between the interior and exterior, contributing to unwanted heat losses and gains. Reducing the amount of wood reduces energy use. Advance wall framing lowers cost of construction.
2. Proper Sizing of HVAC (Heating, Ventilation and Air Conditioning) Systems - A significant percentage of residential HVAC systems are sized by rules-of-thumb and/or are intentionally oversized. Doing so reduces the energy efficiency of the furnaces, boilers and air conditioners. It also uses more materials for ducts. Equipment should be sized to match loads calculated in accordance with Manual J, "Residential Load Calculation", and ducts should be sized in accordance with Manual D, "Residential Duct Design". Both manuals are published by the Air Conditioning Contractors of America (ACCA). Properly sizing the HVAC systems lowers the cost of construction.

[1] *Advance Wall Framing*, Office of Building Technology, State and Community Programs, Energy Efficiency and Renewable Energy, U.S. Department of Energy, http://www.earthcrafthouse.com/documents/factsheets/AWF-Advanced_frame%2000-770.pdf, May 2000.

3. Heat Recovery Ventilators (HRV) and Energy Recovery Ventilators (ERV) - These are devices that save energy by transferring energy between exhaust air leaving the building and fresh air entering the building. They are off-the-shelf technologies that are easy to integrate into forced air heating and cooling systems, which are the most common type of system used in residential buildings. They have a low cost in comparison to the total cost of the heating and cooling system.
4. Energy Star Certified Roofing Systems - Dark colored roofing systems tend to absorb a high percentage of solar radiation, which is transferred to attics and conditioned spaces. This can result in high cooling loads. Energy Start certified roofing systems reduce cooling loads by reflecting a high percentage of solar radiation away. Since this method typically only requires being selective about the color of the roofing system it cost nothing.

These are just four of the numerous methods available for reducing energy use and greenhouse gas emissions.

Question 2

What are the factors that have led new residential construction to fall far short of the potential to reduce energy use and greenhouse gas emissions?

More than half (61.1%) of all the housing in the United States is single-family detached housing.[2] Most of it is built as a market commodity by developers and builders. Future owners are typically not identified beyond a specific demographic, such as start up families or empty nesters. Developers and builders, owners, and mortgage lenders all contribute to underlying issue that restricts this subtype of single-family housing from being energy efficient.

[2] *Selected Housing Characteristics: 2004*, 2004 American Community Survey, U.S. Census Bureau.

1. Developers and builders produce this type housing as a commodity for market, much in the same way Ford and General Motors manufacture a commodity for market. Consequently, they produce what they see the market as demanding.
2. Most potential owners determine value primarily on size and finishes. Heating and cooling cost is a secondary determinate; and environmental impact is seldom a factor. This creates a market that is extremely sensitive to cost increases associated with reducing energy use and greenhouse gas emissions.
3. As with buyers, most mortgage lenders look at only the initial price and the single bottom line of economic value. Far fewer lenders use the triple bottom line (TBL) of economic, environmental and social values and costs to qualify buyers.

Housing that is truly energy-efficient, such as passive solar housing, is typically produced by developers and builders seeking a niche market or for specific owners. As a subtype it represents a small percentage of single-family housing.

Question 3

What can the Federal Government do to address those factors?

The Federal Government tried to address these factors in 1979 when HUD implemented the Energy Efficient Mortgages Program (EEM), which increases the amount buyers can borrow. Unfortunately, the perception is that the loans are more complex to obtain than conventional loans. According to the National Energy Renewal Laboratory, after twenty years, only 1.5 percent of the loans currently being made by a major federal lender are EEM loans.[3] HUD reports, "... as many as 250,000 more new homebuyers could qualify per year, according to a 1986 study by the Joint Center for Housing Studies."[4]

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[3] Farhar, Barbara, *Pilot States Program Report: Home Energy Rating Systems and Energy-Efficient Mortgages*, Golden, Colo.: National Energy Renewal Laboratory, NREL/TP-550-27722, April 2000.

[4] U.S. Department of Housing and Urban Development, Energy Efficient Mortgages Program, http://www.hud.gov/offices/hsg/sfh/eem/energy-r.cfm, July 2008.

Based on the limited success of this program, and regional issues I will discuss shortly, the Federal Government should take a supportive role in helping state and municipal governments implement regional codes and guidelines for energy efficiency.

The Federal Government has been successful in researching the factors and barriers leading to new residential construction falling far short of the potential to reduce energy use and greenhouse gas emissions. This information enables state and municipal governments to make informed decisions about codes and standards. For that reason, continued research is a function the Federal Government should do to help address these factors.

Question 4

What are my views of efforts to upgrade and provide enhanced implementation of energy-efficiency building codes?

Success in the implementation of energy-efficiency building codes has been limited to a few states and municipalities. In 1978, California adopted Title 24, Part 6, of the California Code of Regulations, Energy Efficiency Standards for Residential and Nonresidential Buildings. Minnesota has had energy code since 1976. More recently the City of Chicago adopted the Chicago Energy Conservation Code. These three codes are good examples of how regional codes can yield housing that that is more energy-efficient than what is being built throughout most of the country.

Question 5

What are market and non-market barriers that have resulted in much new home construction falling well below cost-effective levels of energy efficiency?

The U.S. Department of Housing and Urban Development lists four barriers to innovation in housing. They are fragmentation, risk, education, and cultural values.[5] For each of these four barriers there are multiple forms of the barrier. For example, the RAND Science and Technology Policy Institute concluded, "... the housing industry is fragmented vertically, horizontally, and geographically."[6] The report goes on to list "... municipal regulation, industry competitiveness, and the predominance of small builders" as the reasons for geographically fragmentation.[7] Missing from this list is regional building practice. As a laborer, carpenter and general contractor, I have built housing on remote sites in Wyoming, and on south side of Chicago. I have also built housing in the Sonoran Desert of Arizona and the suburbs of Seattle. This set of experiences has shown me a wide variation in regional practices that are based on climate, available materials and local skills. *It is important to note geographic fragmentation barriers intensify when two or more geographic regions with dissimilar forms of fragmentation are combined into one larger region.* The one constant that does exist is a lack of willingness to deviate from the regional norms.

Risk and education are two more barriers I have watched builders struggle with. In a report prepared by the National Research Council the effects of education and risk on advancing energy-efficacy is summarized as follows.

> "Although many energy-efficient materials and products do not have higher first costs, builders resist implementing them because additional time is needed to train workers to install them. Also, until the builder gains experience with these energy-efficient materials and products, they are perceived as risky."[8]

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[5] *Overcoming Barriers to Innovation in the Home Building Industry*, Building Technology Incorporated, Silver Spring MD: Building Technology Incorporate, p. 4, 2005.

[6] *Building Better Homes: Government Strategies for Promoting Innovation in Housing*, RAND Science and Technology Policy Institute, Arlington VA: RAND, p. 15, 2003.

[7] Ibid, p. 46.

[8] *Energy Research at DOE: Was It Worth It? Energy Efficiency and Fossil Energy Research 1978 to 2000*, National Research Council, Board on Energy and Environmental Systems, Committee on Benefits of DOE R&D on Energy Efficiency and Fossil Energy, Washington D.C.: National Academy Press, p. 25, 2001.

A factor that is amplifying the severity of these barriers is the increasing practice of piece work. Builders routinely pay short-term laborers by the piece, rather than by the hour, to perform specific tasks. The practice has yielded a labor force of workers that float from builder to builder; and, within the labor force each worker typically possesses a very limited set of skills. With workers no longer employed by one builder for a significant period of time to do a wide range of tasks there is little incentive for builders to educate the labor force.

Question 6

How should the market and non-market barriers to inclusion of cost-effective energy efficiency in new housing be overcome?

The barriers to building housing that is energy efficient and produces less greenhouse gasses can be broken down into two groups, 1) those that are unique to each region, such as regional building practice, and 2) those that are universal throughout the United States, such as risk associated with the adoption of new technologies. Methods for overcoming these barriers range from financial incentives to energy codes. The lack of wide spread use of readily available methods for contractors to build energy efficient housing while reducing costs, as discussed in question 1, and the ineffectiveness of energy efficient mortgages, as discussed in question 3, points to a need to implement energy codes. Given how resistant the housing industry is to change it stands to reason that the less change an energy code requires the more likely it is to be implemented. It also stands to reason that when two of more regions with dissimilar forms of fragmentation barriers are combined into one region through the implementation of a common energy code; it is going require the housing industry to make more changes. This argues for implementation of energy codes on a regional basis, be it state by state or municipality by municipality.

An additional benefit of implementing regional energy codes is that it permits the opportunity to structure the code to enhance regional design approaches, which are commonly used by architects in the designing of energy-efficient and environmentally-responsible buildings.

Thank you for this opportunity.

Mr. BOUCHER. Thank you, Mr. Gentry. Mr. Weiland.

STATEMENT OF RICHARD P. WEILAND, CHIEF EXECUTIVE OFFICER, INTERNATIONAL CODE COUNCIL

Mr. WEILAND. Good morning, Mr. Chairman, distinguished members of the subcommittee, Congresswoman Matsui. My name is Rick Weiland. I am the Chief Executive Officer of the International Code Council. I am delighted to be here to discuss the benefits of increasing energy efficiency in the built environment.

I address you on behalf of tens of thousands of building safety professionals. We call them first preventers, as they are increasingly being known these days. Our members have the crucial role of developing and enforcing the codes that protect people, property, and health and limit risks to first responders when accidents do occur.

We are in the unique position of being the organization that provides the forum for the development of building codes in the United States, codes that are used by nearly every State and local jurisdiction that has adopted a mandatory building code. While we cannot control the outcome of the open and democratic process for code development that we refer to as the governmental consensus process, we do try to lead by example.

We also educate our membership of building industry professionals on the latest technology, materials, and processes available to make buildings better, safer, and more energy efficient. We offer a residential energy inspector certification, and we are developing currently a certification for inspector of green building technologies.

The Code Council is also the forum for the development of the International Energy Conservation Code, or Energy Code, and has been ever since the Council and its legacy organizations worked with the Department of Energy on the first energy efficiency construction code some 30 years ago.

We understand, as you certainly do, that in a democratic process like our consensus process for developing codes, not everyone will be completely satisfied with the result. Some will say the code is moving too fast. Others will say not fast enough.

The dedicated code professionals who devote their time to participating in the code development process take seriously their commitment to building and fire safety. In that context, however, they want to make sure that energy efficiency amendments don't conflict with those goals and are cost-effective to both users and those in the construction industry. When the codes meet those criteria, they are more likely to get adopted and enforced locally all across the Nation.

Our process requires that each of our codes is revised and updated regularly and reissued every 3 years. Each of our 13 model codes including the Energy Code, is developed through our open process, and each is offered equally for adoption to any jurisdiction that wishes to adopt it with or without modifications.

As the Committee suggests in its questions, residential energy efficiency could be higher, and the Code Council is committed to help lead the way in making that happen. Two examples I would like to highlight. First, the Code Council's development of the National Green Building Standard in partnership with the National Associa-

tion of Home Builders expected to be first true green standard developed for residential construction through the ANSI process.

And the second, the Code Council's promotion of H.R. 4461, which I spoke to the chairman about before the hearing, which will provide grants to building and fire code administration and for compliance capabilities. This legislation will provide matching challenge grants to help local governments develop stronger code compliance for the long term. And without strong compliance, even the most positive code provisions have limited value.

We are pleased that the full House approved H.R. 4461 just last week. This bill was introduced by Congressman Dennis Moore of Kansas and had several cosponsors, including Congresswoman Matsui. But it is one area really where we feel the federal role is absolutely appropriate and critical to overall effectiveness. You can mandate whatever you want in terms of building energy efficiency or green buildings, but if you don't have people on the local—in government at the ground level making sure that those codes are being complied with, you are creating a false sense that you are doing something positive and moving forward.

The International Code Council has always welcomed federal agency involvement and participation in the development and use of our codes, including the Energy Code. In that process, several code changes to increase building energy efficiency are now pending and will be voted on later this year.

The respected research and statistical information provided by DOE and other agencies in support of such proposals is very helpful. And the Department of Energy and other federal agencies should be encouraged to continue their involvement and frankly expand their participation.

Beyond code development, we are always ready to work with other federal agencies. For example, right now we are coordinating our Smart Codes effort to automate code checking including energy code through the Building Information Modeling system. This new technology will help agencies to better and more efficiently meet their own energy and environmental mandates from Congress and the President. As with other technologies where the government leads by example, this technology will be very useful in the private sector as well.

Beyond changes to the codes and these partnering activities, we would also respectfully suggest the need, as was mentioned earlier, for incentives for existing home and building owners such as the tax incentives contained in the Energy Policy Act of 2005. Such policies encourage increased energy efficiency in existing buildings, which are generally not affected by changes in the building code unless extensive remodeling or renovation takes place.

We look forward to working with Congress, with all of you, with our colleagues in the construction and energy conservation communities and other interested parties to increase the energy efficiency of the built environment, just as we have worked over the years to increase building safety and fire prevention over the years.

With that summary, I would like to thank the committee and the chairman for this opportunity to contribute to this ongoing national dialogue on energy efficiency in the built environment. Thank you.

[The prepared statement of Mr. Weiland follows:]

STATEMENT OF RICHARD P. WEILAND

Good morning, Mr. Chairman, and distinguished Members of the Subcommittee. My name is Richard Weiland, Chief Executive Officer of the International Code Council. I am delighted to be here to discuss the benefits of increasing energy efficiency in the built environment, speaking on behalf of the tens of thousands of code safety officials, "First preventers," as they are increasingly known, who have the crucial role of implementing the codes that protect people, property and health and reduce risks to First Responders when accidents occur.

The Code Council was formed in 1994 as a nonprofit organization dedicated to developing a single set of comprehensive and coordinated national model construction codes. The founders of the ICC were the Building Officials and Code Administrators International, Inc. (BOCA), International Conference of Building Officials (ICBO), and Southern Building Code Congress International, Inc. (SBCCI). Since the early 1900s, these nonprofit organizations developed three separate sets of model codes used throughout the United States. Although such regional code development was effective at the time, a global marketplace and technological advances in construction made a single set of codes a practical necessity. The Nation's three model code groups responded to this need by creating the International Code Council and by developing codes without regional limitations—the International Codes.

Today our International Codes have been adopted at the state or local level in all 50 states and the District of Columbia. Numerous federal agencies, including the General Services Administration, the Department of Defense and the Architect of the Capitol have implemented the I-Codes, as have Puerto Rico and the U.S. Virgin Islands. The Code Council's 46,000 members and 300 chapters include state, county and municipal code enforcement and fire officials, architects, engineers, builders, contractors, elected officials, manufacturers and others in the construction industry.

Recognizing that buildings are responsible for 40 percent of annual energy consumption and 25 percent of landfill deposits in the United States and that energy efficiency is central to environmental security and health safety, the Code Council embraces its national and international leadership responsibility in helping communities everywhere become better stewards of the safety of our people and the health of our planet. The stronger and more sustainable homes and buildings are, the safer and more affordable to maintain they become and the less impact they have on the world's limited resources. Energy efficient buildings save money by greatly reducing operating and maintenance costs. Helping communities build safe, sustainable and green is a core element of ICC's mission for the 21st century.

The Code Council is the proper forum for the development of an energy efficiency code for buildings. Long before the use of the term "green" came into vogue, in the mid 70s, ICC's legacy organizations developed with the Department of Energy the first energy efficiency construction code—a model code still used today as the basis for state and local energy codes. Our widely adopted family of codes set the minimum performance standards for energy efficiency, demonstrating the significant benefits that can accrue through compliance with codes and standards that are consistent and coordinated to achieve the maximum benefit for the lowest cost.. The model codes also provide the platform from which state and local governments can move to even higher standards.

Each of the 13 model codes developed by the Code Council is written for direct adoption by government authorities as legally enforceable requirements. As important as our codes are, it is the professional commitment and capabilities of design and build professionals and compliance officials that ensures that code requirements are actually met. The professional certification and training programs we provide prepare and qualify building and fire safety professionals across the country. These certification and training programs are based on a thorough understanding of these codes as mandatory engineering and architectural requirements for design professionals, and as readily measurable requirements for inspectors.

The Subcommittee is specifically interested in the question of improved energy efficiency for buildings as it relates to our model codes. Before I address that issue, I would like to take a moment and explain how the code development process works. Our model codes are regularly updated and amended through an open and thorough democratic process in which any individual or group can propose a change. ICC committees, comprised of a balance of interests, hear all code change proposals. These members are the same people who work every day as design, construction and compliance professionals, saving lives, protecting property and reducing recovery costs. Final decisions are made by our voting members, who have no vested interests beyond public safety.

Through this Governmental Consensus Process we reach a grassroots national position on how responsibly to address Americas needs, priorities and expectations for

the built environment. It is undoubtedly true that in a democratic process like ours not every jurisdiction or industry sector will be completely satisfied with the outcome. Inevitably some will say we are moving too fast, and others that we are not moving fast enough. Because the decisions are consensus driven and arrived at democratically, the result does not represent an extreme, but rather a prudent and practical result based on technological feasibility, economic purpose, and public benefit.

The Subcommittee asked whether model building codes give the same priority to energy efficiency as to fire protection and other safety elements. The fundamental mandate of model codes is to protect the health, safety and general welfare of building occupants, both in regular building usage and in emergency situations. The Code Council publishes 13 codes, relating to different aspects of construction and building use- each is developed in the same fashion and offered for adoption, but individual jurisdictions are free to choose which of these codes to adopt and enforce. In that respect, the Energy Efficiency Code is treated just like every other code we publish. Within the building codes, increasing energy efficiency must remain consistent with our responsibility to provide for structural safety, fire prevention, water use, sanitation, disaster resilience, indoor air quality, emergency egress, and the like. The minimum requirements of the codes are based on the voting action of our membership and reflect broad, expert consensus regarding the very least that can and should be done in achieving energy efficiency in tandem with other building requirements.

Yet in the development of our Nation's model building codes, there is a long and proud history of public safety professionals using the code development process as a forum for addressing broad and growing social expectations in building requirements. In this way advances in energy efficiency can most directly and effectively be translated into widely understood, adopted, and enforced policies and practices.

Clearly, expectations for more stringent requirements in the ICC energy code for new buildings are increasing. Interest in the ICC Energy Conservation Code has grown in each code development cycle since it was first produced. During the 2007 092008 cycle, a record 150 code change proposals were submitted related to the energy code. One hundred of those proposals will be considered for inclusion in the 2009 I-Codes during the Final Action Hearings in Minneapolis this September. Of those 100 proposed changes, I will highlight two that would affect energy efficiency in buildings.

Both proposals are essentially the same, but one (EC-14) would mandate the reduction of energy use in buildings by 30 percent, while the other (EC-154) would make the reduction optional. This so-called "30 percent solution" has been proposed by the Energy Efficient Codes Coalition and would add new efficiency measures for lighting, insulation, ventilation and other building components that contribute to energy use. The proposals are in direct response to DOE's Energy Efficiency Campaign, which calls for the evaluation and strengthening of residential and commercial building codes.

As the Subcommittee suggests in its questions, residential energy efficiency could be higher, and the Code Council is committed to providing a forum for that outcome. It is our view that the most significant barrier to achieving compliance with a significant number of state and local energy efficiency requirements based on the ICC Energy Efficiency Code is a lack of financial support for code offices and code officials. The quality and effectiveness of codes are ultimately dependent on having professionals in the field in every local community who have the tools and training to ensure compliance.

For more than 2 years now the Code Council has been working with Congress to establish a competitively available grant program dedicated exclusively to the purpose of funding improvements in local and state code enforcement capacity. We are of course incredibly pleased with the House passage last week of H.R. 4461, the Community Building Code Administration Grant Act of 2007, sponsored by your colleague from Kansas, Representative Dennis Moore. With the support of over 100 nationally endorsing organizations, including some of my fellow panelists, we are actively working to encourage Senate action on S. 2458, the companion to the House bill.

The Code Council, in partnership with the National Association of Home Builders, has also just completed initial development of the National Green Building Standard, which is expected to be the first ANSI-accredited standard for green residential construction. This new standard will make it easier for builders to adapt to green building methods, techniques and materials, and it will give jurisdictions a means to scale up and provide requirements for even higher energy efficiency.

The green building standard is just one way in which we are seeking to lessen the environmental impact of the built environment. The Code Council already offers

a Residential Energy Inspector Certification, and is developing a new certification for code officials to demonstrate an inspector's ability to assess compliance with green building programs. The Inspector of Green Building Technologies will help "First Preventers" provide assurances that green building projects are both safe and meet current energy codes and standards. ICC also supports sustainable building through a working agreement with the U.S. Green Building Council to develop green educational materials.

The Committee also asked whether code requirements are readily enforceable by local code inspectors. This was one of the issues raised years ago when the first energy codes were developed. Since then and through our process many enhancements have been made to the code that include clear labeling of products, simplicity of requirement presentation, availability of software, and minimization of calculation. Code enforcers can also request an interpretation, or review support materials available, through the Code Council.

The Committee asked why the energy requirements in the codes are not higher. The short answer is that the process determines the requirements. Considering where the requirements started in 1977 they have become significantly higher and should continue to do so commensurate with available research and analytical documentation.

While the focus on global warming is important, the consensus process allows for other issues to be taken into account. When dealing with buildings that are expected to last for 50 or 100 years, factors such as safety, longevity, life-cycle cost and potential unintended problems must also be considered. Our process ensures that those who must implement design and product changes at the level of building construction and renovation are actually aware of those new technologies, and that building officials can assure installation in compliance with the code.

We welcome and encourage heightened Federal involvement and participation in the development and dissemination of our codes, including revisions to the International Energy Conservation Code, where support for higher efficiency standards would be helpful, and the National Green Building Standard. We also welcome the participation of our colleagues and friends at the witness table, some of whom are already extensively involved.

Federal agencies and officials have long played an important role in the code development process. Like Code Council members and the public at large, federal agencies can offer code changes, present evidence, and act in advocacy for the adoption, amendment or rejection of proposals.

The Department of Energy, represented here on the panel, is among the most active. The history of DOE's involvement with model codes goes back more than 30 years, to the development, adoption and implementation of the first nationally recognized stand-alone model energy code. Other agencies adopting and utilizing model codes include the Department of Housing and Urban Development, especially for elements addressing accessibility and the Fair Housing Act; the General Services Administration; the Department of Defense; and the Architect of the Capitol.

Because we are addressing national imperatives to increase energy efficiency and reduce greenhouse gas emissions, DOE and the Environmental Protection Agency must be supported and funded to actively participate in the ICC model code development process at a level on par with our national priority to achieve these results. True to the nature of our democratic process, acceptance of code change proposals is based on the development and presentation of supporting research and actively providing background and education to other participants. It is through grassroots efforts that code advancements are accepted, then made local policy by jurisdictional adoption, and then put into force by design, building and compliance professionals across the country.

For maximum effectiveness, building energy code development and advocacy must remain principally focused on the ICC model code process. The Federal/State/local partnership in development and enforcement of policies to achieve building energy code requirements must continue to respect the jurisdictional independence of local and state authorities.

We also need to address the fact that the majority of our present and near-future energy consumption is by buildings that exist already. Unless a building is remodeled or renovated, it will not be affected by building code requirements for new construction. Steadily and responsibly advancing requirements for new building is part of the equation, but we also need to continue to increase our investment, as a nation, in incentive policies that will successfully encourage existing property owners, both commercial and residential, to voluntarily retrofit older buildings with cost-effective improvements that will get their properties to perform as close as possible to—or even outperform—new building requirements.

Market barriers to greater energy efficiency are being identified through the work of organizations that prepare product evaluation reports to facilitate the acceptance of new technology. These reports are used by code compliance officials to recognize and accept the installation of new technologies that can support energy and environmental goals. Our affiliate, ICC Evaluation Service, is one such national organization.

ICC's efforts to facilitate the application and use of Building Information Model (BIM) technology will help address the productivity issues facing the building industry, and cost savings can be applied toward making buildings more energy efficient. A BIM prepared from a building design can be quickly analyzed for energy code compliance. This is particularly useful since a building designed to be compliant in one geographic region may need different features for compliance in another. BIM technology can also reduce the energy consumed in constructing a building through more efficient management and use of time and materials.

In closing, the Code Council and its members are proud of their support of the environment through the development of responsible and innovative codes and standards for the regulation of building construction. I applaud the work of your Subcommittee and encourage continued collaboration between the public and private sectors to achieve the important goal of increased energy efficiency in our nation's buildings. Thank you again for the opportunity to appear before you today. I will gladly answer any questions.

Mr. BOUCHER. Thank you very much, Mr. Weiland. Mr. Fay.

STATEMENT OF WILLIAM D. FAY, DIRECTOR, ENERGY EFFICIENT CODES COALITION

Mr. FAY. Mr. Chairman, Mr. Upton, members of the committee, I want to thank you very much for the opportunity to tell you about a very exciting effort to boost energy efficient codes for new home construction by 30 percent.

Polls show that Americans want and are willing to pay more for energy efficient homes, just as they want fire and safety protection. But because they aren't experts in those vital areas and because the new homes that they buy are often already completed, we have to have model codes to guide our energy, fire, and safety requirements. Unfortunately, our energy model code, the IECC, is lagging behind our Nation's desperate need for energy efficiency. In fact, one of the last great frontiers of wasted energy in the United States is in our homes.

That is why our organization united—to try to take a new approach to energy codes. It is rare to see a marriage as vast as our Energy Efficient Codes Coalition. All forms of utilities. We have investor-owned. We have co-ops and municipalities as members. We have environmental groups. We have all five regional energy alliances from the Midwest, Northeast, Northwest, Southeast, Southwest. We have businesses. We have government. NASEO, which represents state energy officials, is a member of our effort. Low-income homeowner and consumer advocates, and I am just naming a few of them. I have attached the list to the end of my testimony.

Our goal is very simple. We want to boost the 2009 IECC by 30 percent over the current model code, and we have authored the only proposal before the IECC that will actually accomplish that goal. "The 30% Solution" is what we call it, which will come up for vote by the ICC on or soon after the 20th of September in Minneapolis, is filled with low-hanging fruit for energy efficiency. Its elements—and they are extensive. They cover nearly every part of home construction. They cover space heating and cooling. They

cover duct testing. They cover the thermal envelope, air sealing, hot water heating, and lighting.

All of its elements are being built in energy efficient homes around the country as we speak. This is not complicated. We are not driving technology. Everything we are putting in this proposal is on-the-shelf, existing technology that is being done around the United States.

Homeowners are going to reap the rewards of our 30% Solution in terms of positive cash flow from the stabilized utility bills on the day that they move in. The 30% Solution was supported in testimony by the U.S. Department of Energy at the hearings in February. The U.S. Conference of Mayors has not only passed a resolution unanimously in support of The 30% Solution, but it has also urged its members, mayors around the United States to send delegates to the International Code Council to make sure that they are voting for The 30% Solution.

Our proposal does not tell people to use less energy. It simply reduces the wasted energy of their homes, their new homes. Now, you would think that this affordable, achievable proposal shouldn't be a very heavy lift, but the NAHB opposed each—well, all but one of its elements. And they opposed the comprehensive package. In fact, the only element they did support was one, which you have mandated, which has to do with CFLs.

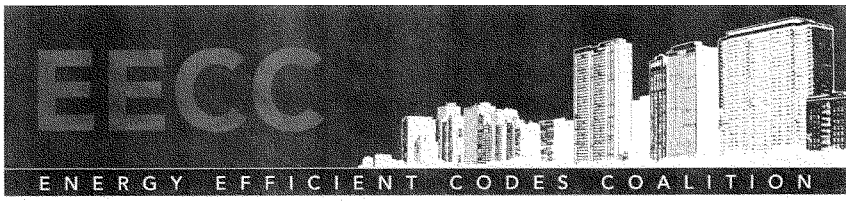
We need national leadership, and we hope that that leadership comes from the ICC. We strongly support the ICC process and are working within that process, but our national energy crisis is a matter of national energy policy. And it is also a matter of national environmental and climate policy. And that means that the ICC's action must be a subject for Congress, for the administration, for governors, for mayors, and policymakers.

We are thrilled to see the DOE actively take a role in this process. We are thrilled to see the mayors and governors and others do the same. Many of you are looking at legislation that shares the goal of ICC leadership. It says we are looking to the ICC to lead, but at the same time sets efficiency targets for model codes to achieve.

In addition, Congress has already made ASHRAE a mandatory requirement. You probably should think about doing the same thing with our national model energy code, the IECC. So we applaud your efforts, and we support Congress's active involvement in boosting the IECC's energy efficiency.

I look forward to answering questions. Thank you very much, Mr. Chairman and Mr. Upton.

[The prepared statement of Mr. Fay follows:]



Testimony

of

William D. Fay
Executive Director
Energy Efficient Code Coalition

before the

Subcommittee on Energy & Air Quality

of the

Committee on Energy and Commerce
US House of Representatives

Thursday, July 17, 2008

Mr. Chairman, members of the committee, thank you for inviting me to testify before this august body at this extremely difficult time for America's energy consumers.

America's Most Significant Energy and Environmental Policy Vote of 2008

I come here today to tell you about what is arguably America's most significant energy and environmental policy vote of 2008. The vote won't be held in Washington, DC, but in Minneapolis, MN. It won't be cast by legislators, but by local and state code and other officials

attending final action hearings on nearly twenty different codes under the aegis of the International Code Council (ICC). One of those codes, the International Energy Conservation Code, or IECC, is generally accepted as the national model energy code. Versions of the IECC are effect in over 40 states and it is often adopted as a state's single comprehensive energy efficient building code. It alone is referenced in the U.S. Code, federal regulations, LEED, and many other state and federal programs.

Furthermore, the IECC is the only model energy code that serves as the basis for federal tax credits for energy efficient homes, energy efficiency standards for federal residential buildings and manufactured housing, state energy code determinations, and qualification for FHA and other government-backed mortgages. Although the IECC contains comprehensive provisions for all buildings, residential and commercial, our organization and its proposals focus on residential construction.

It is our belief that substantial part of that wasted energy can be eliminated with affordable measures that don't affect our lifestyle, but simply change the way in which the home is constructed by boosting the energy efficiency of our nation's model building code, the IECC.

"The 30% Solution" – which we authored – was supported by the US Department of Energy in testimony at February IECC Development Committee hearings and by a unanimous resolution from the US Conference of Mayors. Despite their support (and the support of ICLEI, the National Association of State Energy Officials and our broad-based membership), "The 30% Solution" will face a withering assault by opponents of the current IECC and our efforts to strengthen it.

If it is adopted by the ICC on or around September 21 and fully implemented by state and local governments after the 2009 IECC is published, "The 30% Solution" would, on average,

boost the energy efficiency of upwards of a million new and renovated homes each year by roughly 30% and generate positive cash flow to homeowners that begins on the day they move in. If "The 30% Solution" is defeated, those energy inefficient homes will burden generations with their wasted energy.

Homes Are One of America's Last Great Frontiers of Wasted Energy

As such, I want to commend this committee for holding this hearing to explore the potential for the energy savings that can be achieved through greater energy efficiency in American buildings. In the arena of energy, there is little to add to the committee's extensive knowledge. You know that homes and commercial buildings are this nation's largest sector of energy use and – because of the close relationship between greenhouse gases and energy consumption – also the largest US source of anthropogenic greenhouse gases.

Suffice it to say that buildings – and particularly residences – represent one of the last great frontiers of wasted energy. To understand the magnitude of this frontier, we must look at the longevity of homes – a new home that is wasting energy today will probably be wasting energy for generations to come. Add to that testimony by the NAHB that half of the homes America will need by 2030 have not yet been built and it's easy to understand why the energy policy decisions we make today regarding new home construction will have extremely long term consequences for future energy policy.

In the letter of invitation I received from the committee, I was asked to discuss why drivers of higher energy efficiency seem to be more effective in commercial buildings than in residential buildings. A related question asked why residential model codes aren't stronger than they are. The answers probably lie in four areas:

- Nearly every commercial building is different from another. There are fewer of the "cookie-cutter" designs that we see in residential construction and the information exchange between the engineers and architects that are involved in the design and construction of commercial buildings appears to be greater.
- Because of their urban/suburban visibility and the larger size and occupancy of commercial buildings, local government planners and regulators appear to be more involved in their construction.
- More recently, ASHRAE and other engineering associations have shown outstanding leadership in conducting education on the benefits of commercial building efficiency, developing commercial building proposals to boost energy efficiency, and focusing an intense spotlight on the value of making those investments.
- Finally, there is no powerful opposition lobby fighting more energy efficient building codes for commercial buildings, as there is for residential construction.

Simply stated, because homes and commercial buildings consume almost half of America's energy, they ***must*** play a significant role in any *successful* effort to improve energy efficiency. It is because of this national imperative that the broad-based Energy Efficient Codes Coalition (EECC) was established.

The Energy Efficient Codes Coalition

Since its formation last fall, Energy Efficient Codes Coalition (EECC) has mounted a comprehensive, integrated campaign to achieve its goal of boosting new home model code energy efficiency of the 2009 IECC by 30%. EECC supporters hail from government, non-profit

national energy efficiency organizations (like the Alliance to Save Energy), all five regional energy efficiency alliances, academia/think tanks, affordable-housing advocates, architects, environmental groups, utilities, energy consumers and businesses *(a complete list of supporters is appended to this testimony).*

In approaching our 2009 residential IECC deliberations, the EECC operated under four guiding principles:

1. Support the adoption of a 2009 model energy code (the IECC) that is at least 30% more energy efficient than the 2006 model code.
2. Support going beyond the original EECC proposals through the adoption of other affordable energy code proposals that boost the energy efficiency of new home construction.
3. Oppose proposals or amendments that weaken energy efficiency.
4. Oppose industry- or product-specific special exemptions or provisions.

"The 30% Solution": An Ambitious, Yet Achievable and Affordable Proposal to Reduce Wasted Energy from New and Renovated Homes.

The 30% Solution" is a comprehensive proposal designed to boost the residential energy efficiency of America's model energy code, the International Energy Conservation Code (IECC), by 30%. It consists of five elements:

1) **EC14 07/08**, the only individual proposal before the ICC's 2009 IECC Final Action Hearing that has been independently estimated to achieve roughly a 30% improvement over the current IECC. This comprehensive package boosts energy efficiency in virtually every part of the house subject to code requirements – space heating and cooling (including ducts), thermal envelope, air sealing, hot water heating

and lighting. EC14 was recently revised and resubmitted as a modified package to reflect and incorporate the comments and recommendations, as appropriate, of both the IECC Development Committee and interested stakeholders. EC14 compile all pro-energy efficiency proposals supported by the Development Committee in February – regardless of the proposal's author – and to revise meritorious EECC proposals that were not recommended for approval. The result is a *new and improved version* of our comprehensive package comprised of 21 individual proposals – fourteen of which were approved by the Development Committee in Palm Springs, with modifications as appropriate, and seven other proposals which were initially not approved but have now been modified by the EECC in its public comments.

2) **RE-3,** which would recognize the IECC as the national model energy code by making the International Residential Code's energy requirements consistent with the IECC. RE-3 not only brings the IRC and IECC back into line with each other again, but it's predicated on the national recognition bestowed on the IECC by Congress and the Department of Energy. Having one consistent national code will avoid a "race to the bottom" by states that see model codes as laying the floor, rather than leading the nation to improved energy efficiency.
3) **EC154:** "The 30% Solution" in *voluntary appendix* form (EC154). The IECC voluntary appendix suggests additional efficiency measures to jurisdictions interested in increasing their energy conservation objectives beyond what the basic IECC provides and serves as a publicly available repository of building energy code "best practices" that provides innovative ways of increasing energy efficiency that have been implemented in other jurisdictions.

4) The component parts of "The 30% Solution" that were not recommended for approval *individually.*

5) Some additional public comments on proposals where the EECC saw potential improvements that should be considered.

Like the original, our new and improved version of "The 30% Solution" was specifically developed to be:

- Achievable (using readily available, "state-of-the-shelf" technologies),
- Affordable, and
- Enforceable, adding no substantial burden to code officials' current duties.

The Positive Cash Flow Homeowners Reap from Energy Efficiency

Investments in more efficient homes ***today*** will pay myriad personal and societal dividends in the future and give homeowners greater certainty and control over their future energy budgets. "The 30% Solution" uses everyday "state-of-the-shelf" technologies that have been demonstrated to save energy and to provide positive cash flow to the homeowner.

Government research has shown that going 30% beyond code generates positive cash flow that exceeds the amortized cost of those energy improvements. In fact, a National Renewable Energy Laboratory study of Greensburg, Kansas found that the "break even point" between cash flow of energy efficiency investments is actually reached when new homes are built to roughly 60% more efficient than today's model energy code! The NREL analysis found that new homes that are 30% over code produce net annual savings of $512 to the homeowner, calculated as follows:

- $211 per year in additional home construction investment cost of $4,000, spread across a 30-year mortgage at 7% (with interest deducted at 28% effective tax rate).
- $723 in estimated annual utility bill savings *(because energy prices have skyrocketed since the NREL study, these savings would be commensurately greater today).*

NAHB's polling confirms that energy efficiency does sell to home buyers. The 2/14/2008 *BuilderOnline* reports: "Home Buyers Willing to Pay for Energy Efficiency. New NAHB study of consumers reports that 51 percent willing to pay up to $11,000 more if energy costs are reduced $1,000 annually."

Like the NREL study, we would expect poll respondents to be even more willing to invest in energy efficiency under today's energy prices. In fact, in these times of skyrocketing energy costs like these, it's hard to believe that energy efficiency wouldn't be one of a new home's major selling points. However, there's no debate that – unlike marble countertops and crown molding – energy efficiency pays monthly dividends throughout a home's life via the positive cash flow of more stable utility costs.

Momentous Opportunity to Make a Historic Boost in Energy Efficiency

On or soon after September 20th, the ICC will have a momentous opportunity to make a significant step to advance America's energy security. "The 30% Solution" is the most ambitious single proposal before the ICC and its adoption would truly secure the ICC's leadership in the energy efficiency debate for new home construction. By boosting the 2009 IECC by 30%, its adoption would also tacitly achieve a goal shared by many in Congress and included in the House version of last year's comprehensive energy legislation.

The IECC Development Committee's Important Vote

Over the past couple of decades, the ICC has made only modest improvements in the energy efficiency of building codes. This has caused some to wonder whether the council was giving the same level of emphasis to energy as it gives to fire protection and other safety elements. In ICC's defense, those modest improvements may have been due to:

- **Lack of a Strong Driver:** Only recently have we been faced with the wake-up call of $12+/million Btu natural gas and $130+/barrel oil, coupled with energy demand pressing up against available supply.
- **Lack of a Comprehensive Framework for Action.** "The 30% Solution" represents the first time that the ICC has seen a comprehensive package of energy efficient proposals that provides a framework for action and showcase their collective impact, as opposed to facing hundreds of seemingly unrelated proposals.
- **A Focused and Vocal Energy Efficiency Opponent, Without a Corresponding Choir Calling for Action.** The EECC grew out of a growing chorus of calls for better energy codes, from an increasing number of highly respected governmental and other bodies like the EPA/DOE National Action Plan for Energy Efficiency, ASHRAE, Western Governors Association, US Department of Energy, National Petroleum Council, American Institute of Architects, Mayors for Climate Protection and members of Congress. The voices calling for a 30% boost in energy efficiency have become rallying point around a common goal and objective.

At its hearings in February, the IECC Development Committee saw all three factors reversed and the results were historic as the committee took significant steps by adopting several elements of "The 30% Solution" and other EECC-supported proposals from DOE, the Northwest

Codes Group and others. If fully implemented, we estimate that the Development Committee recommendations would improve efficiency of new homes by approximately half of our shared 30% goal.

A National Imperative to Boost the IECC Means a National Imperative to Enforce It

A question raised by the committee is whether energy efficiency code requirements are readily enforceable by local code inspectors. We believe that today's codes – which vary from state to state and sometimes from city to city – ***are*** being enforced in most areas throughout the US. Many in our coalition are dedicated to working with local inspectors and other code officials to ensure enforcement of the IECC in all jurisdictions that adopt it.

But even assuming that model codes are not fully enforced, the fact that they are part of state and local laws means that all law abiding builders must follow them. As the courts have frequently stated, builders have a duty to meet a reasonable standard of care in complying with codes. In fact, because codes are the *minimum* standard of care as established in state laws, non-compliance with those codes is a greater issue for builders than it is for code officials.

But as we work to tighten codes as part of our nation's growing imperative to reduce wasted energy, the EECC has pledged its support for efforts at the national, state, and local level that ensure funding for code officials have to receive the training, resources and manpower they need to do their jobs.

Conclusion

Mr. Chairman, members of the subcommittee, thank you for the opportunity to tell you about what we believe will be America's most significant energy, environmental and climate policy vote of 2008. I look forward to your questions.

Supporters of the Energy Efficient Codes Coalition

The Energy Efficient Codes Coalition (EECC) is a unique, broad-based alliance of longstanding energy efficiency advocates who have adopted the goal of boosting residential energy efficiency by at least 30% over current model energy codes. Supporters of this goal include:

Government
US Conference of Mayors
US Department of Energy
National Association of State Energy Officials

Broad Based Energy Efficiency Groups
The Alliance to Save Energy
American Council for an Energy Efficient Economy (ACEEE)
United Nations Foundation

Regional Energy Alliances
Midwest Energy Efficiency Alliance (MEEA)
Northeast Energy Efficiency Partnerships (NEEP)
Northwest Energy Codes Group
Southeast Energy Efficiency Alliance (SEEA)
Southwest Energy Efficiency Project (SWEEP)

Academia/Think Tanks
American College and University Presidents Climate Commitment
Institute for Market Transformation

Affordable Housing Advocates
Global Green

Architecture
Ed Mazria, Architecture 2030

Business and Insurance
American Chemistry Council
Bayer
Business Council for Sustainable Energy
Cardinal Glass
Current Energy
Extruded Polystyrene Foam Association (XPSA)
Fireman's Fund ***(wrote support letter)***
North American Insulation Manufacturers Association (NAIMA)
Polyisocyanurate Insulation Manufacturers Association (PIMA)
Structural Insulated Panel Association (SIPA)

Energy Consumers
Consumers Federation of America

Environmental Groups
2020 Vision
Environment America
Natural Resources Defense Council (NRDC)
Sierra Club

New Energy Efficient Home Construction Advocates
New Buildings Institute

Utilities
American Public Power Association
Edison Electric Institute
National Rural Electric Cooperative Association

The 30% Solution" was supported by the US Department of Energy in testimony before the IECC Development Committee hearing in February 2008.

On June 23, 2008, the full US Conference of Mayors unanimously adopted Resolution #54, which "endorses the full adoption of 'The 30% Solution' at the ICC's Final Action Hearings this September in Minneapolis and encourages eligible code officials to attend these hearings and to vote in favor of the adoption of 'The 30% Solution.'"

Resolution No. 54 – ADOPTED JUNE 23, 2008

Submitted by:

The Honorable Will Wynn
Mayor of Austin

The Honorable Heather Fargo
Mayor of Sacramento

The Honorable Mark Begich
Mayor of Anchorage

The Honorable Shirley Franklin
Mayor of Atlanta

The Honorable Michael Belsky
Mayor of Highland Park

The Honorable Patrick Hays
Mayor of North Little Rock

The Honorable David Berger
Mayor of Lima

The Honorable John Hickenlooper
Mayor of Denver

The Honorable Michael Bloomberg
Mayor of New York City

The Honorable Elizabeth Kautz
Mayor of Burnsville

The Honorable Marty Blum
Mayor of Santa Barbara

The Honorable Scott Lang
Mayor of New Bedford

The Honorable James Brainard
Mayor of Carmel

The Honorable Brenda Lawrence
Mayor of Southfield

The Honorable Roy Buol
Mayor of Dubuque

The Honorable Tom Leppert
Mayor of Dallas

The Honorable Kevin Burns
Mayor of North Miami

The Honorable Gene Marks
Mayor of Northbrook

The Honorable Martin Chavez
Mayor of Albuquerque

The Honorable Thomas Menino
Mayor of Boston

The Honorable Robert Cluck
Mayor of Arlington

The Honorable Larry Nelson
Mayor of Waukesha

The Honorable Dan Coody
Mayor of Fayetteville

The Honorable Gavin Newsom
Mayor of San Francisco

The Honorable David Coss
Mayor of Santa Fe

The Honorable Thomas O'Grady
Mayor of North Olmsted

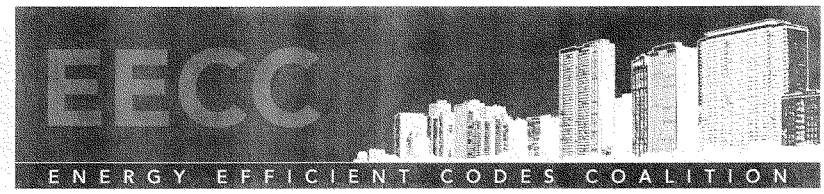
The Honorable Manuel Diaz
Mayor of Miami

The Honorable David Pope
Mayor of Oak Park

The Honorable Tom Potter
Mayor of Portland

The Honorable Laurel Prussing
Mayor of Urbana

The Honorable Adrian Fenty
Mayor of Washington DC



ENDORSING 30% RESIDENTIAL EFFICIENCY IMPROVEMENT IN 2009 INTERNATIONAL ENERGY CONSERVATION CODE

1. **WHEREAS**, America's mayors have long recognized the importance of energy efficiency in the development of a successful national energy policy; and

2. **WHEREAS**, homes and non-industrial buildings represent America's largest energy-consuming sector – using approximately 40 percent of the nation's energy and 75 percent of its electricity; and

3. **WHEREAS**, the International Energy Conservation Code (IECC) is the most widely used model code for residential construction in the U.S., establishing efficiency baselines that are voluntarily adopted by cities throughout the country; and

4. **WHEREAS**, the IECC is currently undergoing a review and revision process that occurs once every three years, involving committee hearings in the spring and a final vote in the fall; and

5. **WHEREAS**, calls for increasing residential efficiency by 30 percent have been issued by the Western Governors Association, ASHRAE, the U.S. EPA/DOE National Action Plan for Energy Efficiency, the American Institute for Architects, the Business Roundtable and by leaders in Congress from both parties; and

6. **WHEREAS**, the broad-based Energy Efficient Codes Coalition has compiled a series of efficiency improvements into a comprehensive package of recommendations known as The 30% Solution and submitted it for adoption; and

7. **WHEREAS**, support for The 30% Solution comes from a diverse cross-section of energy efficiency professionals, including the National Association of State Energy Officials, all five regional energy efficiency alliances, the Alliance to Save Energy, the American Council for an Energy Efficient Economy, and electric utilities (IOUs, municipal and coops); and

8. **WHEREAS**, The 30% Solution incorporates affordable, off the shelf technologies and practices, and studies show these efficiency improvements would enhance the affordability and security of homeownership by creating net positive cash flow for homeowners; and

9. **WHEREAS**, at its February hearings, the IECC Development Committee took significant preliminary steps toward adopting The 30% Solution, recommending provisions estimated to improve efficiency by approximately 20 percent over the existing 2006 IECC; and

10. **WHEREAS**, this September the International Code Council (ICC), a body made up primarily of municipal code officials, will consider Development Committee recommendations and the input of voting members present and will vote to establish the 2009 IECC; and

11. **WHEREAS**, mayors are in a unique position to encourage the eligible code officials from their cities to participate in the ICC deliberations and vote for the full package of efficiency measure outlined in The 30% Solution; and

12. **WHEREAS**, the 2009 IECC will strongly influence efficiency performance in the more than three million homes expected to be built in the U.S. through 2012, and success in achieving full adoption of The 30% Solution will have a tremendous impact in reducing energy use over the life of those homes,

13. NOW, THEREFORE, BE IT RESOLVED, that the U.S. Conference of Mayors endorses the full adoption of "The 30% Solution" at the ICC's Final Action Hearings this September in Minneapolis and encourages eligible code officials to attend these hearings and to vote in favor of the adoption of "The 30% Solution."

Summary of Testimony of
William D. Fay
Executive Director
Energy Efficient Code Coalition

On or soon after September 20th, the International Codes Council will have a momentous opportunity to make a significant step to advance America's energy security. Adopting "The 30% Solution," the most ambitious single proposal before the ICC, would truly secure the ICC's leadership in the energy efficiency debate for new home construction.

Because homes and commercial buildings consume nearly half of America's energy, they represent one of the last great frontiers of wasted energy and ***must*** play a significant role in any *successful* effort to improve our nation's energy efficiency.

The Energy Efficient Codes Coalition (EECC) – comprised of supporters from government, non-profit national energy efficiency organizations (like the Alliance to Save Energy), all five regional energy efficiency alliances, academia/think tanks, affordable-housing advocates, architects, environmental groups, utilities, energy consumers and businesses – was formed in response to the growing chorus calling for a 30% boost in new home model code energy efficiency.

"The 30% Solution," authored by the EECC is an ambitious, yet fully achievable and affordable proposal to reduce wasted energy from our new homes. Homes built to meet its provisions will produce positive cash flow to new homeowners beginning on the day the move in.

Investments in more efficient homes ***today*** will pay myriad personal and societal dividends in the future and give homeowners greater certainty and control over their future energy budgets.

There are three emerging drivers for more energy efficient homes:

> . . . ***Energy Imperatives:*** *$12+/million Btu natural gas, $130+/barrel oil, import overdependence, envelope leakage, greenhouse gas emissions, skyrocketing utility bills, record high utility bill defaults and shut offs.*
>
> . . . ***Proponents of 30%:*** *The US Conference of Mayors, US Department of Energy, ASHRAE, Western Governors Association, the Business Roundtable, all five regional energy efficiency alliances, utilities (investor owned, rural coops and public), businesses, academia, think tanks, and environmental, consumer and low-income homeowner advocacy groups.*
>
> . . . ***Codes, both past and future:*** *Unprecedented gains in the IECC Development Committee's recommendations, two decades of modest improvements.*

Mr. BOUCHER. Thank you, Mr. Fay. Mr. Heavner.

STATEMENT OF BRAD HEAVNER, STATE DIRECTOR, ENVIRONMENT MARYLAND

Mr. HEAVNER. Good morning, Mr. Chairman and members of the committee. Thank you for the opportunity to testify and for your attention on this very important matter. My name is Brad Heavner. I am the State Director of Environment Maryland, a State partner of Environment America. Environment America is the new home of U.S. PIRG's environmental work. We are a federation of State-based citizen-funded environmental advocacy organizations.

We are way past due in dealing with global warming, and we need to get to work immediately. My father was born in 1936. The family lived in a small brick house in Detroit with an oil furnace. The carbon dioxide emissions from that furnace in that year are still in the atmosphere today. CO_2 lasts in the atmosphere for at least 100 years. The emissions associated with cooling this building today will be a factor in the stability of the climate when my grandchildren are older than I am today. We need to get to work.

We have come a long way in building efficiency since my father was born, but our buildings still pollute far too much. Despite advances in technology, the total amount of energy used by American buildings has increased 25 percent since 1990. But our greatest crisis is also our greatest opportunity. As peak oil forces changes in our economy, an economy that is very heavily dependent on cheap fuel, what will be the next growth industry? I believe it is this: energy efficiency and clean energy. And preventing wasted energy in buildings is probably the greatest opportunity of all clean energy opportunities.

A report issued this past February by the McKinsey Global Institute found that by 2020, we could reduce annual energy consumption nationwide by 10 percent through cost effective building efficiency measures. These changes would reduce our annual global warming emissions by 962 million metric tons. That is about 14 percent of current total U.S. emissions.

These reductions would also eliminate the need to build dozens of new power plants and thereby save us money. Building coal plants to produce the same amount of energy would cost us three times as much. Building nuclear plants would cost five times as much. So the big question is if there is all this potential for energy savings and it is cost effective, why isn't it more standard already?

I don't think the answer to that is really all that complicated. The biggest hurdle is that the decisionmakers for how buildings get built are usually not the same people who benefit from reduced fuel consumption. Builders are primarily focused on the initial sale price of the house, and the ongoing operating costs of that house are not a big business factor for them. Homebuyers are rarely experts on energy-saving building techniques, so they take their advice from the builders.

It is therefore essential that we set strong standards to protect consumers and the environment. Building codes should be based on up-to-date potential for energy savings. For existing buildings where you are usually unable to roll the costs into a long-term

mortgage, financial incentives are key in addition to the creative financing mechanisms that allow homeowners to spread out the costs over time.

Overall, zero-energy buildings should be the standard for all new buildings by 2030. Last year's energy bill made progress towards this goal, but there is much more to do. The first thing that Congress can do is to require building codes to be strengthened and enforced. National legislation should require the codes to be 30 percent more efficient by 2010 and 50 percent more efficient by 2020. And it should ensure that all States require and enforce this level of energy efficiency in new buildings.

We will have a chance to get a head start on this in September when officials from towns and cities across the country come together to adopt the Model Residential Energy Code. They will be voting on this 30% Solution, which would require new homes to be 30 percent more energy efficient. Officials need to hear from their elected leaders that they are depending on them to deliver a strong code that includes The 30% Solution and that will give the support they need to enforce the codes once they are adopted.

There are also a number of existing and newly created programs that are essential for high efficiency buildings. The energy tax credits set to expire the end of this year include tax deductions and bonds to help Americans construct buildings and retrofit buildings to waste less energy and to take advantage of solar power. These tax credits must be renewed.

Congress has created the Energy Efficiency and Conservation Block Grant Program to assist local governments to promote high performance buildings, but Congress has yet to appropriate the $2 billion needed per year to fund that program.

And finally for three decades, the Federal Government has been providing grants to State agencies for the Weatherization Assistance Program. Recently funding for this program has come into question, and it should be expanded not cut back and reach more homes to provide even greater energy efficiency improvements.

My final thought is this: we need to adopt many policies to address global warming. Some will be easy, and some will be difficult. Some will save us money. Some will cost us money. Some will have a lot of secondary benefits. Some will be more limited. Policies to promote green buildings are among the most positive win-win policies available to us. We should be as aggressive as possible in the area of high efficiency buildings. We would be cheating ourselves if we didn't maximize the potential from energy efficiency buildings. Thank you very much.

[The prepared statement of Mr. Heavner follows:]

Testimony of Brad Heavner, Director, Environment Maryland, Before the Subcommittee on Energy and Air Quality of the Energy and Commerce Committee, U.S. House of Representatives, July 17, 2008

Summary
We can no longer ignore the terrible consequences of our reliance on fossil fuels. Energy bills are already a leading cause of home foreclosures, and with energy prices soaring heating and cooling bills will remain huge financial strain on families and businesses. Additionally our use of fossil fuels contributes to air pollution, global warming and other environmental degradation.

Preventing wasted energy in buildings is likely the biggest opportunity to reduce our consumption of fossil fuels. Almost half the energy we use in the United States – 10 percent of the energy in the world – is used to power our homes, businesses, and industrial buildings. Per unit of economic output, America's economy is twice as energy-intensive as Germany's and nearly three times as energy-intensive as Japan's. And a report by the McKinsey Global Institute found that by 2020 we could reduce annual United States energy consumption by 11 percent through simple building efficiency measures such as more efficient lighting, water heating, and appliances, and by designing new buildings to be more energy efficient.

In fact, we have the technology to completely eliminate energy use in the building sector. Homes and businesses already exist that use a fraction of the energy of typical buildings. Some also generate all the energy needed to power them on-site, using renewable sources such as wind and solar power. These zero energy buildings could be the standard for all new buildings by 2030.

To get there, we need to do everything we can to ramp up building efficiency and encourage on-site renewable energy:

- Building energy codes should be improved and enforced.
- We should adopt policies that encourage building far beyond code and retrofitting existing buildings.
- Policies should be designed to encourage on-site renewable power.
- We should set a national goal for all new buildings to be zero net energy by 2030.

The first thing Congress can do to lead us on the path towards a zero energy building sector is to require building energy codes to be strengthened and enforced. National legislation should require the model codes to be 30 percent more efficient beginning in 2010, and 50 percent more efficient beginning in 2020. It should ensure that all states require and enforce this level of energy efficiency in new buildings to 90 percent compliance.

Any federal legislation designed to enhance our energy security or reduce global warming emissions must take advantage of the vast energy savings available in buildings in order to help us meet our goals on global warming, cut the pollution going into our air and water, and help ease the strain of energy costs on American families and businesses. Ramping up building energy efficiency will also make America more energy independent, reinvigorate our economy, and create good, new jobs here at home.

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The first thing Congress can do to lead us on the path towards a zero energy building sector is to require building energy codes to be strengthened and enforced. National legislation should require the model codes to be 30 percent more efficient beginning in 2010, and 50 percent more efficient beginning in 2020. It should ensure that all states require and enforce this level of energy efficiency in new buildings to 90 percent compliance.

Any federal legislation designed to enhance our energy security or reduce global warming emissions must take advantage of the vast energy savings available in buildings in order to help us meet our goals on global warming, cut the pollution going into our air and water, and help ease the strain of energy costs on American families and businesses. Ramping up building energy efficiency will also make America more energy independent, reinvigorate our economy, and create good, new jobs here at home.

- Many construction and home building firms resist the marginally higher upfront costs of actions to improve building efficiency and therefore are slow to adopt measures that would benefit renters and home and building owners.[3,4,5]
- Buyers and renters lack the information needed to choose more energy-efficient properties.

Policies should be adopted to overcome these barriers and ensure that new buildings and renovations take advantage of energy-efficient practices:[6]

- Building energy codes should be improved and enforced. National model codes should be 30 percent more efficient starting in 2010 and 50 percent more efficient starting in 2020. State codes should be required to match or exceed the model codes, and enforce the codes to 90 percent compliance.
- Policies should encourage building far beyond code and retrofitting existing buildings for increased efficiency.
- Incentives should be designed to encourage on-site renewable power.
- Political leaders should set the goal for all new buildings to be zero net energy by 2030.

These policy changes would have a huge impact on energy use and global warming emissions in the United States, at little cost.

- Adopting and enforcing strong building codes nationally could reduce our annual energy consumption by 2 percent from 2030 projected use, reducing our annual carbon dioxide emissions by 41 MMT and saving consumers $25.5 billion annually. In terms of global warming emissions, this is the equivalent of taking over 27 million cars off the road.[7,8]
- By 2020 we could reduce annual United States energy consumption by 11 percent through simple building efficiency measures such as more efficient lighting, water heating, and appliances, and by designing new buildings to be more energy efficient. This would reduce annual carbon dioxide emissions by 962 MMT.[9]

- A $21.6 billion investment in cost-effective energy efficiency in buildings would save enough energy to eliminate the need for 22.3 conventional coal plants at a third of the cost. Similarly, supplying the same amount of energy with new nuclear plants would cost more than 5 times as much. [10]

Half of the buildings constructed today will still be in use in the middle of this century.[11] The decisions we make today will have a lasting effect on our energy use and global warming emissions.

The Problem: Energy Use and Global Warming Emissions in the United States

America is on the brink of an energy crisis. Our reliance on polluting energy sources contributes to global warming, unhealthy air quality, and mercury pollution in our lakes and rivers. From 1990 to 2005, global warming pollution from electricity generation increased by more than 25 percent.[12]

We are importing more and more of our energy from abroad, leaving us vulnerable to supply disruptions and sending billions of dollars out of the local economy. Natural gas has become increasingly expensive as demand inches closer toward available supply—driven in part by the increased use of gas for electricity generation. Gas prices have more than doubled since 2000, increasing the cost of heating our homes and fueling our industries.[13]

Since 1990, our consumption of energy has increased by 18 percent, and America is projected to use approximately 19 percent more energy in 2025 than we do today.[14, 15]

Much of this energy is wasted. Per unit of economic output, America's economy is twice as energy-intensive as Germany's and nearly three times as energy-intensive as Japan's.[16] We use more energy each year than China and Russia combined.[17]

Buildings represent the biggest culprit in wasted energy. Forty-eight percent of our energy is used inside buildings, and 76 percent of our electricity.[18],[19] Building energy use is also

responsible for 43 percent of America's carbon dioxide pollution, making our workplaces and our homes our nation's biggest global warming polluters.[20]

All of this waste, however, means that the building sector represents the largest opportunity to rescue ourselves from the impending crisis and re-create our energy economy to be efficient, clean, renewable and stable.

Energy efficiency is also the cheapest and cleanest way to increase our energy productivity. A recent McKinsey report calculates that a $21.6 billion investment in simple, cost-effective building efficiency would save enough energy to eliminate the need for 22.3 conventional coal plants.[21],[22] Based on that calculation, it would cost $42.1 billion to gain one quad of energy through residential and commercial building efficiency.[23] In comparison, it would cost $122 billion to deliver this much energy by building coal plants, and $222 billion by building nuclear power plants.[24]

Approximately 75 percent of our buildings will be new or renovated by the year 2035. Every building that is constructed without the highest levels of cost-effective efficiency technology available from now until then is truly a missed opportunity, the effects of which will stay with us for decades. We have to start seriously tackling the energy used in our buildings, today.

Policy Options

It is clear that we can and should be building and renovating homes and businesses to be much more energy-efficient, and setting ourselves on the path toward zero energy buildings as the standard. However, there are a number of barriers that will prevent progress unless we implement strong policies to overcome them.

Despite higher upfront costs, high efficiency buildings are ultimately cheaper for home and business owners. But "split" incentives often stand in the way of realizing these benefits: a builder or landlord doesn't want to pay upfront costs that will save money for buyers or renters.[25] This especially affects multi-family homes. In addition, many building firms are small and therefore unwilling to take risks by using practices and technologies they aren't used to.[26, 27]

Compounding this problem is a general lack of awareness about the potential for energy savings in buildings, and the benefits that often come with higher efficiency, beyond their societal importance. When buying or renting, consumers often don't have the information they need to choose more energy-efficient properties. On the commercial side, energy expenses are often a small share of total expenses and therefore overlooked.

Moreover, "green" buildings are perceived as expensive, an optional added luxury, when in fact choosing energy efficient and zero energy techniques can be a way to save money over the long term; some techniques, such as orienting a building differently to maximize sunlight or reducing the size of the HVAC system, have no added upfront cost and can even lower the upfront cost of a building or renovation.

Public policy should be designed to eliminate these market barriers and to push new technologies into the marketplace so that they can become mainstream.

The experience of California shows how aggressive public policies can eliminate barriers to energy-efficient building. California has long been a leader in energy efficiency. It was the first state to adopt energy efficiency standards for home appliances, has the nation's most stringent building energy codes, and has long had well-funded, aggressive programs for promoting energy efficiency. While homes have become more efficient across the United States, California has truly excelled. On a per-capita basis, the country used 16 percent less energy in homes in 2002 than it did in 1975. But in California, residential energy use declined by more than 40 percent per capita between the mid-1970s and 2002.[28]

If the United States had achieved the same per-capita percentage reduction in residential energy use between 1975 and 2002 as California did, the nation would have consumed more than 3 percent less energy in 2002. Moreover, residential energy consumption in the United States would have been 17 percent lower in absolute terms than it was in 1975, rather than 12 percent higher.[29]

These changes can, and should, be replicated in other states and on a national level. We need both policies that establish a minimum standard for building energy efficiency, and those that encourage building far beyond those standards to put us on the path towards zero energy building.

Minimum energy efficiency standards—Building energy codes

Building energy codes regulate energy use in new buildings and major renovations, and strengthening the codes is the best way to affect the bottom line standard for building efficiency.

In general, building energy codes are adopted at the state or local level and based on national model codes. These model codes and standards are updated every few years and states and localities have the option of adopting them once the updated version is published.

Though many states have adopted the latest model codes, most have not, and some do not have any statewide code. In addition, in many states enforcement of the codes is severely lacking—compliance is estimated to be 40 to 60 percent for new buildings, depending on the state, and this number is probably even lower for renovations.[30] Building code agencies tend to be understaffed and understandably prioritize health and safety code enforcement while energy code enforcement falls by the wayside. This is compounded by a lack of training in energy code enforcement for code officials and in energy code requirements for builders and designers.[31]

The potential for saving energy through building codes is huge. If all states adopted building energy codes that are 30% more efficient starting in 2010 and 50% more efficient starting in 2020, and enforced them with 90 percent compliance, we would use 2.6 fewer quads of energy in 2030 – almost 3 percent of our current annual energy use. This would also reduce our carbon dioxide emissions by 41 MMT and save consumers $25.5 billion annually. In terms of global warming emissions, this is the equivalent of taking over 27 million cars off the road. Under this scenario, cumulative savings through the year 2050 would be 111 quads of energy and 1,757 MMT of carbon dioxide emissions.[32]

The House version of the 2007 Energy Bill included a provision that required the efficiency of the model codes to be increased by 30 percent starting in 2010, and by 50 percent in 2020, and that all states adopt the model code, or codes that meet these efficiency benchmarks. All states should be required to update their codes to match the model code as it improves over time, and to enforce the code to at least 90 percent compliance. Making full use of energy codes will have an enormous effect on energy use and global warming emissions from our buildings.

Improve the national model codes

Increasing the efficiency required by the model codes is the best way to affect the bottom line standard for building efficiency. Almost every state has standard energy codes for new residential and commercial buildings. Most of these are based on national model codes: the International Energy Conservation Code (IECC) for residential buildings, and the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) Standard 90.1 for commercial buildings. Both of these codes are updated every few years.

Increases in the efficiency mandated by these codes have been small and incremental in the past. However, in the current cycle the ASHRAE board has set a goal to make the 2010 commercial standard 30 percent more efficient than the 2004 version.

The Energy Efficient Codes Coalition (EECC), a broad coalition of regional energy efficiency networks, environmental groups, utilities and businesses, proposed changes to the 2009 IECC residential code that would increase its efficiency by 30 percent – the "30 Percent Solution". The EECC developed the 30 Percent Solution in response to calls for an improved energy code from bodies such as the Western Governors Association, US Department of Energy, National Petroleum Council, American Institute of Architects, and Mayors for Climate Protection. Some of these changes passed the first round of decision-making, but not the full 30 percent. In the second round of voting, the full 30 percent could be reinstated for the published version if enough code officials turn out to vote for energy efficiency.

It is vital that the model codes are published with these efficiency increases, and that all states adopt the new codes, or codes of equal or greater efficiency. National legislation requiring these

efficiency improvements can ensure that new buildings take advantage of the technology available to save energy and reduce global warming emissions.

We must also set our sights much higher and put the country on a track towards net zero energy homes. The California Public Utility Commission has set a goal of net zero energy codes for all new residences by 2020, and all new commercial buildings by 2030.[33] This should be the goal for the entire country.

Improve state adoption of codes

Once model energy codes are improved, states must adopt them in order for them to have any effect. Only 18 states have adopted the most recent residential model codes or equivalents, and only 24 states have adopted the most recent commercial energy codes. Sixteen states currently have building energy codes that date to 1998 or prior, or have no statewide code, despite significant increases in the strength of building energy codes since then.

So while it is important that the model code is updated to reflect today's potential for building energy efficiency, it is equally vital to ensure that they will be adopted and enforced on a short timeline across the country. The best way to achieve this would be through a national requirement that states adopt codes that match or exceed the efficiency of the latest model codes.

Improve energy code enforcement

Enforcement of building energy codes is often lax; depending on the state, compliance can be as low as 40 percent for residential energy codes, and some jurisdictions don't enforce the energy codes at all.[34] Some state building legislation includes provisions that increase compliance with energy codes by requiring specific energy code training for all officials and inspectors, and requiring that all new construction and major renovations pass inspection by third party certified inspectors.[35] On the national level, legislation requiring state adoption of the model codes should require states to achieve 90 percent compliance with their updated codes.

Encouraging efficiency far beyond code

Establishing a baseline standard for efficiency through building energy codes is important in order to ensure that all new buildings at least meet the minimum of what is possible for energy efficiency. With so much potential for energy efficiency, however, policies that encourage building far beyond code can have a huge impact.

Annual energy consumption in residential and commercial buildings could be reduced by 11.1 quads in 2020 through cost effective changes such as lighting and appliance replacements for a cost of $21.6 billion per quad.[36] That is, if we invested $21.6 billion a year for five years on building efficiency through federal programs – a small portion of the recent $168 billion economic stimulus package – we would use 5 fewer quads of energy a year and emit 433.6 MMT less carbon dioxide.[37]

Many of these policies are especially suited to encourage higher efficiency through retrofits and renovations. These policies are also necessary to gain wider acceptance of new building methods and technologies, so that we can keep raising the minimum energy efficiency called for in the codes.

Time-of-transfer energy audit

A time-of-transfer energy audit requirement would establish a scoring system for building energy efficiency, to be evaluated when a building is bought or rented. This would give consumers the information they need to consider efficiency when buying a home or leasing a business space, and provide an incentive to increase energy efficiency in both new buildings and renovations and through retrofits.

A time-of-transfer system could also be used to enforce energy codes in existing buildings, to ensure that all of our buildings take advantage of the latest efficiency technology. The city of Davis, California, requires owners to show that their buildings are compliant with the city building code before sale or transfer.

Incentives

Incentives encourage building beyond code by lowering the upfront cost of building efficiently. Many local and state jurisdictions have tax incentives, tax deductions and/or rebates for energy efficient building. These are also the policies most often used to encourage retrofits.

In 2005 the federal government established the first comprehensive set of tax incentives for new buildings that use 50 percent less energy than typical building, through the Energy Policy Act of 2005 (EPACT 2005). EPACT 2005 also set up incentives for highly efficient heating and cooling equipment and appliances. However, some of these tax incentives expired at the end of 2007 and others will expire at the end of 2008, too short a time for most taxpayers to use them. These incentives were not renewed in the latest energy bill, and should be extended and increased to encourage efficient building in the next bill.[38]

Even stronger tax incentives have been highly effective at the state level. In 2007, New Mexico enacted a "Green Building Tax Credit," which extends some of the federal credits and also enacts stronger ones of its own, based on square footage, a green building rating and energy efficiency. [39] Oregon also enacted tax credits for energy-efficient building practices in 2007, with separate programs for residential and commercial buildings.[40] These tax credits can amount to thousands of dollars and large percentages of the incremental costs, making a significant difference in the ability of homeowners to save energy.

Funding for research and technology development

There is huge potential to improve energy-efficient technology, and to find ways to make it available and affordable on a wider scale. Building America is a program sponsored by the DOE that conducts research with the long-term goal of developing cost-effective net zero energy use homes. The program is a private/public partnership and works to develop energy-efficient techniques to improve both new and existing homes.[41] Funding for programs such as this helps bring even higher levels of energy efficiency within our grasp.

Weatherization Assistance Program

For three decades, the federal government has been providing grants to state agencies that help low-income households improve their energy efficiency through the Weatherization Assistance

Program. A recent evaluation of the program in 19 states found that the program reduced natural gas consumption for space heating in affected homes by approximately 32 percent.[42] Recently, this program has been threatened; instead it should be expanded to provide even further to reach more homes and provide even greater energy efficiency improvements.

Getting to zero

Zero energy buildings require small-scale renewable power to cancel out the small amount of energy they use. While solar power and small wind turbines are becoming more common, there are a number of barriers to their widespread use. Net-metering and connection policies in many states make it difficult to connect a small system to the grid, or limit the amount of electricity a household or business will be compensated for. And while solar panels can ultimately save money over time, the up-front cost of adding any of these systems is prohibitive for many.

Currently, electricity in the United States is supplied from large, centralized power plants. Distributed generation is a new model in which electricity is supplied by small, usually renewable generators owned by individuals and businesses to offset their power needs. This model better serves consumers by making prices more stable, reducing the amount of electricity lost in transmission, and making our power supply less vulnerable to large-scale failures, in addition to the environmental and national security benefits of local, renewable power.[43] Distributed generation also serves utilities by reducing the need to find new sources of power, and, in the case of small solar systems, supplying extra power at the times when demand is highest.

However, utilities inexperienced with distributed generation worry that it will make the grid unstable or pose a safety hazard and reduce their revenue.[44] In many states current policies cater to utility fears and discourage small generators; instead, policies should empower home and business owners to add renewable systems to their buildings.

Incentives can have a huge impact in reducing barriers to the wider use of on-site renewables. In addition to reducing the upfront costs to consumers in the short term, by increasing the market for renewable systems incentives can lower the cost of the systems over time, eventually

eliminating the need for incentives. In California the price of retrofitted residential solar energy systems dropped by 36 percent from 1998 to 2004 because of a strong incentive program.[45]

Conclusion: Recommendations

We need to put America on the path toward zero energy buildings, and start taking advantage of all the energy efficiency techniques that are available and cost-effective today. Every new building or renovation that does not improve energy efficiency locks in global warming emissions for decades. Quick action will require strong leadership from policy-makers to make energy-efficient buildings the standard.

Government leaders should commit to a goal of zero energy buildings for all new construction starting in 2030. To get there, we need to do everything we can to ramp up building efficiency and encourage on-site renewable energy.

- Building energy codes should be improved and enforced.
- We should adopt policies that encourage building far beyond code and retrofitting existing buildings.
- Policies should be designed to encourage on-site renewable power.
- We should set a national goal for all new buildings to be zero net energy by 2030.

Last year's energy bill made progress towards these goals. But there is much more to do.

The first thing Congress can do to lead us on the path towards a zero energy building sector is to require building energy codes to be strengthened and enforced. National legislation should require the model codes to be 30 percent more efficient beginning in 2010, and 50 percent more efficient beginning in 2020. It should ensure that all states require and enforce this level of energy efficiency in new buildings. This provision was in the House version of the 2007 Energy Bill, and should be included in any federal legislation designed to enhance our energy security or reduce global warming emissions.

There are also a number of existing programs that Congress can use to help families, businesses, and municipalities retrofit existing buildings, and to encourage building more efficiently than the code requires.

- The energy tax credits set to expire at the end of this year include tax deductions and bonds to help Americans construct buildings that waste less energy and take advantage of solar power.
- The Energy Efficiency and Conservation Block Grant (EECBG) Program could be used to assist local governments promote high performance, energy efficient buildings. Congress has yet to allocate the $2 billion per year to fund the program.
- For three decades, the federal government has been providing grants to state agencies that help low-income households improve their energy efficiency through the Weatherization Assistance Program. Recently, this program has been threatened; instead it should be expanded to reach more homes and provide even greater energy efficiency improvements.

Any federal legislation designed to enhance our energy security or reduce global warming emissions must take advantage of the vast energy savings available in buildings in order to help us meet our goals on global warming, cut the pollution going into our air and water, and help ease the strain of energy costs on American families and businesses. Ramping up building energy efficiency will also make America more energy independent, reinvigorate our economy, and create good, new jobs here at home.

We have the technology to save ourselves from the impending energy crisis, through new and traditional techniques that increase building efficiency and allow us to provide any remaining building energy needs with clean, renewable fuels. Strong policies can put these building methods and technologies into widespread use so that inefficient, wasteful buildings are a thing of the past. All we need is the commitment to make this vision a reality.

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Mr. BOUCHER. Thank you, Mr. Heavner, and thanks to each of the witnesses for your thoughtful testimony here this morning. I will begin my questions with Mr. McLean. For some time you have administered a very popular and highly successful Energy Star program for appliances. So successful, in fact, that I think the manufacturers of these appliances perceive a marketing advantage to having the Energy Star label affixed to their appliance.

But we are not there yet when it comes to the Energy Star program for buildings. What are you doing to try to promote that program and achieve the level of acceptability for that and the level of recognition for it and the marketing advantage for that that exists for the appliances program today?

Mr. MCLEAN. Well, first of all, I would like to give credit to the Department of Energy for the appliance part of the program, but we work with DOE on the Energy Star program and divide up the products. And many of the home appliances are covered by the Department of Energy.

What we have tried to do with the new homes program for Energy Star—and if you go back to when we started this program, we were trying to identify why what many people have talked about here today are clear economic advantages to promoting energy efficiency and why they were not being adopted and why they were not finding their way into homes and buildings.

And we have sort of focused our program around those barriers or obstacles and designed our efforts to overcome those. Some of those are consumer information. Some of those are barriers between builders and homeowners, the different incentives that are in the system, and try to identify where the problems are. And sometimes they are at the federal level. A lot of times they are at the State and local level. A lot of times they are informational levels, and so we have designed and focused our programs around achieving those

And what we have done, and it is sort of a beyond code area, the code is sort of the minimum, and then we have looked at what can we do beyond that, and how do we get people to participate and play. And I think you have seen here today some differences between maybe the homebuilders and the constraints they see and the advocates who want to go beyond it.

And we have tried to move the ball along by encouraging people to go beyond code. And then over time, you can update that code because it has become a normal practice, but there is always a beyond code element that you can identify. And then you recognize the builders, and you recognize the operators of commercial buildings with the recognition for going beyond that. So that is the niche and the area that we have focused on and what we have tried to develop.

Mr. BOUCHER. OK. All right, thank you. It has been asserted that one of the barriers to constructing energy efficiencies into new buildings is the fact that there is a long payback period before those initial investments are recovered in the energy savings year by year. And that payback period can be 5 years or longer, meaning that people who oftentimes sell their homes within just a few years would not actually recover those up-front investments.

Is there any evidence that you have seen that affixing the Energy Star for buildings to these new homes might enhance the resale value of the home so that even someone who sells the home before that break-even point is achieved could recover in the resale value of the home some of those upfront energy investments?

Mr. MCLEAN. I don't know if we have enough data because of the turnover of homes. There are a lot of cases where people only own their home for 3 to 5 years and where that could work. I would have to look into that and get back to you as to whether we have any data that would indicate that has been helpful. I mean we have looked at like the mortgage area of trying to fold that in to pay for these upfront costs, and we have also tried to make sure that the upfront costs aren't too large in the first place so that we can get as much advantage out of minimal cost increases. But we would need to get back and see whether we have data on that.

Mr. BOUCHER. Well, if you have some information and can share it with us, that would be helpful. Mr. Fay, do you have a response to that? I also have some questions for you, but if you want to comment on that, that is fine.

Mr. FAY. In my testimony, I referred to a NREL study, the National Renewable Engineering Lab study that took a look at what happened to—with homeowners that had 30 percent, 40 percent, 50 percent, and 100 percent more energy efficient homes beyond the 2003 IECC. The interesting part about it was 30 percent actually produced a positive cash flow to the homeowner beginning on the day that they move in of $512 a year. And that was calculated because they are presuming that the homebuyer is able to put the cost of that energy efficiency into their mortgage.

And when you take a look at that additional mortgage cost, each $1,000 at 7 percent fixed 30-year mortgages, it adds $6.85 a month. And when you take that across the year and then you take the interest deduction from it, the cost of that investment is $211 a year, but the benefit, the energy efficiency benefit that they get from utility bills is $723 a year. So you end up right off the bat with a homeowner that is recovering money from that investment. And even if they sell the house in 5 or 10 years, they have still had that positive cash flow. They haven't paid anything for the—they paid more at the beginning of the purchase price of the house, but that is—they have recovered it over the years.

Mr. BOUCHER. Thank you. Let me ask you about a different area. You mentioned in your testimony your efforts in support of our section 431 last year, which would have presented to the States model building codes for their consideration. And some of the commentary we have heard today, both from members on this panel and also from some of the witnesses, suggests that we should not adopt a national one-size-fits-all approach, but that to the extent we do anything, we take into account regional climate variation and make sure that there is adaptability of some national standards to take those variations around the country into account.

Could you describe how our section 431, as written last year, and as passed by the House but not in the final legislation, responded to that need?

Mr. FAY. Well, not really. I am not as familiar with that provision of your legislation.

Mr. BOUCHER. Let me ask if there are other members on the panel who would like to undertake that challenge. Mr. Rodgers, would you like to respond to that?

Mr. RODGERS. Thank you, Mr. Chairman. I think it is critical to know that our research and development program, which was already documented that 30 percent improved energy efficiency homes are cost effective on day one for the homeowner and lower utilities bills are already designed to take into account regional and climactic differences across the United States.

The code programs that we work on, the model building codes——

Mr. BOUCHER. Well, my question was more directed to the provision that we adopted last year.

Mr. RODGERS. Yes, sir.

Mr. BOUCHER. And——

Mr. RODGERS. And so that provision, my understanding is that provision replicates this emphasis on regional climatic differences that are already reflected in the way that model building codes are developed and how our analytical tools are providing that information already, sir.

Mr. BOUCHER. And so I gather from that answer that had our provision been passed into law, regional variations in climate could have been taken into account as a national recommendation was considered and ultimately adopted State by State?

Mr. RODGERS. Yes, sir. I think that was one of the beauties of the approach that reflects technology differences need to be fine-tuned to climatic differences within our country.

Mr. BOUCHER. Right. Mr. Weiland, you represent the building code officials at the local level. Do you agree that our legislation was structured so as to take into account these regional climatic variations?

Mr. WEILAND. Let me just point out a little bit of a clarification. Currently right now the International Energy Conservation Code, which several people have referenced, is already adopted in 31 States nationwide. And I want to go back to a comment I made earlier in that I think maybe more—there is more of an enforcement concern, a compliance concern or issue that we need to address. And that was one of the things that we were trying to address through our legislation that the House did pass last week, that building departments are strapped.

They don't have either enough people or enough well trained people to go out and enforce the existing energy conservation mechanisms that are there. And I can't comment in detail on the specific piece of legislation that you——

Mr. BOUCHER. Well, my time has expired. Thank you very much. The gentleman from Michigan, Mr. Upton.

Mr. UPTON. Thank you, Mr. Chairman. I appreciate everyone's testimony this morning. That is for sure. And I would like to just underscore a couple things, and I have some questions at the end.

As many of you know, our electric needs are expected to grow 30 to 40 percent by the year 2030. And already this year, we have seen natural gas prices go up by more than 50 percent, which will be reflected in consumers' bills at some point as they need cooling or heating. And we have seen coal prices increase by 100 percent.

In fact, Mr. Shimkus the other day talked about a closed coal mining operation in southern Illinois, which is now opened, reopened because of these costs. USA Today highlighted that on the front page—and I wish I had brought it down—this morning in terms of alerting the Nation's public about this.

But today's Wall Street Journal I don't know if you saw this today, but on the front page, it talks about on a hot day in May back in Texas—I can hardly wait to bring this up with my good friend Mr. Barton and others—wholesale prices rose briefly to more than $4 a kilowatt hour in Texas. It obviously is reflected in people's view. And I was one, along with the chairman, that voted for both the '05 and the '07 bill, thinking that they—knowing that they were taking a step in the right direction. And I think many of you know that Jane Harman and I authored the legislation which was part of the '07 bill which sought significant savings because of light bulbs.

And I would note that Phillips came in to see me. I wish Mr. Burgess was here. He is now coming in the door. But they have now developed the lights that will meet that standard already, the 2012 standard, and they are doing it without lead, without mercury, significant energy savings. And in fact, production is being done in this country versus overseas. I thought that was terrific news.

Mr. Belcher, you talk about a number of incentives that we need to renew. Solar and wind are part of that, which, of course, expired the end of last year, but there is a whole other series that you talked about. And you are right on the mark with that regard.

Mr. Rodgers, I can remember when Secretary Bodman made his first appearance before this subcommittee. Maybe it was the full committee hearing, and I believe it was Mr. Markey that really lamented him because of the energy appliance standards that were still on the shelf that had not been done for, I want to say more than 10 years. So I am a big supporter of those Energy Star. I am glad that they are done, and great credit to the administration for getting that done.

Mr. McLean, you talked about six priorities for EPA, and like I saw low-hanging fruit on light bulbs, one of the things that I really see that we have not done is to help the utilities by increasing the depreciation so that there are incentives for using electricity in the off hours. So that you can run your washing machine or your dishwasher at night after most folks return home from work. And yet, I think that was proposed though in the '07 bill that was dropped somewhere along the line. But I just can't see that. Those lights are right in my eye.

I would be interested to know if there is any objection from any of you here at the table to try and give the incentives to the utility industry to, in fact, install those new meters, relatively new—I think they are used in Europe—to encourage folks to use electricity in off—and that ought to be highlighted in terms of what we can do, not only for residential but for commercial. Does anyone have any objection to that? Mr. McLean, no objection? I just want to make sure I get my last question.

Mr. MCLEAN. I wouldn't object, but I would say one of the things we are concerned about as those things are done is that consumers

also see that information so that they can react. So it helps utilities manage their supply, and it helps consumers——

Mr. UPTON. And if they get $4 per kilowatt.

Mr. MCLEAN. Right.

Mr. UPTON. Now, is there some way that consumers are going to know that, right now at 11:30 it is $4 per kilowatt and they better turn everything off?

Mr. MCLEAN. Well, those things are becoming more possible. The information technology is moving so fast that I think we can supply consumers with more information as we implement the things you are suggesting.

Mr. UPTON. Mr. Weiland, my last question, as my time is coming down, is you represent the International Code Council. Knowing that we have done a lot in the country—thank goodness but maybe not enough, but whether it be light bulbs or obviously efficiency standards on appliances, all those different things, where do we stack up internationally to what other countries have done or not done particularly as I think about the EU and what they have done with their—where are we stacking up in terms of actual regulations on the books, seeing positive changes in the right direction to reduce electricity needs for the different devices that we all use?

Mr. WEILAND. Well, if it is any indication in terms of the—I guess the growth within our industry internationally, and the demands now upon our organization to work with other countries, primarily the focus has been on—more on the safe—building safety and fire safety side, not on the energy side. But this organization, the International Code Council really has, in my opinion, developed probably the safest building safety system in the world. I think it is second to none.

Where we stack up in the energy side, I think that is something we need to drill down and take a look at. I don't really have a great answer for you, but I can get you one.

Mr. UPTON. Does anyone here have a comment as it relates to that? Mr. Fay?

Mr. FAY. I do. The IECC, for the last 20 years, has stayed rather—it has had, at best, modest gains. That seems rather astonishing, particularly with the energy situation we are facing here. And I think one of the questions is, where fire and safety fit in with the ICC process and where energy fits in. Our contention is that, first of all, fire and safety is always going to be the most important thing that the IECC does. We know that, but we also think that energy is elevated as a national priority, maybe not to the level of fire and safety, but very close to that.

I think there was a tremendous step forward made by the IECC Development Committee meeting in Palm Springs in February. They took the first stab at what will be culminated in the hearings in, final hearings in Minneapolis in September. And that Development Committee got, we think, about halfway to the 30 percent boost in energy efficiency that we are seeking. DOE, I think, estimates that it is somewhere between 17 and 22%. That is rather historic for energy and the IECC.

So I am going to give them some kudos here because the Development Committee did take a large step toward energy efficiency. I think the recognition was there. Now, keep in mind that in Feb-

ruary, look at what our prices were for energy compared to today. There is a compelling need for the ICC in September to really go the next step and adopt the 30 percent that DOE and governors and mayors and others have set for us.

Mr. UPTON. Thank you. I know my time has expired.

Mr. BOUCHER. Thank you, Mr. Upton. The gentlelady from California, Ms. Matsui, is recognized for 5 minutes.

Ms. MATSUI. Thank you very much, Mr. Chairman. I find it really very interesting to listen to all of you here because I think we all are agreed on the fact that we need to be more energy efficient, and we can do it. It is how we do it, and we have various standards and codes in order to try to get us there.

I feel much of this is within the education process too in that, for instance, the people who buy homes may not understand that maybe it is more expensive if you get—when you first buy it, it will be more expensive to have an energy efficient home. But over the course of the loan, it manages to work itself out.

I am also looking at aspects of where we are as far as energy costs as Mr. Upton was talking about—my municipal utility came in to see me regarding off time usage and how important that would be, particularly as we are moving forward and they are moving forward with some other plug-in type vehicles and all that.

I am wondering whether it is possible to have some sort of hourly focus, whether part of it is in the utilities area, about the cost savings as far as off use. And I think you were talking about the meters and things of that nature, what the cost effectiveness of that would be. And also in the financial aspects of it, the mortgages, and obviously we are talking about mortgages today. And it is probably not the best thing to talk about in this climate; however, looking at how we structure some of these mortgages and to really build in some of that cost effectiveness into that also.

I am also interested in, Mr. Heavner, about what you see moving forward as you listen to all of this, where you would like to see us focus more, realizing you brought up the history of your father and what we would like to do. Realizing realistically that what we can do in the short term—I am saying short ter—the next 3 to 5 years. What are the best things we can do because I always feel the public is very impatient, and they want to see progress? And whether we see it in our bills that we get from utilities or cost of our homes or whatever, what do you see that we can do that is going to be environmentally sensitive in looking at climate change that we can be doing in the next 3 to 5 years? Looking at all these aspects that we have before us here.

Mr. HEAVNER. I think by far the most important thing is that model codes be adopted and enforced by all states. Thirty-one states is good. It is not 50 states. It is not good enough. And those codes are not enforced well enough, and I think that any assurance that a State is doing its job needs to include assurance that there is at least 90 percent compliance in actual homes built to the standards. They will need assistance for that, and I think it is a very good use of federal funding that may become available to deal with energy security and to deal with global warming to assist local officials in the enforcement. People will see this in reduced energy bills.

With regard to retrofits, direct assistance to homeowners is essential. And I think the single most important thing for Congress to do this year is to extend those tax credits. And it would be a shame, and a lot of jobs are dependent on this and a lot of people's financial stability dependent on this. It would be a shame not to have that happen by the end of this year.

In addition, there are things that we can do to spread out the financing of home retrofits and efficient appliances, allowing the homeowners to roll that into their utility bills. If they are able to purchase an efficient appliance or do an upgrade and pay that back over time with the utility bill, they are saving money from day one, and they will—they can build in a margin for utilities to make a profit.

Ms. MATSUI. Much like you do as far as when we get a new furnace or something like that. You are thinking about the home itself that you are fitting and putting that in.

Mr. HEAVNER. Yes, and consumers would see that immediately. You know it would be an opportunity for them to make an upgrade and lower their utility bills. A requirement that utilities make this available to consumers across the country would have an enormous impact on the amount of retrofits that happen.

Ms. MATSUI. Thank you, and I just want to ask a question of Mr. Belcher from the homebuilders. I understand that you probably would not like to have a uniform code across the Nation. I can understand that too because I think there should be some flexibility built into this. How would you feel about having a driver though as far as the building codes if, in fact, there can be some flexibility built into it? And also whether we can—we need to have compliance. We need to have some sort of enforcement moving forward, and most of the people, looking at the homebuilders in order to—that is the first thing that most homeowners think about too.

Mr. BELCHER. Right. Well, first of all, start with the basics. As far as building codes in general go, we as builders need building codes. If nothing else, they level the playing field for all of us, and they set the bar. It is a minimum standard of course, and we have a great relationship working with IECC. I have been certified in the past, of course, as a building official. And to address some of the drivers, as you have suggested, there are some very good programs that are out there right now, programs that we are using, the National Green Building Standard that is about to be launched.

We are using a voluntary standard that that is based off of Energy Star programs out there. And those programs will accomplish what we are trying to do. They just need the incentives to get them out there. Consumers don't understand them.

And a personal experience if you will. The customers that come to me, either if I have a home that has been built or to build for them, a custom home if you will, price is their most sensitive point. And all of you that have bought a home probably had the same experience. The bottom line is still the bottom line.

What we try to do in managing not only energy efficiency but as a green builder, we are looking at all the resources, water efficiency, resource efficiency because as a second generation builder, I want generations beyond me to be able to keep on providing housing for our growing population. So we have to consider all those,

and most consumers have items that they wish to have in their homes, particular countertops or whatever types of finishes.

What we do is work with them, get the desires they want in that house, get their budget, and then make that house as energy efficient and resource efficient as possible to stay in their price point.

And if I may, from a resale standpoint, it is true the majority, I think, of homes are transferred 5 or 10 years to another consumer. And just now are the markets starting to realize the additional value these homes have. The problem is the appraisers, if they don't understand the value these homes have, you are not going to be able to have that home appraised higher.

Ms. MATSUI. Well, could I just say this? I think that as we purchase our cars, we are looking at how much savings can we get, what is the mileage. It might be possible to look at homes itself to see where the cost savings would be too. I think we do that with some of the furnaces and things like that. But we might want to look at the totality of the home——

Mr. BELCHER. That is correct.

Ms. MATSUI [continuing]. To see where the savings would be so——

Mr. BELCHER. And that is where the—like the National Green Building Standard, it gives you some quantifiable information as to how that home is built. It is flexible standards, so it does take into account the different climates of the country. And it will allow you the flexibility to work into your homeowner's budget. But then to have that quantifiable information——

Ms. MATSUI. Right.

Mr. BELCHER [continuing]. For appraisers to use to put value on that home, and then consumers and mortgage lenders will have something quantifiable to make that deal work.

Mr. BOUCHER. Thank you very much.

Ms. MATSUI. Thank you very much.

Mr. BOUCHER. The gentleman from Arizona, Mr. Shadegg, is recognized for 5 minutes.

Mr. SHADEGG. Thank you, Mr. Chairman, and I want to thank all of our panelists. I appreciate the information, and I always learn when I come to these hearings.

Mr. Heavner, I fervently agree with you about the importance of renewing the solar energy tax credits. I voted for those in the past and voted to extend them. Regrettably, this year each time they have come up to be voted upon, they have been added to dramatic tax increases, making it very difficult for some of us and giving us no clean shot. That is, we can't vote to just renew the solar tax credit. I hope that will change in the near future. We will get a straight up or down vote or an up or down vote tied to some other policy rather than a tax increase, which some of us find objectionable.

I want to make a comment. I guess a lot of this discussion is carrot-and-stick. Stick is a building code to a certain degree. Carrot is an incentive. I am interested in using both strategies.

I am a little worried about, or a little concerned that with regard to some of the building codes at least some organizations out there have an agenda other than energy efficiency. That is to say they

want to impose a green building code that works on not cutting down trees or that works on some other issue.

That isn't what I hope the American people will become agitated about because some people may say look, I want energy efficiency. That makes sense to me, but I don't want to buy into somebody else's agenda that is secondary. Some other people might say look, I like the secondary agenda. I don't want to cut down trees so that is OK with me.

But I hope people don't get fooled because I think it is important when we do building codes that are about energy efficiency that they get information about energy efficiency. Then they can make an informed decision. If they want to also achieve some other goal, that is good.

Then that takes me to kind of my passion, which is carrots, not sticks. I was fascinated, Mr. Belcher, by your comments and a little bit, Mr. Gentry, by yours about the degree to which new homes are a part of the problem versus the degree to which old homes are a part of the problem.

My wife and I bought a subdivision home 15, 20 years ago. Lived in it for a long time. Fortunately, we were able to buy a lot and build a home of our own about 4 years ago. It is a bigger home, and yet when our energy bills started to come in, they are lower than our old home.

Now, in part that is because when I built this home—I live in Phoenix, Arizona. I don't worry about the winter, but I worry a lot about the summer. You know I put in a lot of insulation that I was not required to put in and did a number of things that I was not required to do, various techniques which I would be happy to describe to you because I wanted to bring down the operating cost of my home.

The question that occurs to me is talking about national policies. I think a lot of policies should be dictated at the local level, and maybe the idea I am about to give you could be done at the local level. But it could also be done at the national level, and I want to ask anyone on the panel, but particularly Mr. Belcher and Mr. Gentry, has anybody talked about either extending a tax credit or a deduction for an energy audit?

And I think my new home is much more efficient than my old home because it is slightly larger in square footage, but the cost of running it is less. But I will bet you there are inefficiencies still in it, and I would like to go out and have it audited, have somebody come in and say, well, look, you got a leak here under this door or you got this or that. And it seems to me that you could do that for old homes.

And it seems to me you could also perhaps do that for new homes. You could say to a homeowner that was going to buy a new home that was already built, somebody gets a tax credit, the builder or you get a tax credit or the builder or you get a tax deduction if that home is reviewed and you get a report showing how efficient it is or how inefficient it is. Those are both federal tax code issues.

Obviously we as a Nation have a stake in not wasting energy, and I guess I would be interested in your comments on those ideas.

Mr. BELCHER. Well, I can give a great example of Kansas City, Missouri just last week relaunched their green building program.

As part of the incentive, and utilities were mentioned before, their local electrical utility is helping to subsidize the cost of energy audits, both old and in new construction. So that helps that process get off the ground.

Our local utility in St. Louis, our gas utility, their alternative engineering group are the ones that are our third-party verifiers because they understand how the building functions. And it is important to remember when we are—as the technology of these building increase, there are systems that are made up of a lot of smaller systems. And you need to understand how they function, and just going in and building a tighter envelope—this happened when I was a code official back in the early '90s is the energy code started requiring tighter construction.

It overlooked the fact that people lived in those homes and had an effect that way. So, one of the three criteria of the building code, health, safety, and welfare. Well, welfare is a very important part of that triumvirate too so attention needs to be paid to the effect. We can't be hasty and confuse that with necessity.

Mr. SHADEGG. Anybody talking about a deduction or tax credit for energy audit, Mr. Gentry?

Mr. GENTRY. I am fairly new to the State of North Carolina, but we are getting started on a couple of projects down there. And the client we are working with is an organization that does affordable housing, and it is my understanding from my client that the State of North Carolina actually has programs in place to pay for energy audits and actually guarantee maximum—if you get a successful energy audit, then the State will—this program provides a guarantee to the homebuyer that utilities will not exceed a certain amount for—I can't remember whether it is a 3- or 5-year period.

So one of my thoughts is that you really don't need the tax credits because the project we did in Chicago was an excellent example of how you can make it work in the marketplace. What we did is again we were doing affordable housing, and the city of Chicago offers lots for a dollar if you can build a house, an affordable home, for $195,000. That is what it is capped at. And as you might guess, when you build a house for $195,000 in Chicago, you are doing bare bones minimum in terms of insulation and mechanical systems and everything else.

And we went to the city and demonstrated some simulations that we could shift monthly expenditures for utility bills towards the mortgage enough so that it was zero change in the monthly expenditures for the homebuyer so he could qualify that we could raise the cost of the house and sale price the house up to $295,000. We increased it by $100,000, and the city agreed with that and allowed us to do it.

And the advantage of that is that it gives the future homebuyer, it makes the house more affordable on multiple levels, three levels. As utility rates go up, the house remains more affordable than a conventionally built affordable home. They get to put more money into the mortgage rather than the utility bills so when they sell the house, they have greater economic mobility. And income tax credits, of course, work to their advantage.

Mr. SHADEGG. Anybody else want to comment quickly on either energy audits or incentives? Mr. Rodgers.

Mr. RODGERS. Yes, sir, I think you have clearly identified a critical issue. If we give consumers the proper information about the energy performance of their home as represented by scale display, they can make an informed decision. And then they can share it with a builder, the remodeler, the utility, a way of translating those cost savings into a better building. I think you are on to something.

Mr. SHADEGG. Mr. McLean.

Mr. MCLEAN. Just one thing to add. We found that there are several pieces of information a consumer needs, and having been one trying to do my own home, it is very hard to find someone who can talk this language and fix your house. So the audit is the first step, but then they have to be able to know where to go for a credible contractor who understands and can implement those recommendations.

Mr. SHADEGG. OK, thank you.

Mr. MCLEAN. So we are starting to see this as a package of issues that the consumer needs in order to go all the way to realize the energy efficiency.

Mr. SHADEGG. Well, I would be anxious to work with anybody on that issue, and if there is a role for federal legislation, be willing to get involved and help.

Mr. BOUCHER. Thank you very much, Mr. Shadegg. The gentleman from Washington State, Mr. Inslee, is recognized for 5 minutes.

Mr. INSLEE. Thank you. I want to thank the chairman for holding this hearing. As usual, he is right on the money, and I would like to insert in the record a letter dated July 17, 2008 from the U.S. Green Building Council that also thanks the chairman. I can submit that for the record.

[The information appears at the conclusion of the hearing.]

This letter reminded me of the McKinsey report that looked at the cost of all the things we can do to solve our multiple energy challenges. And way over on the left is this huge bar going down showing the negative costs, the cost savings of energy efficiency. And it is just astounding because it is as tall going down saving Americans money as any of the bars going up to deal with anything else we have to do. It really is an eye-catcher.

And moving on these building codes is absolutely a necessity. We will be introducing a bill here shortly with sort of what we call our no-brainer actions, this being one of them to again pass in the House, we hope, this improvement in our national energy codes. And we hope to move that through the House.

I just want to ask a question about again the necessity. The bill we will be introducing does not have any particular sanction from local States or communities that would not follow the federal requirement, no identified sanction in any event.

I would just like to ask the panel, assuming we do pass this, and it does create a federal statute, a federal legal requirement that, in fact, the building codes be updated with 30 percent by 2010 and 50 percent by 2020. What would be the reaction of States and ultimately other jurisdictions without some particular sanction of loss of federal funding? Will these States go to their attorney generals and their, you know, mayors and ask do we have to do this? And

will they be told it is federal law? And will they then act, or will they say well, there is no particular identified sanction, therefore let us just ignore those funny people in Washington D.C. and continue on our merry way?

I would ask for anyone's sort of description of a prediction in that regard if any would like to venture an idea. I certainly believe this is worth doing even without a sanction as a statement at a very, very minimum to move and give a reason for those who advocate for action on a local level to say the Federal Government—this is a legal binding requirement. And giving them that armor or weapon, if you will, to get their State to move makes sense. Mr. Belcher, you wanted to say something?

Mr. BELCHER. Yes, I just actually had a thought as you were talking about that. The State of Missouri, the populated area, St. Louis metropolitan area, Kansas City, Springfield, parts of the State or classes of county that have building code enforcement, they have enough population to justify, have the enforcement staff to do so.

But in outstate Missouri, which is a huge population, the State has not done anything to this point. It is almost impractical economically to try to enforce in the outstate, and frankly they have had a lot of pushback when building codes and things like that are trying to be imposed in outstate Missouri.

And as an aggregate, the population is probably about equal to the populated areas of this State. They are just scattered out obviously.

Mr. INSLEE. Well, would passage of this bill again by the House, if it became law, that did create a federal requirement for updating these codes, would that make it at least somewhat more likely that folks in Missouri would move towards a more robust energy code in your view?

Mr. BELCHER. Well, it is possible, but again it gets back to the State and some of these municipalities saying we just don't have the money to comply with this, and they will bog it down in the process. And again, you know, we do have processes out there that are being adopted around the State such as the Green Building Standard and Energy Star. They are accomplishing these goals. They just need to be promoted.

Mr. INSLEE. Mr. Rodgers?

Mr. RODGERS. Thank you, Mr. Inslee. I think it is important to understand, as Mr. Belcher is saying, that our State and local officials have a lot of work to do, and one of the things that they probably don't have time to do is write building codes from scratch. So the advantage of the proposed legislation is that it creates an incentive for the model building code to be updated regularly with sound, cost-effective technology. I mean it is my personal opinion that if we deliver a more efficient building code, provided through our proven consensus development process, that it will make it easier for our State and local officials to adopt a more efficient code.

Mr. INSLEE. Does anyone see any reason to wait to do this next year? You know we are going to have some more action next year on cap-and-trade and other things. But is there any reason not to do this this year?

Mr. HEAVNER. I think it is essential to do this as soon as possible, and I agree there really needs to be sanctions in addition to incentive. There needs to be incentives and sanctions, incentives to help with the implementation.

I think part of the reason why a lot of local jurisdictions in States don't do this is because it is a lot of work, and they feel like they can't get to it. So giving the carrot to say we will help you do that if you adopt this, but also with sanctions it is a question of national interest that we have to use less energy across this country. It makes perfect sense for Congress to have sanctions if States don't follow the national model code.

Mr. INSLEE. Yes, I may note, we have a lot of argument about offshore drilling, but I will bet you there is five times more energy in this subject we are talking about today that we can get for Americans at zero cost, at net zero cost. I wish we had more attention to this issue. Mr. Fay, you want to make a comment, and then I will yield.

Mr. FAY. Mr. Chairman and Mr. Inslee, I just wanted to point out that, as courts have held, it is the duty of the builders to meet these building codes. These are minimum building codes, and because the codes have a minimum standard of care in State laws, the noncompliance of those codes is a bigger issue, I think, for builders than it is even for code officials.

I think it is very important that we understand that the model code we are pushing does not automatically mandate anything. It has to be adopted then by the States, but once adopted, it is up to the builders to comply with that. And I think that is a very important distinction.

In addition to that though, nearly all of the members of the Energy Efficient Codes Coalition are dedicated to working beyond just the model codes to ensure that—to work with State and local levels to make sure that the funding is there and with Congress, funding is there to provide the training that is necessary for inspectors and for enforcement. And I think that is really important.

But I do think it is very important that we come back to the fact that this is an important issue for the builders to meet.

Mr. INSLEE. Yes, I just want to insert the discussion of what we are talking about today, which is the beauty and cost effectiveness of megawatts. So I would yield back.

Mr. BOUCHER. Thank you, Mr. Inslee. The gentleman from Oregon, Mr. Walden, is recognized for 5 minutes.

Mr. WALDEN. Thank you very much, Mr. Chairman. Appreciate this hearing. I was also down in the one on Telecommunications and the Internet, on privacy on the Internet. So I apologize for not being here for your testimony, but I am aware of it.

Mr. Rodgers, I want to ask you a question that perplexed me for a while. I rushed out and bought these fluorescent light bulbs and put them in. And they all say they are going to last eight or nine years. Is anybody looking at the fact they don't? I have had to deal with so many replacements, and I wonder is anybody at the Department of Energy actually looking at those claims? I am serious. My incandescent bulbs last much longer, and I don't understand why. Maybe it is just me, but I don't think it is.

Mr. RODGERS. Yes, sir. I appreciate that question, and that is one of the critical components of the Energy Star certification program. Any manufacturer that applies for and receives the Energy Star certification for compact fluorescent light bulbs has to submit the product for certification testing including durability testing. And so I very much hope and I would like to know if you have an Energy Star certified product that did not last——

Mr. WALDEN. Yes.

Mr. RODGERS [continuing]. The stated time, we need to know about that.

Mr. WALDEN. Well, I just told you, and I bet I am not alone. Anybody here had this same problem? I am serious, and I love the idea I am cutting my energy costs by a quarter. But I am paying through the nose, and if you think I am keeping those receipts from wherever I am buying this and that I am going to monkey around to go back and take that light bulb back and then argue with somebody about it. So I raise that because I have had it happen here in Washington D.C. in my house. I have had it happen in Oregon in my house, indoor and outdoor fluorescents. I have had them both. Some of them seem to work forever, but some of them just go out in a matter of a few weeks.

So I would encourage the Department of Energy, since we are all out there telling people to do this and you have wonderful signs up and we are all saying this is a great thing to do, I got to tell you I have invested enough in those puppies that I could have bought incandescent lights forever I think. But clearly I am a fan, but I just want to make sure that consumers aren't getting ripped off on that.

Mr. Belcher, on this building code issue, do you think what you are hearing here today and what you are looking at as a homebuilder is going to give the regional flexibility that is necessary?

Mr. BELCHER. I think that is still in question. I think the issue is being regional. Again I refer back to the National Green Building guidelines and upcoming standard which specifically addresses region. The residential code addresses some building issues on a regional basis, but there is a lot of technology involved in putting these homes together, especially as they are growing more and more energy efficient all the time.

Mr. WALDEN. We had a situation in my home community of Hood River, Oregon that I am going to say 30 years ago now, that they came in and tried to do this retrofitting of existing homes to achieve as much energy conservation as possible through the Bonneville Power Administration. And if you look around my hometown, all these homes built in the '40s, '50s, '60s, whatever, have the dual panel windows. They have 12 feet of insulation in the attic. And the one thing they ran into in the end was they sealed them so tight that airflow problems, humidity problems, I mean water problems inside and radon problems. And I assume we have learned from that that you can go too far too and that you are dealing with that in the code.

Mr. BELCHER. Well, that is precisely the point I was speaking to earlier. Even in this generation of homes, 20 or so years ago, as we required homes to be tighter, we weren't thinking of some of those issues——

Mr. WALDEN. Right.

Mr. BELCHER [continuing]. Until in the '90s we had mold and respiratory issues and so on. Now the trend with more building science involved is taking all those issues into account. And again just like in your existing program, if you want to take the biggest swing and hit the biggest ball out of the yard with energy conservation, it is all the existing homes and addressing how we retrofit. And don't just say go make your house tighter, but educate consumers on how to do that.

Mr. WALDEN. And let me go to Mr. Rodgers perhaps for the Department of Energy. Is there a one-stop shop on your Web site or somewhere that people can go? And I know Mr. Shadegg raised the issues about incentives for energy audits, which I think makes sense. And it seems to me there are consumers who frankly right now with the price of gasoline, diesel, natural gas going up 35, 40 percent they think in Oregon for residential heating next year, are going to be strapped to go invest. And yet that is a great investment long term, but short-term cash flow is probably an issue. So incentives and access to——

Mr. RODGERS. Yes, sir, I appreciate that very much. I would offer two one-stop shops. Energysavers.gov has the best collection of energy saving tips that consumers can apply and save energy right now in the homes and vehicles.

Mr. WALDEN. OK.

Mr. RODGERS. And then our joint website, energystar.gov, has access to all the Energy Star products and including home performance with Energy Star contractors who have the tools to come into an existing home and help you remodel that home for more energy efficiency.

Mr. WALDEN. And are there incentives in—I am sorry. Sir, if I can ask just one more—incentives in place for residential consumers to install solar, federal incentives?

Mr. RODGERS. Yes, sir, and there are many utility incentives and State incentives, and I will submit for the record a Web site that we have that documents all of those incentives.

[The information appears at the conclusion of the hearing.]

Mr. WALDEN. Great, because Oregon has had a very aggressive business incentive program for solar and renewable energy that has worked quite well. And I know everybody is kind of looking OK, what do we do in the residential site. Thank you, Mr. Chairman, for your indulgence on the time. And I want to thank the panel for their testimony.

Mr. BOUCHER. Thank you very much, Mr. Walden. Without objection, a letter that is addressed to our colleague Mr. Rogers from the Flat Glass Association of North America will be admitted into the record. And the record will remain open for a reasonable period of time so that additional questions can be propounded in writing by members of the panel to our witnesses today. And when you receive those inquiries, your expeditious response to them would be appreciated.

I want to thank each of our witnesses for the time you have spent with us this morning, for your well-prepared testimony. I think each of us has learned extensively from the comments that

you have provided, and we are most appreciative to you for the time that you have spent with us.

Having heard from all of the members on the panel and our witnesses, this hearing is adjourned.

[Whereupon, at 11:58 a.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

STATEMENT OF HON. JOHN D. DINGELL

Mr. Chairman, thank you for convening this hearing on the important issue of how we can improve the energy efficiency of our buildings, to limit greenhouse gas emissions that are causing climate change.

Few subjects related to energy efficiency have consumed more time and political energy than the subject of vehicle fuel economy. Yet our national fleet of buildings consumes 38 percent more energy on an annual basis than does our national fleet of cars, trucks, and airplanes.

In the first session of this Congress, the Energy Independence and Security Act of 2007 included a provision that mandated a 40 percent improvement in the fuel economy of automobiles and light trucks, a provision that had my full attention and that of many other Members. At the same time, a provision to provide for a 30 percent improvement in the minimum energy efficiency of new homes was unceremoniously dropped in the Senate after passing twice in this body.

Unlike motor vehicles, new technology is not an issue in the building sector; the experts tell us—and will tell us again today—that technologies are available today that could double the energy efficiency of our buildings without shrinking them, making them less safe, or making them less able functional.

A car put into service this year might remain in the automobile fleet for an average of about 12 years, on until 2020. But a new home or commercial building put into service this year will remain in use for more than a century.

Improving the energy efficiency of our buildings may prove to be a larger, more urgent, and much better opportunity to reduce energy consumption and related greenhouse gas emissions. It is an opportunity that deserves greater and more urgent attention from this Congress and from all Americans. I look forward to this hearing, and to learning from this fine group of witnesses what we can and should do to address this important issue.

STATEMENT OF HON. MARSHA BLACKBURN

Mr. Chairman:

I want to thank you for holding this hearing, and I want to thank the witnesses for taking their time to come and testify before this committee.

Energy efficiency measures are often a low-cost method to stabilize energy demands while providing a cost benefit to homeowners and commercial building operators.

But energy efficiency measures should not be mandated.

They should be decided by the free market.

Last year's energy bill was an example of how not to approach this issue.

It imposed numerous energy efficiency mandates.

It required more use of ethanol, driving food prices up.

It prevents the Air Force from using alternative fuels, making our military more dependent upon foreign sources of oil.

And it banned the incandescent light bulb and requires everyone to replace it with a dangerous mercury-filled compact fluorescent lamp.

All done in the name of the global warming religion.

Mr. Chairman,

Energy efficiency is a laudable goal, but it can only go so far.

Mandates are not the answer. New supply is the answer.

And I have yet to hear from the other side regarding a rational energy policy that encourages new energy supply for the United States.

Americans all across the country are demanding Congress to allow more exploration and production of American sources of energy.

They want to drill here, drill now, and pay less.

I hope my colleagues are listening to their constituents on this critical issue.

I yield the balance of my time.

USGBC
1800 MASSACHUSETTS AVE, NW
SUITE 300
WASHINGTON DC 20036
202 828-7422
WWW.USGBC.ORG

July 17, 2008

The Honorable Rick Boucher
U.S. House of Representatives
Committee on Energy and Commerce
Subcommittee on Energy and Air Quality
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Boucher:

On behalf of the U.S. Green Building Council, a nonprofit with more than 16,000 member organizations and more than 70 local chapters working to advance structures that are environmentally responsible, profitable, and healthy places to live, work and learn, I would like to thank you for your leadership in convening this hearing to examine the climate benefits of energy-efficient buildings.

Buildings have a significant impact on the environment, accounting for 40% of U.S. primary energy use[1] and 39% of U.S. carbon dioxide emissions.[2] Policymakers and building owners alike are now recognizing green building as one of the most effective strategies for meeting the challenges of energy consumption and climate change. By addressing the whole building, from construction materials to cleaning supplies, green building generates opportunities to reduce emissions and environmental impact throughout the supply chain and the complete building lifecycle.

Importantly, the technology to make substantial reductions in energy use and CO_2 emissions in buildings already exists; modest investments in energy-saving and other climate-friendly technologies can yield buildings and communities that are significantly more environmentally responsible, and are also more profitable and healthy places to live and work.

In its December 2007 report evaluating potential solutions for reducing greenhouse gas emissions, McKinsey & Company highlighted improvements to the energy efficiency of buildings and appliances as a "negative-cost" option, meaning that investments of this kind yield positive financial returns over the course of their life cycle.[3] Recognizing the above benefits, the building design and construction industry is voluntarily leading a green revolution that has begun to visibly transform cities and towns across America; but there remains much work to be done.

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[1] *2007 U.S. DOE Buildings Energy Data Book.*
[2] *2007 U.S. DOE Buildings Energy Data Book.*
[3] McKinsey & Company, *Reducing Greenhouse Gas Emissions: How Much at What Cost?* (December 2007), *available at http://www.mckinsey.com/clientservice/ccsi/pdf/US_ghg_final_report.pdf.*

To realize both individual and societal benefits sooner rather than later, a proactive effort is needed to build professional capacity, mainstream green building practices, and educate builders and occupants about the benefits of green building. The federal government can and should be a partner in this process.

The U.S. Green Building Council commends you and the Subcommittee for your leadership in addressing this vital issue. We look forward to working with the Subcommittee to identify and advance appropriate means of enhancing building efficiency and mitigating climate change.

Sincerely,

Jason Hartke
Director of Advocacy and Public Policy

COMMITTEE: HOUSE ENERGY & COMMERCE SUBCOMMITTEE ON ENERGY & AIR QUALITY

HEARING DATE: JULY 17, 2008

WITNESS: DAVID RODGERS
PAGE: 102; LINE: 2110-2113

INSERT FOR THE RECORD

A website that documents state and the utility incentives for residential consumers to install solar technology is located at http://apps1.eere.energy.gov/consumer/ if the "Database of State Incentives for Renewable Energy" link is selected. Established in 1995, the Database of State Incentives for Renewables & Efficiency is an ongoing project of the North Carolina Solar Center and the Interstate Renewable Energy Council (IREC) funded by the U.S. Department of Energy.

July 16, 2008

Hon. Mike Rogers (R, MI-8)
U.S. House of Representatives
133 Cannon Building
Washington, DC 20515

Dear Congressman Rogers:

On behalf of AGC Flat Glass North America, Inc. and Pilkington North America, Inc. we thank you and the Subcommittee on Energy & Air Quality for holding a hearing regarding the climate benefits of improved building energy efficiency.

AGC Flat Glass North America and Pilkington North America have led the glass industry in research, development, and commercialization of glass products to improve energy efficiency in buildings. We offer customers a broad range of products because we believe that window glass should not be treated as a commodity, but should help consumers achieve specific goals, including energy efficiency.

In the United States today, there is no differentiation between energy efficient windows for the North versus those for the South. The same window products designed to keep the heat of the sun out of homes in warm, cooling dominated climates, are being used to keep the heat of the sun out of homes in cold, heating dominated, climates as well.

When determining building codes for windows, emphasis has typically been placed on the U-factor for windows without consideration of the solar heat gain coefficient (SHGC). (U-factor indicates the rate of heat loss of a window assembly. The lower the U-factor the better its insulating value. The SHGC is solar radiation admitted through a window. The lower a window's solar heat gain coefficient the less solar heat it transmits.) The reality is that both U-Factor and SHGC must be considered.

AGC and Pilkington believe that energy efficient windows used in northern climates should have different properties than those used in southern climates. Specifically, windows in the north need to allow the heat from the sun to be used to offset heating costs. AGC Glass commissioned a study of this issue by Enermodal Engineering which concluded that in the northern climates, high SHGC windows add solar heat energy in winter, reducing furnace or heat pump load and improving annual combined heating and cooling costs.

AGC and Pilkington have been working with the International Code Council to change the codes for northern climate windows. We support lowering the U-factor from 0.35 to 0.32 in northern zones of the United States with an alternative path where a U-factor of 0.35 can be used if the window's SHGC is greater than or equal to 0.45.

Our advocacy of high solar heat gain windows in the north has received some opposition from entities who believe that it will be difficult to market different window glass in different regions of the country. We believe that the consumer should be encouraged to purchase windows which provide them with energy efficiency solutions designed for their climates. The International Code Council is scheduled to meet in September to consider this issue.

We are also working with the United States Department of Energy in support of a revised Energy Star criteria for windows which would include a minimum SHGC in the north. We will be participating in an Energy Star stakeholders meeting hosted by the Department of Energy on August 13th where this issue will be discussed.

AGC Flat Glass North America, Inc. and Pilkington North America, Inc. will continue to work to improve glass products which will lead to more energy efficient windows across the United States. We hope that members of this subcommittee will join us in supporting differentiation of windows for northern climates including a minimum SHGC, which will improve energy efficiency and yield climate benefits.

We welcome opportunities to meet with members of the subcommittee and/or staff to discuss this issue further.

Sincerely,
Pilkington North America
AGC Flat Glass North America

Department of Energy
Washington, DC 20585

March 3, 2009

The Honorable John Dingell
Chairman
Subcommittee on Energy and Air Quality
Committee on Energy and Commerce
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

On July 17, 2008, David Rogers, Deputy Assistant Secretary, Office of Energy Efficiency and Renewable Energy, testified regarding "Climate Benefits of Improved Building Energy Efficiency."

Enclosed are the answers to nine questions submitted by you and Representative Rogers to complete the hearing record.

If we can be of further assistance, please have your staff contact our Congressional Hearing Coordinator, Lillian Owen, at (202) 586-2031.

Sincerely,

Betty A. Nolan
Senior Advisor
Congressional and Intergovernmental Affairs

Enclosures

QUESTION FROM REPRESENTATIVE DINGELL

Q1. In your testimony, you estimate that the FY 2009 Building Technologies Program would cumulatively avoid 330 to 517 million metric tons of carbon dioxide (C02) emissions by the year 2020. How much would that emission reduction cost, on an average per-ton basis? What portion of that cost is, in fact, net savings, if any, to the economy? Is this per-ton cost lower than EIA projections of emission allowance prices under legislative proposals for cap-and-trade systems to reduce greenhouse gases (GHGs)? If so, can you estimate how many more emissions the Building Technologies Program could reduce, up to the per-ton cost of prevailing allowance prices, by 2020, if it were given additional resources?

A1. The referenced analysis does not identify the abatement cost associated with specific building technologies. This analysis is the result of detailed modeling exercise conducted each year to support the President's Budget[1]. The modeling assumes funding levels consistent with FY 2009 budget projections and current policy, which does not include a cost for carbon. The analysis does estimate a cumulative net savings to consumers of $31-133 billion, and a savings to the electric utilities of $34-52 billion accompanying the reductions in CO_2. This is a net benefit of more than $100 / ton CO_2, significantly less expensive than the $30 / ton cost projected by EIA in 2020 as an allowance price in their analysis of S.2191 from the 110th Congress[2].

The abatement potential reported in the FY 2009 budget request represents only a fraction of the total abatement that can be achieved through energy efficiency in buildings with similar economic benefits.[3] This analysis for the FY 2009 budget does not directly address this larger abatement potential.

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[1] Methodology and assumption available on line at:
http://www1.eere.energy.gov/ba/pba/program_benefits.html
[2] http://www.eia.doe.gov/oiaf/servicerpt/s2191/
[3] Dirks JA, DM Anderson, DJ Hostick, DB Belzer, and KA Cort. 2008. *Lost Opportunities in the Buildings Sector: Energy-Efficiency Analysis and Results*. PNNL-17623, Pacific Northwest National Laboratory, Richland, WA.

QUESTION FROM REPRESENTATIVE DINGELL

Q2. In the Department of Energy's FY 2009 Budget Request, the Administration has proposed to eliminate the funding of the Weatherization Assistance Program (WAP). According to the budget request, the funding for this program is being redirected towards research and development. The justification provided for this move, according to the DOE, is the WAP's benefit to cost ratio of 1.53 to 1, while the Energy Efficiency and Renewable Energy Program aims to maintain program benefit to cost ratios at close to 20 To 1. I understand the necessity for and significant benefits which result from increased investment in energy efficiency technologies. However, I worry that-investment in research may come at the detriment of deploying current energy efficiency technologies into the existing building stock. Please explain in detail the rationale for the proposed WAP funding redirection. What specific programs are the WAP funds being redirected to? Will these funds be used to research energy efficiency technologies for existing buildings in keeping with the mission of the WAP? What programs does the DOE currently have in place to encourage weatherization and energy efficiency upgrades in existing homes?

A2. The comparison between the Weatherization Assistance Program (WAP) and the Department's R&D programs highlights the discrepancy in the return on the investment of taxpayer dollars. Based on a study by the National Academy of Sciences, investments in energy efficiency and renewable energy applied R&D result in energy impacts 20 times greater than costs. [1] In contrast, the energy savings from WAP grants results in a significantly lower benefit/cost ratio of 1.53 to 1. This ratio was calculated by Oak Ridge National Laboratory based on past evaluation efforts and Energy Information Administration projected energy prices. [2]

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[1] "Energy Research at DOE: Was It Worth It?" National Research Council (http://www.nap.edu/openbook.php?isbn=0309074487). This study, published in 2001, analyzed investments in 17 energy efficiency R&D activities between 1978 and 2000 costing a total of $1.566 billion (p.23) and representing about one fifth of energy efficiency program spending in that time frame. The NRC found overall net economic returns of about $30 billion (p.29). This is a public return 20 times greater than the cost of the investment within the time period considered. In addition, the NRC calculated net environmental benefits worth $3-20 billion for these activities. As is the case with many diverse R&D investment portfolios, most of the benefits were generated by few – in this case, three of 17 – activities assessed (p. 29).

Prudent portfolio management requires DOE to focus available resources on its core areas of expertise and mission consistent with the DOE Strategic Plan. The Department does not transfer funding between specific programs, but instead supports highest priority programs based on impact analysis of the entire Energy Efficiency and Renewable Energy portfolio.

In addition to WAP, DOE's work on ENERGY STAR® and Home Performance, appliance standards, building codes (for renovations), the State Energy Program, and partnerships with retailers and local governments encourage energy efficiency upgrades in existing homes.

[2] The ORNL analysis can be found on the web (http://weatherization.ornl.gov/pdf/CON-493FINAL10-10-05.pdf). The benefit/cost ratio in the study is 1.34 – the 1.53 ratio cited above uses the same calculations with energy cost data updated for 2006.

QUESTION FROM REPRESENTATIVE ROGERS

Q1. In your experience, is the adoption of efficient technology and material better driven by specific, narrow mandates or through a competitive marketplace?

A1. Adoption of energy efficient technologies and materials can be accelerated through specific, narrow mandates and through a competitive marketplace. In cases where technical advances are available to improve the energy efficiency of products, but manufacturers do not incorporate those advances because of cost and competition issues, mandates in the form of economically justified national standards may be appropriate. Such standards would essentially create a level playing field where minimum efficiency for the consumer is assured and manufacturers can compete on price, features and quality of their products. The National Appliance and Commercial Equipment Standards program administered by the Department is responsible for determining minimum efficiency levels for a broad range of products; issues of competition are considered in the rulemaking process. Implementation of these standards results in 100 percent market penetration of products with the specified efficiency level.

In cases where manufacturers recognize the value of new advanced technologies competition can be a strong driver of market adoption. The recent emergence of white light solid state lighting (light emitting diodes or LEDs) technology has attracted the interest of all the major lighting manufacturers, who are bringing forth products with strong value propositions for commercial building owners and operators. These products have the potential to be superior in efficacy, are durable and have extremely long service life. The DOE is supporting this

emerging competitive market through competitive cost-shared applied technology and product development research directly targeting the efficacy of the technology, standards development, product testing and demonstration. The lighting industry is supporting voluntary labelling of solid state lighting products using ENERGY STAR criteria developed by the Department that became effective September 30, 2008. At this time minimum efficiency standards for LEDs are not anticipated.

QUESTION FROM REPRESENTATIVE ROGERS

Q2. Do energy conservation measures need to be cost effective to be justified?

A2. DOE considers efficiency as "doing more with less" while conservation is "doing less with less." Turning off the lights to save energy, for example, is conservation. Replacing an incandescent bulb with a compact fluorescent bulb is a form of efficiency; the new bulb uses less energy to produce the same amount of light.

Energy efficiency measures often have a positive return on investment. In many cases, installation of efficiency measures requires an up-front investment that will pay itself back over time. Using high R-value insulation in a building may be initially more expensive than low R-value insulation, but installing it saves energy and lowers monthly energy bills, as compared to that expected with the low-R insulation. The cumulative savings can total more than the price of the initial investment, saving the consumer money over the life of the product. Many currently available efficiency measures are life-cycle cost effective and, by definition, economically justified.

Pure conservation of energy can also be cost-effective. Measures like turning down the thermostat in an unoccupied building or avoiding unnecessary truck idling save energy and money at no economic cost. As such, these energy conservation measures are economically justified.

In addition to economic benefits, energy efficiency and conservation offer secondary benefits including improved energy security, enhanced competitiveness, and reduced emissions.

QUESTION FROM REPRESENTATIVE ROGERS

Q3. What is DOE's process for considering proposed changes at various code hearings?

A3. As required by statute, the Department participates in the Model Energy Code process for both commercial and residential building codes. As proposed code changes are submitted to the model code development process, the Department carefully reviews each proposal for its feasibility to increase energy performance, and to determine whether the technology is available and economically justified. DOE also evaluates enforceable code language to ensure it can be easily adopted by state and local jurisdictions.

In the International Code Council's International Energy Conservation Code process the Department meets or communicates with the proposer and with other proposers of similar changes to clarify any questions, convey any concerns, and to suggest consensus in combining similar positive proposals into a stronger single technically sound and economically justified proposal.

When working in the American Society of Heating, Refrigerating and Air-Conditioning Engineer's Standard (ASHRAE) 90.1 model code process, DOE meets and works with proposers and other stakeholders in the committee consensus process to work out the most appropriate change. In making final recommendations on code proposals, DOE also considers analysis provided by technical experts from our national laboratories.

QUESTION FROM REPRESENTATIVE ROGERS

Q4. Is there a standardized methodology that DOE uses to evaluate and determine which code proposals to support at the various code hearings? Is there a score sheet?

A4. DOE is required by the Energy Conservation and Production Act to seek adoption of technologically feasible and economically justified energy efficiency measures. (P.L. 94-335, 42 U.S.C. 6836(b)(2)). The Department is sensitive to the potential implications of proposals that could adversely impact competition in the industry. Proposals to change ASHRAE Standard 90.1 for commercial buildings and the International Energy Conservation Code for residential buildings vary in their substance, scope, and complexity. Use of a standardized methodology for all proposals is not feasible. Each proposal is analyzed individually on the merits using energy analysis, modelling tools, and building science. This analysis, rather than a score sheet, allows DOE to estimate the relative energy benefits of each code proposal.

QUESTION FROM REPRESENTATIVE ROGERS

Q5. **When it comes to determining which model codes to support, is safety or energy conservation the top priority?**

A5. The Energy Conservation and Production Act requires DOE to support the upgrading of ASHRAE Standard 90.1 for commercial buildings and the International Energy Conservation Code for residential buildings. (42 U.S.C. 6836(a)) Specifically, DOE must determine whether the revised editions of those codes would improve energy efficiency in commercial and residential buildings, respectively. (42 U.S.C. 6833(a)(5)(A)) Finally, DOE is also required to provide financial and technical assistance to states to update, implement and enforce their codes to meet the model building energy codes for which DOE has made a positive determination. (42 U.S.C. 6833(e) and (f)) The Department focuses on energy efficiency, but not at the expense of safety.

QUESTION FROM REPRESENTATIVE ROGERS

Q6. **Secretary Bodman recently stated that DOE is working to align energy efficiency standards between Canada, Mexico and the U.S. How well is this effort progressing, and what steps are DOE taking with regards to its programs (building codes, energy star) to ensure that the most effective products for particular climate zones are available in all three countries?**

A6. The North American Energy Working Group (NAEWG) was established 2001 by the Canadian Minister of Natural Resources, the Mexican Secretary of Energy and the U.S. Secretary of Energy, to enhance North American energy cooperation. The Group is led by officials from Natural Resources Canada (NRCan), the Mexican Secretariat of Energy, and the U.S. Department of Energy. The main purpose of the NAEWG has been to harmonize energy efficiency standards and test procedures among U.S., Canada and Mexico.

NRCan is implementing an ENERGY STAR® program in Canada through an agreement with the EPA for a broad range of products including office equipment, consumer electronics, heating and cooling equipment, home appliances, lighting and signage, distribution transformers, commercial solid door refrigerators and freezers, and windows. Mexico does not have an ENERGY STAR® program.

NAEWG continues to meet and examine revisions to each of the countries' standards and test procedures with the goal to harmonize when possible.

QUESTION FROM REPRESENTATIVE ROGERS

Q7. Following up on that, Canada uses what are referred to as alternate performance path criteria, but DOE does not appear to share the same commitment. Why?

A7. DOE does recognize the potential value of performance paths. As directed by the Energy Conservation and Production Act, DOE provides support in upgrading ASHRAE Standard 90.1 for commercial buildings, and the International Energy Conservation Code for residential buildings. (42 U.S.C. 6836(a)) Both model building energy codes have long contained alternative compliance paths. ASHRAE Standard 90.1 has prescriptive component requirements, component trade-off provisions and an energy cost budget performance approach. The International Energy Conservation Code has a similar set of compliance paths. The Department does not favour one of these compliance approaches over another. Each approach may be appropriate for different situations. For example, the prescriptive compliance path may often be most appropriate for simple repetitive buildings, whereas the component trade-off compliance provisions may be more appropriate for use where greater design flexibility is desired. The performance compliance path may be most appropriate for larger more complex buildings where building simulation will normally be used in the design process. While States are responsible for the upgrading, implementation, and enforcement of building energy codes, generally based on these model codes, DOE can provide financial and technical assistance to States to help them fulfill these responsibilities.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 09 2008

OFFICE OF CONGRESSIONAL AND
INTERGOVERNMENTAL RELATIONS

The Honorable John Dingell
Chairman
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairman Dingell:

Thank you for the opportunity to respond to questions following the July 17, 2008, hearing entitled, "Climate Benefits of Improved Building Energy Efficiency." I hope this information will be useful to you and the other members of the Committee.

If you have any further questions, please contact me or your staff may contact Cheryl Mackay in my office at (202) 564-2023.

Sincerely,

Christopher P. Bliley
Associate Administrator

Enclosure

The Honorable John D. Dingell

1. **Can you estimate the average per-ton cost of avoided greenhouse gas emissions from the Environmental Protection Agency's (EPA) energy efficiency programs, including ENERGY STAR? What portion of this cost is, in fact, net savings, if any, to the economy?**

ANSWER:

In 2007 net savings to energy consumers (bill savings minus technology expenditures) from the ENERGY STAR program managed at the US EPA were estimated to be $16.3 billion with associated avoided greenhouse gas emissions of 42.4 MMTCE (million metric tons carbon equivalent). EPA estimates that through 2017 the present value of cumulative net savings will total $191.4 billion with associated avoided greenhouse gas emissions of 536 MMTCE. State and utility efforts leveraged EPA's programs and, thus, contributed to these results. Please see our most recent annual report for full details on EPA accomplishments through the ENERGY STAR program and the methods used to estimate the benefits.

It is estimated that EPA's efforts through ENERGY STAR avoid 1 metric ton of carbon emissions while saving consumers more than $60 (net) for every federal dollar spent.

Note: ENERGY STAR is operated jointly by EPA and DOE. These figures pertain only to EPA's ENERGY STAR program efforts.

Source: ENERGY STAR and Other Climate Protection Partnerships: 2007 Annual Report. <www.energystar.gov>

2. **How does EPA assess near-term opportunities for greenhouse gas reductions from its energy efficiency programs, as well as their average per-ton cost?**

ANSWER:

EPA assesses near-term opportunities for greenhouse gas reductions from its energy efficiency programs through a variety of means depending upon the area of the ENERGY STAR program. EPA relies on its more than fifteen years of experience in administering energy efficiency programs, the work of other organizations such as the national laboratories, and commissions its own analyses as necessary. Examples include:

- EPA undertakes market research to determine the potential savings from new product categories to add to the ENERGY STAR program while already understanding the costs necessary to administer the ENERGY STAR program across product categories based on over fifteen years of experience.
- EPA focuses its ENERGY STAR commercial building program on key sectors based on the carbon savings opportunities present in these sectors as has been established by DOE's commercial building energy consumption survey

(CBECS) and supplemental analysis on energy savings opportunities, and proven out through field demonstrations.

- EPA focuses its ENERGY STAR industrial program on key sectors that also represent significant carbon savings opportunities based on their overall energy use and estimates of the potential for cost-effective energy savings using a variety of research materials and industry input.

3. How does this cost compare with expected allowance prices leading to 2020?

ANSWER:

While EPA does not have any specific expectations about potential prices for greenhouse gas allowances under any future regulatory regime, recent analyses of S. 2191 estimates future allowance prices at greater than $20 in 2015 and rising to over $100 by 2050. This is just one analysis of one recent bill.

Note: these values are in no way comparable to those provided in the response to Question 1, above (i.e., carbon reduced per federal dollar spent).

4. If it is lower, would additional resources to EPA's energy efficiency programs achieve additional emission reductions at per-ton costs below expected allowance prices?

ANSWER:

EPA estimates that for every federal dollar spent on its energy efficiency programs through 2007, $15 is invested in energy efficiency, $60 is saved on net, and 1 ton of carbon is avoided. Based on this historical performance, EPA believes additional resources to EPA's energy efficiency programs could provide substantial additional carbon reductions in a cost-effective manner.

EPA employs strategies across the residential, commercial, and industrial sectors; these energy efficiency programs continue to evolve and have the potential to deliver substantial additional savings at comparatively low cost to the federal government, while delivering net economic benefits for consumers. A few examples where additional efforts could be undertaken to achieve energy efficiency improvements: 1) The ENERGY STAR new construction program currently is deployed regionally and can be expanded to many additional markets; 2) the ENERGY STAR label can be expanded to a number of additional product categories, including commercial food service to address highly energy intensive commercial buildings with commercial kitchens; and 3) EPA's buildings and industrial programs can be expanded to additional sectors and to have greater penetration in the existing sectors.

5. If the International Code Council (ICC) improves its energy efficiency code by 30 percent, and the ENERGY STAR homes typically qualify if they are 15-20 percent above the code, will the ENERGY STAR Program adjust its ratings to qualify homes that exceed the new code level by that percentage? In other

words, what more could ENERGY STAR accomplish if building codes are improved?

ANSWER:

Through the ENERGY STAR Program, EPA promotes new construction that is more energy efficient than homes that are built to the national building code. EPA, anticipating the national code might become more stringent over the next two years, is developing the next generation of ENERGY STAR specifications for new home construction. To achieve savings beyond any new code requirements, EPA is currently looking at builder installation and construction practices related to the thermal envelope, heating and cooling equipment, and water heating.

6. **What is EPA doing to achieve for it's ENERGY STAR Homes Program the same level of widespread use, trust, and acceptance by the public that has been achieved in the appliances area?**

ANSWER:

EPA is actively working to see that ENERGY STAR homes are widely available across the country. EPA is currently working with more than 6,000 builders and is having substantial success:

- There are forty housing markets with over 20 percent market penetration;
- The national market penetration of new homes in 2007 was almost 12%.
- Three of the top eleven builders in the country are committed to building 100% of their homes as ENERGY STAR.

Further, to ensure a quality product, a third party, home energy rater verifies that the home meets ENERGY STAR specifications. Such verification is performed under the detailed protocols issued by the Residential Energy Services Network (RESNET), a national standards setting body for building energy efficiency rating systems. To help promote ENERGY STAR Qualified New Homes, EPA runs an annual outreach campaign with builders through out the country. This year builders from over 33 metropolitan areas ran outreach campaigns promoting ENERGY STAR homes to new home buyers. This private sector based funding totaled close to $ 2.5 million.

7. **We understand that a leading Multiple Listings Service (MLS) for commercial buildings now displays whether or not the properties have received the ENERGY STAR. Should the Federal Government promote disclosure of the ENERGY STAR or other energy efficiency metrics for residential properties?**

ANSWER:

CoStar is one of the nation's leading MLS's for commercial buildings and has included information on ENERGY STAR labeled buildings for about 2 years. EPA has found that disclosure of this and other information on the energy performance of buildings can have a powerful impact in the marketplace. More recently, California and the District of Columbia have mandated through statute the reporting of the

energy performance of their commercial buildings. In CA the energy disclosure is at the time of a transaction, such as a sale, lease or financing. In DC, the law requires energy disclosure on an annual basis, phased in by building size. Both mandates reference the use of the ENERGY STAR Commercial Building Benchmarking Tool. To help facilitate communication regarding energy information on December 9 and 10, 2008, in Washington DC, U.S. EPA will host a workshop on related issues -- The Power of Information to Motivate Change: Communicating the Energy Efficiency of Today's Commercial Buildings.

Disclosure of energy performance is also a critical strategy in the residential sector. EPA believes that it would be useful to disclose the energy efficiency of a home at time of sale. EPA has worked with MLS's in parts of the country to designate listed homes as ENERGY STAR, if those homes have met the ENERGY STAR specification. In addition, there is a growing effort to require a Home Energy Rating at time of sale (e.g., Massachusetts, Oregon, and the City of Austin have recently established such a requirement). While a Home Energy Rating would inform the prospective buyer about the energy efficiency of the home, it can cost up to $400 to have a rating performed on a home. This is a significant cost. EPA is exploring alternative approaches that could cost much less. One such approach is the Home Energy Yardstick found on the ENERGY STAR website. The Yardstick provides a ranking of a home's energy consumption relative to other homes in the country. It requires 12 months of utility bills and basic information about the homes that a homeowner can answer.

8. **What effect would achieving the near- and long-term goals called for in the National Action Plan for Energy Efficiency have on electricity prices and greenhouse gas emissions?**

ANSWER:

Building upon the recommendations of the National Action Plan for Energy Efficiency a long-term aspirational goal has been established to achieve all cost-effective energy efficiency by 2025. In the Action Plan's "Vision for 2025" document (2008) it is estimated that achievement of this goal would result in the following level of annual benefits in 2025:

- > $100 billion in lower energy bills in that year,
- > 900 billion KWh in energy savings, and
- reductions in greenhouse gas emissions on the order of 500 million metric tons of CO2.

Source: National Action Plan for Energy Efficiency (2007). *National Action Plan for Energy Efficiency Vision for 2025:* Developing a Framework for Change. <www.epa.gov/eeactionplan>

This analysis did not estimate the impact of reduced energy demand on electricity or natural gas prices. One source of information on the potential impact of energy

efficiency provisions on energy prices is EPA's forthcoming analysis of S. 3036. While this analysis does not estimate the effect of the Action Plan's aspirational goal, it does estimate the effects of some significant energy efficiency provisions within the bill. In addition, various analyses and forecasts by the Department of Energy's Energy Information Administration also assess the effects of variations in energy demand on energy prices.

9. **If the ICC adopts the "30 percent solution" this September at its meeting in Minneapolis, how will this affect greenhouse gas emissions and emission of other air pollutants associated with power generation, such as sulfur dioxide, nitrogen oxides, particulates, and mercury? Would this type of proposal have a significant impact on the ability of air quality nonattainment areas to meet the national ambient air quality standards?**

ANSWER:

EPA has not yet completed its analysis on how changes to the IECC will affect greenhouse emissions or emissions of other pollutants. This task is complicated by the fact that states now must decide to adopt the IECC as code. Not all states will follow the new code. In addition, not all states that adopt the code will enforce the code. These variables make this type of analysis difficult.

THE AMERICAN INSTITUTE OF ARCHITECTS

November 14, 2008

The Honorable John D. Dingell
Chairman, House Committee on Energy and Commerce
Rayburn Building
Washington, DC 20515

Dear Chairman Dingell:

Thank you for allowing me the opportunity to testify before the Subcommittee on Energy and Air Quality at the July 17, 2008, hearing entitled, "Climate Benefits of Improved Building Energy Efficiency". The American Institute of Architects is supportive of the Committee's efforts to pursue legislation that will promote energy efficiency in the built environment, and we look forward to working with you during the 111th Congress.

This correspondence is in response to your letter of October 30, 2008, which included questions to complement my testimony. Please see the questions and my answers on the following pages of this letter.

Again, I thank you for all the work you have done to improve energy efficiency in the building sector and I am hopeful that the AIA can continue to work with your Committee next year.

Sincerely,

Marshall E. Purnell, FAIA
President

1735 New York Avenue, NW
Washington, DC 20006-5292
Information Central: 800-242-3837

1. How does the proposed GREEN Act compare with HUD's existing Energy Efficient Mortgages Program? Does either really drive consumer demand for energy efficient remodeling or new home construction, or do they confront the kind of information barriers we see today?

The American Institute of Architects strongly supports policies that will expand the use of Energy Efficient Mortgages (EEMs), as well as Location Efficient Mortgages (LEMs). The Green Resources for Energy Efficient Neighborhoods Act of 2008 (H.R. 6078) includes a number of provisions that would expand the use of EEMs across the country.

Given the current state of our economy, many Americans are unable to qualify for mortgages as banks are tightening lending requirements. In these instances, EEMs can be very effective tools to justifiably raise the loan limit for borrowers and allow more people to buy homes. However there are currently a number of impediments to widespread deployment of EEMs. Perhaps the most significant of these barriers is simply a lack of knowledge of the availability of EEMs.

As you noted, there is currently an information barrier that is preventing EEMs from reaching the marketplace. Simply put, many lenders and borrowers do not understand EEMs, and in some cases, do not realize that they even exist. The GREEN Act attempts to address this by requiring the federal government to conduct an education and outreach campaign to inform and educate residential lenders and prospective borrowers regarding the availability, benefits, advantages, and terms of energy efficient mortgages. The bill would require the Department of Housing and Urban Development, the Department of Energy, the Department of Education, and the Environmental Protection Agency to conduct this campaign and allows them to consult with outside entities to publicize and market EEMs. The AIA feels that this is an excellent strategy to begin the process of educating the marketplace about EEMs. As a number of these departments already have programs in place supporting the use of EEMs, it makes sense to promote and expand the programs that already functioning.

While there is currently no conclusive data showing that an aggressive publicity and marketing campaign by the federal government to promote EEMs will result in their expanded use, I believe that this campaign – particularly at a time when homeowners are more aware of rising energy costs than ever – will have an impact. Especially given that many potential home buyers are looking for incentives to help them qualify for a loan, educating the general public about the benefits of EEMs will most likely increase demand among consumers to purchase an energy efficient home.

The AIA also supports HUD's current Energy Efficient Mortgage Program. As I have stated above, however, the lack of knowledge among lenders and borrowers regarding EEMs is limiting the effectiveness of this program. The GREEN Act does not attempt to supplant HUD's program but rather establishes new policies that will result in more EEMs reaching the marketplace.

Specifically, the bill requires both Fannie Mae and Freddie Mac to purchase, sell, service, lend on security, and otherwise deal in EEMs. Currently, both Fannie and Freddie are authorized to deal in EEMs; neither, however, have made doing so a priority. Given the current state of the lending market and noting the numerous benefits that widespread use of EEMs would offer energy security, the environment, and borrowers as a whole, the AIA believes the secondary mortgage market can and should do more to promote EEMs.

Under the GREEN Act, Fannie and Freddie are required to purchase a specific percentage of EEMs each year over the life of the bill. By 2016, these entities must ensure that 5 percent of all mortgages purchased during the year are EEMs. This is an aggressive target but one that can be achieved. The AIA believes that along with an intelligent publicity and marketing campaign, establishing EEM goals for government sponsored enterprises who deal in mortgages will result in many more EEMs reaching the marketplace.

2. In regards to climate change legislation, your testimony offers support for Federal incentives to "states, localities, energy providers and energy consumers to make buildings more energy efficient. What form do you envision those incentives taking?

The American Institute of Architects believes that any successfull policy aimed at reducing our nation's carbon emissions must include provisions that will improve the energy efficiency of our nation's buildings. As the built environment is number one producer of greenhouse gas emissions in the nation, we must address energy use in the building sector in order to achieve meaningful reductions in carbon emissions.

As I stated in my testimony, improving efficiency in new and existing buildings offers the greatest potential for reducing carbon emissions at the lowest cost. Specifically, the energy efficiency improvements in residential and commercial buildings (including the appliances inside) make up the largest cluster of negative-cost abatement opportunities. Over the life-cycle of the building, energy efficiency improvements generate positive

economic returns through reduced energy costs. Essentially, making buildings more energy efficient is a cost-effective way to achieve major reductions in GHG emissions and reducing our nation's dependence on foreign oil while enhancing economic growth.

One of the major barriers to widespread deployment of energy efficient buildings and technologies is the up-front cost associated with energy efficient systems. While it is well documented that energy efficient expenditures are recouped within a short period of time (usually within five years), many building owners are reluctant to spend the additional capital at the outset. This is especially true given the ongoing economic crisis, as it has become increasingly difficult to secure financing for construction projects. Thus federal incentives for energy efficient design and construction can be effective tools to overcome the market barriers that are restricting the expansion of energy efficiency nationwide.

The AIA believes that the federal government can play a major role in improving energy efficiency in the building sector through incentives within climate change legislation. Any climate change bill should include dedicated allocations to states to improve energy efficiency among their buildings. This can be achieved through a number of ways, one of which your Committee has included in the *Climate Change Discussion Draft* released in October (Section 501, State Energy Efficiency Development Funds).

Specifically, State Energy Efficiency Development Funds (SEED) would distribute funding to each state on a formula basis to improve energy efficiency within their jurisdictions. States can distribute these funds as low- or zero-interest loans to entities within the state that would then use the loans to improve energy efficiency in new or existing buildings. This is an intelligent strategy to achieve greater energy efficiency in buildings as administratively, it would be nearly impossible for a federal entity to manage energy efficiency improvements in buildings across the country. Providing funding to each state would guarantee efficiency improvements nationwide, in turn reducing carbon emissions.

Another strategy to improve energy efficiency is to establish more efficient building codes. The *Discussion Draft* includes provisions (Sec. 515) that will provide incentives to states and localities who implement building codes that achieve energy efficiency beyond what current codes call for. These incentives could be used by the states to develop the codes in an open, consensus based process, allowing all affected parties the opportunity to comment and propose amendments to the codes. Many jurisdictions are reluctant to develop more energy efficient building codes as they do not have sufficient

funding to enforce current codes, let alone pursue more efficient codes. A federal commitment to more efficient building codes will result in the design and construction of many more energy efficient buildings.

One of the major impediments to widespread energy efficiency is a lack of knowledge among end-use energy consumers of energy efficient practices. Many Americans do not realize that simple practices, such as using efficient light bulbs, can save vast quantities of energy and in turn, save them money in their monthly utility bills. One way the federal government can educate consumers of the benefits that come along with energy efficiency is through energy producers. The federal government could provide incentives for utilities to educate their consumers on energy savings practices. These incentives could come in the form of allowances under a cap and trade program. This will provide utilities with an impetus to encourage their customers to change their behavior and begin improving their energy efficiency.

GOVERNMENT AFFAIRS

Joseph M. Stanton
Chief Lobbyist

November 14, 2008

Honorable John Dingell, Chairman
House Energy and Commerce Committee
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairman Dingell:

On behalf of the 235,000 members of the National Association of Home Builders, please accept the written responses to the questions we received from the Committee members for the July 17, 2008, hearing entitled, "Climate Benefits of Improved Building Energy Efficiency."

Please contact Elizabeth Odina with NAHB staff at (202) 266-8570, if you have any questions or concerns regarding this submission. We thank you again for the opportunity to participate in this hearing and look forward to working with you and the Committee in the future.

Sincerely,

Joseph M. Stanton

Cc: Honorable Joe Barton
Honorable Rick Boucher
Honorable Fred Upton
Honorable Edward J. Markey
Honorable Mike Rogers

Response to Follow-Up Questions for Written Submission

Subcommittee on Energy and Air Quality Hearing

"Climate Benefits of Improved Building Energy Efficiency"

July 17, 2008

Matt Belcher, on behalf of the National Association of Home Builders (NAHB)

Questions from the Honorable John D. Dingell

1. **You argue that residents' behavior drives up to 48.5 percent of home energy consumption, and that builders have no control over residents' behavior. Do builders' decisions affect residents' utility costs, and potentially affect their ability to invest in more energy efficient appliances that occasionally carry higher upfront costs?**

   In addition to structural and building envelope efficiency, builders are generally responsible for installing major space heating and cooling appliances that go into a new home. These decisions will have some affect on a consumer's utility bills. Furthermore, when the upfront costs for more efficient major appliances do not exceedingly outpace expected savings to the homeowner it is a good business decision on the part of the builder to install those appliances and will likely help sell the home.

   Alternatively, as savings accrue to consumers from assumed reductions in utility bills, consumers are free to spend such savings on whatever items they wish. Realistically, they may choose not to reinvest in efficiency of the remaining appliances in the home that are not at the discretion of the builder – e.g., washers/dryers, refrigerators, TVs, dishwashers, computers, and other plug-connected equipment. For example, consumers may use their savings to purchase large-screen plasma television sets, which are not known for efficiency, or they may choose to spend on other social activities. As referenced in my *Written Statement*, builders can only control consumption up to a certain amount through envelope efficiency and higher-efficiency HVAC equipment. Builders cannot directly affect a specific consumers' choice of whether or not to reinvest in further efficiency beyond the envelope or major HVAC systems. Similarly, a builder cannot predict how consumers will spend projected savings from reduced utility costs for efficiency resulting from builder decisions.

   On the other hand, if the builder changes the design or construction of a home in a manner that increases up-front costs substantially relative to the expected utility savings, it may impair the ability to deliver the home to the market. This could result in a buyer having higher mortgage payments relative to future savings on heating and cooling, leaving the homeowner with fewer resources to devote to further investment in energy efficient appliances. It is NAHB's experience that people who do not actually have to pay the upfront costs for changing the design and construction of a home (i.e., efficiency advocates, architects, nonprofits) often tend to underestimate those upfront costs when the home is actually constructed and needs to be financed by home buyers.

2. **How does residents' behavior act as a barrier to the builder's taking the opportunity to make improvements in the structural envelope of a building to enhance its energy efficiency?**

   Generally, the thermal performance of the structural envelope is not a feature that is readily apparent to prospective home buyers. Thus, it can be challenging to sell the extra cost of certain features that cannot easily be seen or evaluated, as is a certain type of siding or countertop. However, it should be noted that even when builders do take the opportunity to make structural envelope improvements, it is possible for the consumption behaviors of the homeowners to outpace some of the enhancements associated with improved thermal performance.

   The Department of Energy's Energy Information Administration (EIA) estimated in its Annual Energy Outlook for 2007 that by 2030, 30% of the residential energy load will be plug connected. The popularity of a plurality of televisions, computers, and other consumer electronics is not showing signs of decline. Consumer products like digital photo frames and other electronic devices that require constant power (DVRs, VCRs) are continuing to proliferate in American households. In a presentation on Capitol Hill held earlier this year (April 2008), the Electric Power Research Institute (EPRI) estimated that the energy consumed by adding one digital photo frame per household is equivalent to powering five 250MW power plants for one year.

   As referenced in my *Written Statement*, it is entirely possible to construct a highly-efficient home that is not operated in an efficient manner. This is important because it affects projected energy savings attributable to homes, whether through structural envelope improvements or higher-efficiency heating/cooling equipment. Due to the extraordinary variable of consumer consumption in the home, much of it plug connected, it is possible to counteract energy savings from builder improvements. These resident behaviors absolutely present a barrier to the overall improvement of the structural performance and enhancements to a home's energy efficiency.

3. **Your testimony notes that consumers are a key influence on the types of new homes that are built, and you suggest that consumers may be rejecting certain energy efficiency improvements related to their cost.**

   Cost concerns are extremely important to many home buyers, especially first-time buyers and those in the lower income ranges. The ability to qualify for and make a mortgage payment is often paramount to any specific features of the home or its projected energy efficiency. Whether right or wrong, utility costs and energy bills are often not one of the most important items considered at the closing table. Furthermore, if a home buyer cannot qualify for or afford the mortgage payment, the energy efficiency (or inefficiency) of a particular home becomes irrelevant. Much of the home buying public are first-time buyers (40%) and, especially in these current times, are price sensitive. The increasing qualification thresholds for lending, coupled with higher down payment requirements, will make every dollar spent on the home even more meaningful. Thus, there are instances where consumers may not be able to afford certain efficiency improvements because of a cost-constraint, particularly when it could mean the difference between being able to buy the home or not.

4. **Are these optional technologies and improvements, along with their construction costs and prospective energy cost savings, actually presented to the average homebuyer for such consideration?**

   Marketing energy efficiency technologies, or even green building, to prospective home buyers is extremely important, especially in today's market. In light of fluctuating energy costs, builders are happy to be able to market the efficiency features of a new home because new homes are dramatically more energy-efficient than existing homes, even those built just a decade ago. The energy efficiency of a newer home is an important selling point and provides a clear advantage for builders of new homes over sellers in the existing home market.

   In fact, several high-volume production builders are already highlighting the efficiency of new homes with a variety of energy-efficient programs and practices. For example, earlier this year Centex® unveiled its *Energy Advantage* program which contains a suite of energy-efficient features installed as standard in all new Centex® homes beginning in January 2009. In the *Energy Advantage* program, all homes come equipped with an energy monitor, which enables homeowners to play a more active role in measuring and controlling consumption, in addition to a high-efficiency HVAC system, programmable thermostats, low-emissivity windows, radiant-barrier roof decking, heavily-insulated walls/ceilings, compact fluorescent lighting, and instructions for operating the home to maximize these efficiency features. In 2007, KB Home launched its *My Home. My Earth*™ strategic environmental initiative that contains a sustainability line and a *Built to Order*™ home buying process allowing consumers to choose and personalize custom efficiency features that can be added to their homes. Since 2001, KB Home has built over 53,000 highly-efficient homes saving 140,000 metric tons of GHGs, equivalent to removing 26,000 cars from the road, and saved consumers $24 million in utility bills. As of 2008, KB Home includes Energy Star® qualified appliances as standard.

5. **What evidence do you have that consumers have identified these particular elements as part of a price point decision?**

   The best data available to prove consumers' price sensitivity relative to certain efficiency investments that can substantially raise upfront costs for new homes is the inability of those consumers to qualify for financing for these homes. Also detailed in the response to Question 8 (below), the Census Bureau's 2007 American Community Survey provides data, calculated on average for the U.S., regarding property tax rates and property insurance rates of $9.46 per $1,000 of property value and $3.35 per $1,000 of property value, respectively. Based on these data, and assuming a 6.25% interest rate on a 30-year fixed rate mortgage with a 45-basis point adjustment for private mortgage insurance, the added cost to a home buyer for an initial efficiency investment of $1,000 for efficiency is about $90 per year.

   For some people, $90 may not seem excessive, but NAHB has shown that using typical assumptions about mortgage, down payment, property taxes and insurance, every $1,000 increase in the median price of a new home will price out more than 217,000 households from affording that home, based on the fact that these households would be able to qualify for a mortgage before the price increase but not afterwards.

6. **A builder who puts a house on the market after completion is effectively making the energy efficiency decisions for the occupants of that home for as long as a century. What**

payback period in terms of reduced utility costs are appropriate to judge whether or not to install an energy efficient feature?

Considering the fact that a builder can only control a portion of the actual energy consumed in a home due to the efficiency features s/he provides, it is only partially true that builders are making "the energy efficiency decisions for the occupants of that home for as long as a century." It is appropriate to give some discretion on payback periods to the homeowners that must actually pay the upfront costs of specific efficiency features because there are many efficiency features which can take decades to payback in terms of savings. [*See examples in the response to Question 3 posed by Honorable Edward J. Markey*]. It is also important to recognize that home buyers face many uncertainties about the dollar savings they will be able to realize over the years from a particular energy conservation feature. Energy prices, household composition, and technology may all change in ways that are difficult to predict and can significantly impact the amount a household pays for energy. Home owners are also typically uncertain about how long they will occupy their homes, the likes/dislikes of future residents, and how much the next buyers will be willing to pay for energy efficiency extras. In general, the effect of this uncertainty is to shorten the required payback period (equivalent to a higher rate of return required on riskier assets).

NAHB bases its cost-effectiveness evaluations on a simple ten-year payback period, based on the longest average period reported in willingness-to-pay consumer surveys. In 2001, the U.S. Environmental Protection Agency (EPA) funded a paper that was co-authored by economists from NAHB, the EPA, and Cornell University that largely discredited payback period estimates based on alternate methods, some of which resulted in considerably shorter or considerably longer payback periods than ten years. NAHB bases its cost-effectiveness evaluations on a simple ten-year payback period. Despite the fact that most consumer surveys actually show a desire for a shorter payback period of less than ten years, NAHB members chose to adopt the upper limit when evaluating energy efficiency proposals in an attempt to reach a compromise with many efficiency advocates' proposals and to embrace support for a wider-range of efficiency improvements.

7. **What energy costs projections do you use in making such a calculation in a world where energy costs, including utility services, have risen dramatically in recent year?**

The cost-effectiveness criterion that NAHB supports is based on a "simple" payback period, where up-front costs are divided by first-year savings. In this calculation, current prices are used, and projections are not really required. NAHB strongly prefers the simple payback approach, given how volatile and unpredictable energy prices have proven to be over time. Over the past 40 years, there have been many instances in which energy prices have either spiked or declined in a way that no one predicted. This introduces substantial uncertainty into any set of energy cost projections, and makes it unlikely that different experts will produce similar projections. Therefore, NAHB prefers using relatively simple payback calculation that will allow for consideration of a large number of energy efficiency measures, including supporting many of them, and to avoid arguments over competing cost projections, about which there is unlikely to be any consensus.

8. Whereas you are correct that the investment cost is often immediate and the savings accumulate more gradually, how much of an impact would this actually have on a consumer who finances a home purchase with a 30-year mortgage?

Depending on the actual cost of the initial investment, the average added expense to a home buyer for a $1,000 efficiency investment is about $90 per year. This calculation assumes a 6.25% interest rate on a 30-year fixed rate mortgage, 45 basis points for private mortgage insurance, a property tax rate of $9.46 per $1,000 of property value and a property insurance rate of $3.35 per $1,000 of property value. These last two numbers are based on averages for the entire U.S. calculated from the Census Bureau's 2007 American Community Survey.

For some, an additional $90 per year per $1,000 may not seem too expensive. However, NAHB has shown that using typical assumptions about the mortgage, down payment, property taxes and property insurance, a $1,000 increase in a median-priced new home will price more than 217,000 U.S. households out of the market for that home, in the sense that these households would be able to qualify for a mortgage before the price increase, but not afterwards. It is likely that these 217,000 households would then remain in an older, less efficient dwelling unit as a result.

It is important to recognize that the costs for these investments will be greater for the home buyers than for builders. The final home price typically has to cover brokers' fees and interest on construction loans – as well as a normal competitive rate of profit, or the business capital will be diverted for some other purpose, and the home may not be built. NAHB does not believe it is anyone's objective to make efficiency or a new home so expensive that consumers can no longer afford it. However, it is important to realize that not all of the costs can just be folded into a mortgage payment with the assumption that buyers can absorb them when variables like lending qualification, down payment, taxes and insurance are objective factors on affordability that must be considered.

9. Do you agree with the findings, some of them made by the witnesses at our hearing, that many of these technologies would generate a cash-positive flow of savings to the purchaser, because the additional costs are rolled into the mortgage?

In order to generate a positive cash flow, the savings need to cover the additional mortgage payment, plus any additional ongoing costs associated with mortgage insurance, property insurance, and property taxes. By this criterion, some technologies exist that would generate positive cash flow, and others exist that would not generate it. It is important to evaluate each on a case-by-case basis using sound and verifiable data regarding costs and savings. Also, all purchasers are not necessarily equal in this scenario, as borrowing costs and the ability (or inability) to qualify for a larger mortgage may differ depending on a borrower's financial characteristics. As previously stated, if a buyer cannot qualify for a mortgage for the more expensive home with super efficiency features, then the performance of those features and the projected utility savings that would supposedly accrue to that buyer will become irrelevant.

10. If energy efficiency improvements to new homes result in a greater reduction in monthly utility bills than a related increase in monthly mortgage payment to cover the cost of the energy efficiency improvements, is that a net benefit to lower-income families immediately?

There are a number of inherent caveats in this scenario: 1) that the reduction in utility bills and increase in mortgage payments is both accurately specified for the lower-income family attempting to buy the home; 2) that the mortgage payments are based on a conventional fixed-rate mortgage of the type that is actually available in the marketplace; 3) that the reduction in utility bills also covers additional ongoing costs of mortgage insurance, property insurance, and property taxes; 4) that the increased up-front costs of the investment do not tip the family in question over one of the thresholds where a mortgage does not become available (a real concern because allowing a family to assume a higher debt burden in exchange for lower operating costs requires underwriting flexibility that is not seen in the current economic environment) or becomes available only at a higher rate, requires mortgage insurance, increases the rate or initial fees on the mortgage insurance, or triggers additional points or origination fees paid up front. If all these caveats are met accordingly, then it is a net benefit to the family as soon as the monthly savings begin to be realized.

Questions from the Honorable Edward J. Markey

1. **How do you and the NAHB, define a green home builder?**

   Green home builders are defined in many different ways by many different organizations. NAHB defines a green home builder as one who knows how to build green via extensive training that leads to a professional, third-party credential (e.g., Certified Green Professional designation). NAHB also defines a green home builder as one who has built or remodeled one or more green homes and has received a credible third-party certification (e.g., National Green Building Certification, local green program certification, Energy Star® certification, etc.).

2. **You have expressed concerns about making housing purchases affordable for low-income buyers. Have you or NAHB considered the impacts of higher energy costs on low-income buyers as well?**

   The cost-effectiveness criterion that NAHB supports is based on a "simple" payback period, where up-front costs are divided by first-year savings. In this calculation, current prices are used, and projections are not really required. NAHB strongly prefers the simple payback approach, given how volatile and unpredictable energy prices have proven to be over time. Over the past 40 years, there have been many instances in which energy prices have either spiked or declined in a way that no one predicted. This introduces substantial uncertainty into any set of energy cost projections, and makes it unlikely that different experts will produce similar projections. Therefore, NAHB prefers a using relatively simple payback calculation that will allow for consideration of a large number of energy efficiency measures, including supporting for many of them, and to avoid arguments over competing cost projections, about which there is unlikely to be any consensus.

   With respect to low-income home buyers, there are a number of items to consider. For example, is the reduction in utility bills, as a result of efficiency upgrades, accurately specified for an increased mortgage payment for the lower-income family attempting to buy the more efficient home? Also, does the reduction in utility bills also cover additional ongoing costs of mortgage insurance, property insurance, and property taxes? Furthermore, do the increased up-front costs of efficiency investments tip the low-income family over one of the thresholds

where a mortgage does not become available or becomes available only at a higher rate, requires mortgage insurance, increases the rate or initial fees on the mortgage insurance, or triggers additional points or origination fees paid up front? When all these factors are considered for the low-income buyer, regardless of projected energy savings, it may be the case that the lower-income family may not be able to afford specific efficiency features of a newer home. Therefore, NAHB uses the ten-year simple payback method as it provides for the most cost-effective way to incorporate efficiency into a home and still accommodate the most buyers, particularly those that are the most price-sensitive, i.e., the low-income families.

3. **In your testimony you assert that recouping the cost of energy efficiency measures can take 20-30 years. What energy efficiency measures were you referring to?**

There are a number of examples of efficiency measures that can take 20-30 years (or more) to payback in terms of energy savings versus up-front costs. As described in my *Written Statement*, Martin Holladay states in the *Journal of Light Construction* from June 2008 that "replacing old single-pane windows with new double-pane low-e units certainly saves energy, but the cost is so high – and the amount of energy saved is so low – that window replacement is almost never cost-effective."

Below are some additional examples of efficiency measures with exceptionally long time payback periods to consumers. Many of these items were actually proposed as changes for inclusion in the upcoming 2009 International Energy Conservation Code (IECC) at recent code-change hearings held in September 2008:

- In Climate Zone 1 (Southern Florida), changing the window U-Factor from 1.2 to 0.65 takes 342 years to payback in energy savings. This change essentially means that the window must go from a single pane to a double pane clear glass. The energy savings for this change on a 2,048 square foot two story house with 15% window glazing is a negative $3 (or about $2 per year), depending on simulation software and orientation. For example, using an average 441 square ft of window glass with a cost per square foot at $1.10 x 441 square feet ($485) and a cost per square foot of sliding glass door at $5.00 for an average 40 square feet ($200) gives a total cost of $685 with a $2 per year energy savings. This equals **over a 342 year payback to the consumer.**

- In Climate Zone 1 (Southern Florida), changing the insulation in the wall from an R-value of 13 to 15 takes over 56 years to payback in energy savings. The cost for this change for a 2,048 square foot two story house is calculated at a cost for upgrading from R-13 to R-15 insulation levels at $0.11 per square foot. Thus, for a 2,048 square foot house, it will cost the consumer $225. The projected energy savings from this change is $4 per year. This equals **over a 56 year payback to the consumer.**

- In Climate Zone 4 (Middle-Atlantic and Midwest – Missouri, Nebraska, Southern Illinois, Kentucky, Tennessee, Virginia, Western North Carolina, Western West Virginia), changing the insulation in the wall from an R-value of 13 to 19 takes over 33 years to payback in energy savings. The cost for this change for a 2,048 square foot two story house is higher in this part of the country because in order to accommodate these insulation levels, builders must use 2x6 lumber instead of 2x4 for the walls. Therefore, the cost for the insulation materials must be added to the additional cost for new lumber specifications for a total cost

of $2,718. The projected energy savings is also higher in this part of the country at $82 per year. Thus, the projected energy savings for this change equals **over a 33 year payback to the consumer.**

There are others, but essentially all efficiency features are characterized by their energy savings and cost returns (as also used by the Department of Energy) to ensure that the most cost-effective technologies are promoted, and implemented nationally. Just as there are many features that have very long payback periods, savings for which the consumers who pay for the investments may never see materialize while they occupy the home, there are also many cost-effective efficiency investments that have very short paybacks and can be easily implemented, e.g., changing out incandescent lighting for fluorescents has a payback of 1-2 years to the consumer.

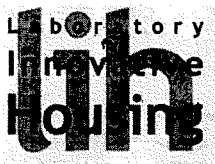
Question from the Honorable Mike Rogers

1. **In your experience, is the adoption of efficient technology and material better driven by specific, narrow mandates or through a competitive marketplace?**

The absolute best way to drive innovation and technology advancement into the market for energy efficiency and sustainability is to foster competition among the purveyors of such technologies. The "who can be the greenest" approach not only fosters greater technology deployment, but it also advances the adoption of improvements in practices and products that makes the utilization much more cost-effective for the downstream consumer. Government rules that mandate market outcomes are by far the least effective policy tools. Mandates, by their very nature, are a one-size-fits-all approach and building technology, and the wide variations in climate across the U.S. with varying efficiency needs should automatically prove that a one-size-fits all system is inherently unworkable. Energy efficiency in Michigan is entirely different than energy efficiency in Hawaii or Florida.

For example, mandates requiring certain above-code energy requirements nationally would not necessarily result in more efficient homes being delivered to the market. Instead of increasing the efficient housing stock, such mandates would largely increase construction costs without reference to consumer demand and, likely, increase the share of the nation's housing stock that is older and less energy efficient. NAHB research has demonstrated that a $1,000 increase in construction costs produces approximately a $1,198 increase in home price. This additional price burden results in an exclusion of 217,000 U.S. households from being able to afford that home.

Evidenced by the exponential growth in the green building movement and the ever-increasing number of available programs, guidelines, certifications, and standards, competition is healthy and vibrant in sustainable building. The green and energy efficient construction market is a relatively bright spot in a rather depressed housing market. This is largely a result of active competition among many groups to offer up the "greenest" building technology, the most sustainable and energy efficient approach to construction, and the fight to bring technology advancement and implementation quickly to the market so that it can be regionally or locally applied in the most effective way possible.



Center for Integrated Building Design Research
School of Architecture
University of North Carolina at Charlotte
9201 University City Blvd, Charlotte NC 28223-0001
InnovativeHousing@UNCC.edu
www.InnovativeHousing.UNCC.edu

November 13, 2008

The Honorable John D. Dingell, Chairman
Committee on Energy and Commerce
U.S. House of Representatives
2322-B Rayburn House Office Building
Washington, DC 20515-6115

RE: CLIMATE BENEFITS OF IMPROVED BUILDING ENERGY EFFICIENCY

Dear Chairman Dingell,

This letter is in response to your letter dated October 30, 2008, in which you ask for additional information on two issues I discussed during my testimony before the Subcommittee on Energy and Air Quality at the July 17, 2008, hearing entitled, "Climate Benefits of Improved Building Energy Efficiency". The response for each question follows the full text of the question.

HUD Energy Efficient Mortgage Program
You cite a 1986 study finding that hundreds of thousands of home purchasers could obtain an Energy Efficient Mortgage loan under a HUD program. What has held this program back, and has there been any significant study of this idea since 1986?

The most current information on the HUD website concerning the Energy Efficient Mortgage Program is from November 30, 2001. It cites 3,500 loans were endorsed in fiscal year 1996 and 4,700 loans that were endorsed in fiscal year 1997. Based on what HUD is still reporting, "... as many as 250,000 more new homebuyers could qualify per year ..." the percentage of qualified homebuyers endorsed in 1996 and 1997 was 1.4% and 1.9%, respectively. This data shows that ten years after the 1986 study by Joint Center for Housing Studies, the EEM program was still undersubscribed. According to a 2000 report prepared by the National Renewable Energy Laboratory, the number of EEMs increased eight fold between 1997 and 1999.[1] This increase

[1] Plympton, Patricia, *National Status Report Home Energy Rating Systems and Energy-Efficient Mortgages*, Golden, Colo.: National Energy Renewal Laboratory, NREL/TP-550-27635, April 2000, p v and 16.

does however still represent a small percentage, and the increase was due in large part to pilot programs implemented in select states to promote rating systems used in conjunction with the mortgage program.

Several barriers were identified in another 2000 report prepared by the National Renewable Energy Laboratory. Some of the identified barriers are:

- Lack of lender and builder incentives,
- Lack of builder, lender and real estate professional awareness and training
- Lack customer awareness,
- Lender risk aversion,
- Lack of data on comparables and defaults, and
- Cost of home energy rating.[2]

In the August 8, 2006 report HUD submitted to congress, 'Promoting Energy Efficiency at HUD in a Time of Change, Report to Congress", HUD reported, "FHA also improved its reporting procedures, providing a more accurate count of FHA-insured EEMs."[3] Planned actions include:

- FHA will take steps to increase consumer awareness of EEMs, and
- FHA will continue EEM marketing efforts, providing information to industry partners, such as lenders, housing counseling agencies, and real estate agents.[4]

In summary, there is a wide range of reasons why the Energy Efficient Mortgage Program has had very limited success during its 29 year run.

Properly Sizing HVAC Systems

Does reducing the size of an HVAC system as you suggest have any impact on its performance? Do any of the energy efficiency improvements you have outlined in your testimony visibly affect residential comfort or surroundings?

The short answer to the question is, yes; it improves performance, both in terms of energy efficiency and thermal comfort. Explaining why this is the case requires a longer answer.

Before energy efficiency and greenhouse gas emissions became the concerns they are now, the major concern in designing HVAC systems was to avoid owner dissatisfaction with undersized systems and subsequent costly modifications. To that end, architects, mechanical engineers and contractors considered it prudent to intentionally oversize HVAC equipment. It was a practice that was easy to adopt because it simplified the design process; and, most owners were unaware of the additional costs being imposed.

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[2] Farhar, Barbara, *Pilot States Program Report: Home Energy Rating Systems and Energy-Efficient Mortgages*, Golden, Colo.: National Energy Renewal Laboratory, NREL/TP-550-27722, April 2000, p 3-4.

[3] *Promoting Energy Efficiency at HUD in a Time of Change, Report to Congress*, Energy Task Force, U.S. Department of Housing and Urban Development, Office of Policy Development and Research, August 8, 2006, p 29.

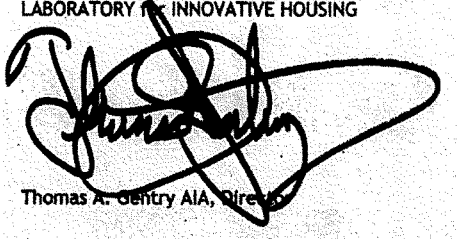
[4] Ibid, 29 -30.

Applying this practice to the design of a car demonstrates why it is energy inefficient and compromises comfortable. Imagine selecting an engine that is large enough to maintain highway speeds while traveling fully loaded up a steep mountain road. Then increase the engine size for good measure. Next, install a throttle that has only two positions, idle and fully open. That is essentially what a single-stage HVAC system has for controls. Now imagine driving such a car with no load on a level road at 30 miles per hour. To maintain a constant speed the engine will need to cycle between running at full throttle for a few seconds and idling for a few seconds, which will result in a jerky ride that is fuel inefficient. It is this type of short-cycling that causes HVAC system to be energy inefficient and compromises thermal comfort.

In theory, energy efficient HVAC systems are sized just big enough to require continuous running for the output to match the heating or cooling load. However, since heating and cooling loads vary, and providing HVAC systems that have the high degree of flexibility needed to match the varying loads is costly, it is necessary to strike a balance. The first step in striking a balance is to abandon the mindset of over-sizing, and to take greater care in sizing HVAC systems. This permits shifting the cost from over-sizing standard efficiency systems to increasing the efficiency of correctly sized systems.

Thank you for this additional opportunity to help define the climate benefits of improving building energy efficiency. Please do not hesitate to contact me if there is anything more I can do to help.

Sincerely,
LABORATORY FOR INNOVATIVE HOUSING



Thomas A. Gentry AIA, Director

November 14, 2008

The Honorable John Dingell
Chairman
House Committee on Energy and Commerce
2322-B Rayburn House Office Building
Washington, DC 20515

The Honorable Rick Boucher
Chairman
Subcommittee on Energy and Environment
House Committee on Energy and Commerce
2322-B Rayburn House Office Building
Washington, DC 20515

Dear Chairmen Dingell and Boucher:

Thank you for the opportunity to respond to the following questions related to my testimony before the Subcommittee on July 17, 2008.

1. ***Your testimony points out that "the IECC is the only model energy code that serves as the basis for federal tax credits . . . and qualification for FHA and other government-backed mortgages." Regardless of the level set by the IECC, do you believe the current structure of such incentives in federal law is appropriate, or could it be improved in some way, perhaps to achieve greater greenhouse gas reductions?***

   The new homes tax credit has had limited, but growing, use for homes that are much more efficient than typical new homes. Most importantly, the tax credit needs to be extended for several years to: 1) Allow time to design, get approvals for, build, and sell the homes, and 2) Let builders know that they aren't a "flash in the pan," but will be around for the foreseeable future. And since much of the debate – within Congress and the Department of Energy and in efforts like "The 30% Solution" – have set 30% as our initial goal, the tax credit would be strengthened by adding a lower tier, such as $1000 for homes that are 30% better than code.

   In addition to the current credit for home improvements, greater energy savings from home improvements might be spurred by an incentive tied to savings (performance) rather than cost—since home performance is difficult to estimate, if possible there should be a prescriptive

William D. Fay • Code Coalition Director • bfay@ase.org
1850 M Street, NW • Suite 600 • Washington, DC 20036 • Phone: (202) 857-0666 • www.thirtypercentsolution.org

pathway to achieving the savings as there is in codes. The commercial buildings deduction (which is tied to performance compared to ASHRAE Standard 90.1) also needs a prescriptive pathway to make it more usable.

In the context of climate legislation, it is important that greenhouse gas emission reductions from more energy efficient homes and commercial buildings be taken into account. One way would be to establish bonus allowances or auction revenues to states that implement programs that adopt the latest model energy codes and achieve a specified level of code compliance. The states could use these funds for code outreach, training and compliance, as well as to compensate builders for building homes and commercial buildings even better than those required by codes.

Alternatively, your legislation establishes a program to certify "carbon offset" projects that would allow a regulated facility to purchase offset credits to meet a portion of their compliance obligation. Although most offsets relate to agricultural practices, they could also be applied to homes and buildings. If a builder erects a structure that reduces greenhouse gas emissions by a certain target beyond what is required, that structure could qualify as an offset and the builder would be paid by the regulated entity for the emissions reductions beyond code requirements.

Finally, from our perspective, the most significant element of federal tax credits is the baseline from which the credit is calculated and whether that baseline in dynamic. The EECC agrees that the concept embodied in your legislation – that energy efficiency is a continual policy goal that needs to be on a continual glide path – is spot on and should be unequivocally reflected in federal law.

2. ***You suggest that energy efficiency is becoming "one of a new home's major selling points." Do you believe buyers can adequately assess the energy efficiency of new homes on the market today? How could this information be improved for the consumer?***

The simple answer to your first question is that very few new home buyers can adequately assess a new home's energy efficiency. And once a home has been built (and its energy efficiency, *or in-efficiency*, has been predetermined), the factors that influence its purchase usually center around its location, layout, available space, or design. Simply stated, there is little that even an energy-savvy new home buyer can do to improve the home's energy efficiency.

This conundrum was expressed by Daniel McGinn in his article "Not Just for Tree Huggers *(Newsweek, 3/8/08)*." After citing a 2007 National Association of Home Builders survey which found that "home buyers were willing to spend an additional $8,964 on a home if it could cut their utility bills," McGinn wrote:

> For all the professed consumer interest, though, the average home buyer knows little about green building. That's partly because it's a broad concept with several components. The most obvious attribute is energy efficiency. For some buyers, that means investing big money in fancy geothermal or solar technologies — but more often it simply means being diligent about using good insulation, efficient appliances, superior windows and designing the house to take advantage of the sun.

As I stated in my testimony, the good news for a new energy efficient home is that it pays dividends to the homeowner through reduced utility costs that exceed the amortized cost of the energy improvements. For example, the Greensburg, Kansas study by the US Department of Energy's National Renewable Energy Laboratory estimates that a 30% boost in new home energy efficiency will cost the homeowner $211/year in after-tax mortgage payments, but will generate $723 in energy savings. That means a net $512 in positive cash flow per year. I've attached a chart that summarizes the NREL study.

Finally, it is extremely difficult for home buyers to get good information on the energy efficiency of new or existing homes today. It could be very important to have standardized labeling and disclosure at time of sale to allow home buyers both to compare the efficiency of homes and to know what improvements should be made to a home they buy. However, it is not yet clear what information they most need or how best to convey it. Further work should be done leading to effective building energy use and energy characteristics requirements. The same is true for commercial buildings as well.

Once again, I appreciate the opportunity to respond to your questions and look forward to working with you as Congress addresses the vitally important issue of the role of new home and commercial building construction in national energy policy.

Sincerely,

William D. Fay

William D. Fay
Code Coalition Director
Energy Efficient Codes Coalition

The US Department of Energy[1] Analysis
Energy Efficiency Pays Dividends to Homeowners!!

	New Home Construction % Beyond 2003 IECC[2]		
	30%	40%	50%
Estimated Incremental First Cost Relative to Standard Practice	$ 4,000	$ 7,000	$ 13,000
Annual Amortized Cost 7%, 30 Year mortgage[3]	$ 211	$ 411	$ 706
Estimated Annual Utility Bill Savings	$ 723	$ 919	$ 1,162
Net Annual Savings (Extra money in the homeowner's wallet)	$ 512	$ 508	$ 456
Simple Payback without Amortizing Cost (Investment ÷ Utility Savings)	5.5 years	7.6 years	11.2 years

[1] Data developed by DOE's National Renewable Energy Laboratory (NREL) in a representative home in Greensburg, KS.
[2] 2000 ft2, 2-story, 16% window to floor ratio, unconditioned basement.
[3] Assumes 28% marginal tax bracket and includes present value of future replacements of equipment over 30 yr life of mortgage.

3121 Saint Paul St. # 26
Baltimore, MD 21218
tel: (410) 467-0439
fax: (410) 366-2051

190 Duke of Gloucester
Annapolis, MD 21401
tel: (410) 267-1900
info@EnvironmentMaryland.org
www.EnvironmentMaryland.org

November 17, 2008

The Honorable John D. Dingell
U.S. House of Representatives
Committee on Energy and Commerce
Washington, DC 20515

Chairman Dingell,

Thank you again for the opportunity to appear before the Subcommittee on Energy and Air Quality on July 17 at the hearing entitled, "Climate Benefits of Improved Building Energy Efficiency."

You recently wrote with four follow-up questions regarding my testimony from subcommittee members. Here are our answers to those questions.

1. You call for a 50 percent improvement to energy efficiency building codes by 2020. Do you base this on projected technological development or on what is feasible today?

Builders are already constructing homes and businesses that are far more than 50 percent more efficient than current code. It is not only feasible today, it is the cheapest and easiest way to increase our energy supply. These targets have been endorsed by a broad coalition of groups, as well as the U.S. Conference of Mayors, the American Institute of Architects, the states of New Mexico, Minnesota, and Illinois, ASHRAE, and President-elect Barack Obama. In addition, the California Public Utilities Commission and California Energy Commission have adopted this and the other targets we support, and developed a plan to implement them.

2. You note that buyers and renters lack information needed to assess the energy efficiency of properties. How do you propose that this information be disclosed or made available more effectively to the consumer?

A number of municipalities require that every time a building or apartment is sold or transferred, it must be audited for energy efficiency and the results shared with prospective buyers or renters. Montgomery County, MD and Austin, TX, for example, recently passed this requirement. This is a good first step toward helping consumers save money on energy bills. Some municipalities, such as Austin, are going farther to help consumers and requiring that these buildings, once audited, are updated to meet a minimum standard of energy efficiency.

3. You note that 16 states either do not have building energy codes at all or have not updated them for over a decade. What reasons do they give for not adopting the most recent national model codes?

For a long time, building energy codes were a low priority for many states because of low energy prices and a lack of awareness about the dangers of our increasing use of energy that is largely supplied by fossil fuels. This has been compounded by resistance to building energy codes from homebuilders associations.

Recently, with energy prices becoming a critical concern and the threat of global warming increasingly apparent, state and local officials are now looking for strong energy codes and other policies that will increase building energy efficiency. This September, building code officials voted to increase the model residential building energy code (the 2009 IECC) by up to 20 percent, the highest efficiency increase in the model code since its creation. An increase of 30 percent drew 64 percent of the votes from local officials, two votes short of the 2/3 majority needed to pass. The time is ripe for stronger and better enforced building energy codes.

4. Do you believe the Energy Star program for homes could provide an appropriate metric for a "time-of-transfer energy audit" that you recommend in your testimony?

Assuming that the Energy Star program for homes is continually updated, it is what we would recommend as a metric for time-of-transfer energy audits.

I hope these responses satisfy the intent of each of the questions. If you need clarification or any further information, we would be happy to help in any way that we can.

Sincerely,

Brad Heavner