ENERGY EFFICIENCY: COMPLEMENTARY POLICIES FOR CLIMATE LEGISLATION

HEARING

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CONTENTS

WITNESSES

Page

SUBMITTED MATERIAL

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[1] Mr. King did not respond to submitted questions for the record.
[2] Mr. Wells did not respond to submitted questions for the record.

ENERGY EFFICIENCY: COMPLEMENTARY POLICIES FOR CLIMATE LEGISLATION

TUESDAY, FEBRUARY 24, 2009

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

The subcommittee met, pursuant to call, at 9:38 a.m., in room 2322, Rayburn House Office Building, Hon. Edward J. Markey (chairman of the subcommittee) presiding.

Present: Representatives Markey, Inslee, Butterfield, Matsui, Welch, Green, Capps, Gonzalez, Baldwin, Matheson, Barrow, Waxman, Upton, Hall, Stearns, Shimkus, Blunt, Pitts, Walden, Burgess, Scalise, Barton, and Blackburn.

Staff Present: John Jimison, Melissa Bez, Joel Beauvais, Matt Weiner, Lindsay Vidal, Greg Dotson, Andrea Spring, Amanda Mertens Campbell, and Peter Kielty.

OPENING STATEMENT OF HON. EDWARD J. MARKEY, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF MASSACHUSETTS

Mr. MARKEY. Good morning.

When we look at the energy and climate solutions toolbox, we tend to focus on exciting, new technologies like high-powered wind turbines and thin-filmed solar cells or carbon capture and sequestration. Today's hearing is about the less-eye-catching but equally important solutions that improve energy efficiency, better building and appliance standards, energy efficiency resource standards, demand side management programs and a host of other policies and technologies that enable us to use energy more intelligently.

The Department of Energy estimates that U.S. electricity demand will grow by 30 percent by 2030. There are two ways to meet these rising demand, megawatts and negawatts. The first approach is familiar to us, simply building more power plants. The second uses efficiency measures to do more with less. It is based on the reality that the cheapest and cleanest power plant is the one we never have to build. Efficiency costs us as little as one-third per kilowatt hour of the cost of new electricity supply and emits no carbon.

Energy efficiency will also play a critical role in avoiding an excessive dash to natural gas, which many fear could damage the competitiveness of U.S. manufacturing. A recent study by McKenzie & Company concluded that in 2030 efficiency measures

can cut U.S. global warming pollution by nearly 15 percent of current levels at a profit.

The 10 northeastern States participating in the RGGI, Regional Greenhouse Gas Initiative, a cap and auction trade system, have found that by auctioning 100 percent of the pollution allowances and investing the proceeds in efficiency measures, they can achieve their climate goals at virtually no additional cost to consumers.

Climate legislation can provide the resources to make efficiency policies work, while efficiency cuts pollution at the lowest possible costs. These solutions help us to work smarter and not harder.

Investing in efficiency is not just a cost-effective energy and climate solution. It will also pay major dividends in new jobs and economic growth. America's efficiency industry already produces close to a trillion dollars in annual revenues. By putting America in the vanguard of the efficiency revolution, we can create high-quality green jobs at home, while exporting high-quality green technology to the world.

Unfortunately, increasing America's energy efficiency is not as straightforward it as may seem. As we will hear from our witnesses, many efficiency improvements can already be achieved today at a profit but are not being implemented because of market barriers and market failures. For this reason, simply putting a price on carbon is not enough. Focused policies must be used to reward efficiency and to eliminate perverse incentives like those that shackle utilities' profits with the amount of electricity they sell.

Progressive States, along with innovative companies like Dow, Johnson Controls, and National Grid, have taken the lead in tackling these challenges. We are grateful to have representatives of these government and business leaders on our witness panel today. They can help show us the way forward.

As Congress considers climate legislation it will be critical to include policies that make energy efficiency our first fuel. Efficiency provides a vast zero carbon energy supply that can be deployed right now with current technologies at a net savings. If we are to cut global warming pollution as quickly and as deeply as the science says it must, it is imperative that climate legislation must be designed to capture efficiency gains immediately.

By making the potential of energy efficiency a reality, we can save the planet, while simultaneously saving consumers money, spurring job growth and meeting our Nation's rising energy demand at the lowest possible cost.

NBA coach Pat Riley once said, a particular shot, a way of moving the ball, can be a player's personal signature, but efficiency of performance is what wins the game for the team. If we are going to beat this energy climate and economic challenge, aggressively increasing America's energy efficiency may be at the center of our game plan.

That completes the opening statement of the Chair. I now turn and recognize the ranking member, the gentleman from Michigan, Mr. Upton.

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

Mr. UPTON. Thank you, Mr. Chairman.

Our hearing today is an important one. The environmental and economic benefits of energy efficiency are truly significant.

Before I begin, I would like to submit a letter from Pilkington North America for the record.

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

Mr. UPTON. Pilkington is the leading U.S. manufacturer of glass, and they have a facility in my district.

Pilkington makes some very interesting points about the nature of energy efficiency. For example, certain building products like windows that are most efficient in southern States are not nearly as efficient in northern States. In the warm weather States of the south, windows that block solar heat are the most energy efficient. However, in the cold weather States in the north, with more heating days than cooling days, such as Massachusetts and Michigan, windows with a higher solar heat gain are more efficient. The right type of window on a cold winter day in Boston or Detroit or Chicago can take in heat from the sun, thus reducing the utility bills and saving energy.

With a tax provision in the stimulus bill that promotes windows that are designed primarily for warmer climates, the tax credit is only available for windows that block over 70 percent of solar heat. According to a Web site developed jointly by the Center for Sustainable Building Research, the Alliance to Save Energy, and Lawrence Berkeley National Lab, lower solar heat gains are best for southern climates. The site also recommends for northern States to reduce heating select the highest solar heat gain you can find so that winter solar gains can offset a portion of the heating energy need.

Pilkington said this about the tax revisions that favor southern windows: ″It will result in northern homes using glass that blocks 70 percent of the sun's free and renewable solar energy from entering the home. That in turn will result in unnecessary burning of additional fossil fuels to heat these homes.″

That means higher utility bills in northern States and more greenhouse gas emissions. We must recognizes regional differences. When it comes to energy efficiency in buildings one size fits all doesn't always work. In fact, as we see in the window example, it could actually have the opposite effect.

I have long been an advocate in spurring efficient technologies into the marketplace. I was proud to work with my colleague, Ms. Harman, in passing legislation that improved efficiency standards of the light bulbs. Across the Nation, the environmental and economic benefits of more efficient bulbs will be, in fact, substantial.

Our work on light bulbs wasn't an arbitrary mandate. We didn't just pick a standard out of the air and look for a catchy sounding standard like 25 by 2025, not based on science or feasible. Instead, we worked with the industry and environmental groups to come up with a standard that made sense and doable, a standard that can be met by bulbs manufactured in this country, a standard that will include bulbs without any hazardous ingredients such as mercury.

If done correctly, increasing the energy efficiency standards can reduce energy costs for consumers, help the environment, and have a positive economic impact. These benefits can be gained without a cap and trade program.

The question is, what should the Federal Government's role be? Well intentioned, it is possible for the government to get it wrong and push policies that will have a detrimental impact on the environment and pocketbook.

I look forward to hearing from our witnesses today, and I yield back the balance of my time.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognized the gentleman from Washington State, Mr. Inslee.

OPENING STATEMENT OF HON. JAY INSLEE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON

Mr. INSLEE. Thank you.

I just want to make two points. One, we have started last week, last Tuesday, down the efficiency road when President Obama signed the economic recovery bill; and I think over the long term one of the most productive things in that bill will be the provisions that require governors to certify that they would move towards more efficient building standards of about 30 percent improvement and decoupling which will unleash great economic resources for the efficiency industry. It was a small, quiet thing that was little noted on but I think will unleash tremendous assets for the efficiency industry.

Number two, I want to make the point that the efficiency industry is an industry. People think of avoiding waste as something of a void or vacuum. In fact, it is a tremendous profit and job creation center.

I just want to note in my little neck of the woods up in Seattle some companies are doing that right now, just so that people know it is not a pipe dream.

We have got the MagnaDrive company in Bellevue, Washington, manufacturing electrical transmission services that reduces the electrical needs of generators by about 30 percent; Seattle Steam that does cogent electrical, a heating that essentially almost doubles the efficiency of a heating plant; McKinstry, which is the world's leading company to help corporations reduce their electrical usage, particularly on server forms; Boeing, which is making the world's energy efficient jetliners 20 percent more energy efficient than any other competitive jetliner; the Verdean Company, which is selling software which significantly reduces a corporation's use of energy in the computer industry.

I point those out because one of the largest job creation engines we have in the United States is the efficiency industry, and we intend to continue to draft policies to help them grow.

Thank you.

Mr. MARKEY. Thank you. The gentleman's time has expired. The Chair recognize the gentleman from Illinois, Mr. Shimkus.

OPENING STATEMENT OF HON. JOHN SHIMKUS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. SHIMKUS. Thank you, Mr. Chairman.

First, I want to thank my ranking member for bringing up that provision on windows. I am surprised I did not read it.

Oh, I did not have enough time to read the bill. But had I read the bill, I might have another window issue.

Mr. UPTON. You will have an extra hour because of daylight savings in a couple of weeks.

Mr. SHIMKUS. But let me thank the chairman on bringing up this issue on efficiencies, and excuse me if I don't share in the enthusiasm. Because for many, many years we have been talking about efficiency gains in the generation of electricity; and we have a Federal policy that does just the opposite. It is one that we have debated here for 12 years, and it is the issue of new source review.

And take a power generating plant—I don't care if it is pulverized coal. I don't care if it is gasification. Say that we want and have a new generator that can generate for the same amount of power output, double the amount of electricity. Now, I would say that many of us would say that that is an efficiency gain that should be noted, not punished, not penalized. But what occurs under new source review is the entire air permitting process has to revolve itself, which is a disincentive. If the boiler is the same, if the emissions is the same, if they are meeting air quality standards at the same time and there is no change, but you are going to double the amount of output, that is what we are talking about in efficiency gains. However, since I have been here for 12 years, we continue to provide a disincentive in the new source review debate.

And you will hear the claim it promotes dirty air. Especially if it is in a generator debate, it does no such thing.

So, Mr. Chairman, I hope you work with me in reforming the permitting process and streamlining the procedures by which, if we have the same emissions standards, whatever they are, and if we are going to have increased efficiency and electricity gains, that we change this capricious new source review program.

I yield back my time.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from North Carolina, Mr. Butterfield.

OPENING STATEMENT OF HON. G.K. BUTTERFIELD, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NORTH CAROLINA

Mr. BUTTERFIELD. Thank you very much, Mr. Chairman, for convening this hearing today and thank the witnesses for coming forward with your testimonies.

Mr. Chairman, you told us a few weeks ago that you were serious about moving this debate along; and you are absolutely right. Today is evidence that we are ready to move boldly with this initiative.

With 40 percent of the U.S. Energy consumption coming from commercial and residential buildings, raising efficiency and greening of our buildings provides a clear path toward lowering our emissions in a relatively low cost yet highly scalable capacity.

In the Southeast, where I am from, making strides in energy efficiency represents the most readily available means of cutting greenhouse gas emissions. North Carolina, my State, currently has a renewable energy standard which is helping to drive innovation

and deployment of new renewable technologies. However, we remain at a regional disadvantage for access to much of the existing renewable energy options. As such, it is incumbent upon us that we develop policies that place a value on the reduction of greenhouse gasses, regardless of the means of achieving that goal. This means focusing on a broader approach, including renewables as well as energy efficiency.

I want to comment briefly on a project in my hometown of Wilson, North Carolina, that is saving energy and reducing emissions using effective design and engineering changes. Wilson Community College recently constructed a LEED building, which is a certified green building, as a student center on the campus. I spoke for the dedication, and what I saw exceeded my expectations.

We must invest in more green buildings. Studies using DOE assistance indicate that this building will use 50 to 60 percent less energy than a normal new building of similar size, built to existing codes. The center's efficiency improvements will pay for themselves 10 times over in energy savings during the building's lifetime.

Energy efficiency is an issue, Mr. Chairman, that is and should be universally supported.

Thank you, I yield back.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from Oregon, Mr. Walden.

OPENING STATEMENT OF HON. GREG WALDEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OREGON

Mr. WALDEN. Thank you very much, Mr. Chairman. I appreciate the opportunity to participate in this hearing.

We also have a communications hearing that is going to take place starting at 10:00, so I apologize to the witnesses ahead of time. I will be bouncing back and forth between the two.

As I was reading through the testimony, I was struck by the Johnson Controls' testimony on the part about how energy efficiency is good for consumers and business. I believe it is, and I come from a State that has pioneered energy efficiency and conservation. We believe in it strongly.

In the testimony, Mr. Campbell says, energy prices are escalating and will continue to rise with the price on carbon. Energy efficiency will reduce the impact of climate policies on consumers' energy bills. It will lower energy spending for American businesses large and small, enabling them to better compete in the global economy. Smarter, more efficient buildings not only have lower utility bills but also improve health, safety and comfort.

I concur with all of that. Except that this committee just passed something that none of us—well, at least those on the Republican side—didn't get a chance to see in advance, and that is this decoupling motion. Which, as I understand it, basically says the utilities will have the right to come in and make up their lost revenue that results from energy efficiency. And while some consumers maybe think that is a warm idea, mine are pretty hot about it. They are going to get hotter the more they find out about it.

I would like to know, Mr. Chairman, who wrote these positions? Who was in the room when this was written in secret in this bill since we never had a hearing and only learned about it as we went

into markup? I would hope at some point we'd know who were the lobbyists in the room? Who were the legislators in the room? There sure seem to be a lot of folks who know about this and how those provisions came to be. But there sure was no public hearing on the legislation.

And I would say, too, our area in Oregon is known for its wind energy. And yet I have also seen the hour-by-hour energy production data that indicates that without some sort of peaking power you cannot balance out that load. So gas does matter. Peaking power is going to be more important the more we go to non-firm power-based generators.

Thank you, Mr. Chairman. I realize I have run out of time.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from California, the chairman of the full committee, Mr. Waxman.

OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. WAXMAN. Thank you very much, Mr. Chairman.

Today's hearing will explore how energy efficiency can meet our power needs, save us money, create jobs and help slow global warming. Sometimes, the simple solutions are overlooked. Energy efficiency is both the most affordable and fastest source of energy, even though many people don't think of it that way.

As several of our witnesses point out in their written testimony, supplying a kilowatt through energy efficiency commonly costs half as much as buying a kilowatt from power generators; and because the cost of efficiency doesn't depend on oil or natural gas prices, efficiency reduces energy costs across the board and their volatility.

Businesses across the country find that when they focus on energy efficiency they can achieve significant cost savings, increasing profits to invest in expansion and new jobs. We will hear about some of those experiences today.

Homeowners find that they can make their houses more comfortable, lower utility bills, recoup their costs in a few years, and then watch their savings grow.

Energy efficiency can also be deployed quickly, compared to planning, siting, financing, permitting, and constructing a new power plant. And energy efficiency doesn't require any new or existing transition capacity. That means efficiency can come on line without waiting for transmission upgrades.

Energy efficiency is a job engine. Because efficiency gains come in so many forms, efficiency creates opportunities for small businesses and big businesses throughout the economy. These range from construction and engineering jobs, retrofitting buildings, manufacture of efficient products such as next generation windows and lighting. In building a strong energy efficient economy for America, we will help employ workers and give more jobs.

For all these reasons, promoting energy efficiency must be a key element of climate legislation. We need substantial efficiency improvements to achieve large greenhouse gas emissions reductions at a reasonable cost. That is why the International Energy Agency concluded that more than half of the emissions reductions required

by 2050 globally must come from improvements in energy efficiency.

And we know that the experiences—that the market by itself won't deliver all the available low-cost efficiency savings. Homeowners, for example, may know that they can save money by buying a more efficient furnace, but many don't have the capital to make up-front investments. A landlord has little incentive to weatherize an apartment when the tenant pays the utilities.

Local, State and Federal policies have helped successfully address some of those and other barriers. Building codes and appliance standards are two types of policies that saved us huge amounts of energy and money in 1 year alone. For example, the savings from the efficient appliances and qualifier for an ENERGY STAR label save as much energy as required by 10 million American homes.

You can see the results in a State such as California, which made energy efficiency a priority for decades. Since 1975, California's energy efficiency standards for buildings and appliances have saved residences and businesses $56 billion in energy costs and avoided the need to build 24 major power plants. And today we will hear about Massachusetts' instructive experience in promoting energy efficiency.

I look forward to hearing from our witnesses and their recommendations on how we design climate change legislation to best take advantage of the great benefits that energy efficiency offers us. Thank you, Mr. Chairman.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from Florida, Mr. Stearns.

OPENING STATEMENT OF HON. CLIFF STEARNS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF FLORIDA

Mr. STEARNS. Thank you, Mr. Chairman. I thank you and the ranking member for this hearing.

My staff just was able to get a copy of the stimulus bill that we passed 11 days ago. So it is not humanly possible for us to read it. So we didn't know of all the intricacies that were in the bill.

But for those homeowners that are installing those programmable thermostats, choosing ENERGY STAR qualified appliances and things Mr. Waxman, the chairman, mentioned, additional attic installation, and replacing all windows and doors with more efficient ones are all cost-effective renovations. Homeowners will be very pleased with these renovations, hoping that will make their house more modernized but also more cost efficient.

But because, my colleagues, of the decoupling provision that passed in the stimulus bill which was supported by the majority party, they will be surprised. Customers will be forced to pay more energy after they have done all these things I mentioned.

The resulting high energy rates will be especially hard on those elderly people that spend their hard-earned dollars to fix up their homes. Because their incomes will be fixed; and these individuals will think, well, gee whiz, my costs are coming down. But, lo and behold, they will not be coming down. Because of the complex structure of the energy utility bills, you hope to attain achievable energy savings, but you will not see that.

So I think that that is a very important part of this hearing. We want to promote energy efficient technologies to reduce energy consumption, but, ultimately, I think the market has to play a spot here, and not Congress, in determining the preferred cost-effective technologies and effective and efficient building practices implemented.

So I look forward to this hearing and thank you, Mr. Chairman.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from Vermont, Mr. Welch.

OPENING STATEMENT OF HON. PETER WELCH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF VERMONT

Mr. WELCH. Thank you, Mr. Chairman.

Global warming, as we all know, is real, and it is urgent, and it requires immediate action. We cannot simply solve this crisis without focusing, increasing our energy efficiency. For a Nation that consumes more than 25 percent of the world's energy, we simply can not afford anything that is less.

In Vermont, actually, we have shown that it can be done. We have an energy efficiency utility. It is the Nation's first Statewide provider of energy efficiency services. And what this pioneering energy efficiency utility has demonstrated is really quite remarkable.

First, efficiency works. Thanks to a commitment to investing in efficiency and the effectiveness of Efficiency Vermont, our Statewide energy requirements were reduced by 1.74 percent in 2007. That exceeded the projected rate of low growth, making us the first State to ever turn low growth negative. People said it couldn't be done. Vermont has done it.

Second, efficiency is cost effective. The cost of efficiency, as you pointed out, is about 2.6 cents per kilowatt hour, compared to 10.7 cents per kilowatt hour for comparable energy; and Vermonters saved money. In 2007, this was an 88 percent increase savings over 2006.

Third, energy efficiency is the path to reducing our carbon emissions. For 2007, Efficiency Vermont's efforts resulted in 661,000 fewer tons of CO_2, 562 fewer tons of nitrogen oxide, and 1,100 fewer tons of sulfur dioxide entering the atmosphere.

The goal of this committee is to reduce greenhouse gasses by 80 percent by 2050. Many models suggest that energy efficiency can and must provide about 30 percent of that reduction, and to meet that target we must have to have as a goal about 3 percent reduction through efficiency each year. Now Vermont had 2 percent last year. We can and we must begin to build the on ramp towards a global warming solution. That on ramp, simply put, is through efficiency.

I yield back.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from Texas, Mr. Hall.

Mr. HALL. Mr. Chairman, I pass on questions. I reserve my time.

Mr. MARKEY. The Chair recognizes the gentleman from Louisiana, Mr. Scalise.

OPENING STATEMENT OF HON. STEVE SCALISE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF LOUISIANA

Mr. SCALISE. Thank you, Mr. Chairman. I am looking forward to the hearing that we are going to have and the testimony from our panel.

As we develop a comprehensive national energy policy, efficiency and conservation are definitely part of what needs to be a comprehensive plan that also needs to include the development of our own natural resources to reduce our dependence on foreign oil. But, also, it has got to include a provision that encourages the development of alternative sources of energy, the renewables like wind and solar which are not commercially viable enough today to replace the domestic energy that we have but ultimately we can use that domestic energy as a bridge to get there.

But I think if you look at what people are doing in this country, they are conserving. When gas was at $4 a gallon, people were cutting back dramatically; and they haven't changed their habits to a large degree, even though the price has dropped a significant amount. So I think we need to encourage that conservation and the efficiencies that they have been yielding.

One concern that some of us have is that we looked at the stimulation bill and there was a provision, the decoupling provision, that, in essence, will penalize some people who go and do those things to make their homes more energy efficient. And I think we have to be very careful in this committee and in the Congress as a whole that we don't penalize people who take those extra steps. If they want to spend what is a large capital outlay to put solar panels on the roof and to put insulation on the attic, they are not penalized by having to pay higher utility rates for doing those things.

So we shouldn't discourage good behavior by policy; and, unfortunately, that was a provision that got into the stimulus bill. Hopefully, as people across the country realize that and senior citizens realize they may be paying more for energy because they didn't spend $40,000 to put those solar panels up, that is an issue we can revisit. Because we should avoid policies that discourage people from doing the right thing.

So, hopefully, we will look at all of those and all parts of that three-legged stool, of a comprehensive policy, efficiency and conservation being one of those three.

Thank you, and I yield back.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes Mr. Green.

Mr. GREEN. Mr. Chairman, I waive opening statement for additional questioning time.

Mr. MARKEY. The gentleman waives.

The Chair recognizes the gentleman from Georgia, Mr. Barrow.

Mr. BARROW. I thank the Chair. I will waive, also.

Mr. MARKEY. The Chair recognizes the gentlelady from California, Ms. Matsui.

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

Ms. MATSUI. Thank you, Mr. Chairman. Thank you very much for calling this hearing today.

I would also like to thank today's panelists. We all appreciate your time and expertise on those matters.

Buildings in our country are responsible for more greenhouse gas emissions than any other sector. Heating, cooling, 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 a quarter of our Nation's carbon emissions.

Improved energy efficiency will be an essential element of any climate change solution. My district of Sacramento, California, has been a leader in adopting green building practices. We have the first LEED platinum certified office building in the country. We also have the second-most LEED certified square footage of any city. We are also home to the California Energy Commission and have been a leader in energy efficiency for over 30 years.

Under the leadership of Art Rosenfeld, who is really the godfather of energy efficiency in this country, our State energy commission has kept California's per capita energy consumption flat.

Furthermore, Federal programs such as ENERGY STAR and Build America are expending technologies and giving us concrete ways to confront climate change.

Last Congress, I introduced a measure to assist homeowners across the country with energy efficiency 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 look forward to working with my colleagues on this committee to examine and promote energy efficiency, while 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, Mr. Chairman, thank you very much for highlighting this important issue; and I yield back the balance of my time.

Mr. MARKEY. The gentlelady's time has completed.

The Chair recognizes the gentleman from Pennsylvania, Mr. Pitts.

OPENING STATEMENT OF HON. JOSEPH R. PITTS, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF PENNSYLVANIA

Mr. PITTS. Thank you, Mr. Chairman. I want to thank you for convening this hearing today on such an important issue.

Like all of us, I believe that sound energy efficiency measures will certainly help decrease the amount of greenhouse gas emission in our atmosphere. It will also encourage our country to strengthen our energy security and end our dependence on foreign energy resources. However, if energy efficiency matters are not implemented in a cost-effective manner, they will harm our economy.

In the recently passed stimulus bill, as has been noted that we just were able to get a copy of, a potentially very harmful provision was included, decoupling. Decoupling, the separating of utility

rates from the amount of electricity or natural gas that utilities sell, will inevitably harm our already damaged economy and those least able to withstand more economic pressure, regular Americans who are struggling to make ends meet during this recession.

Under the stimulus, if a State accepts Federal energy efficiency grants, they will have to guarantee that utilities recover their lost revenue when consumers don't use as much electricity; and this forces the consumer, the rate payer, to keep utilities solvent, even if their own energy use decreases.

With an anticipated decline in energy use in 2009, this policy will force customers to pay more money for less energy; and the government essentially will be punishing people for conserving energy. I believe we must instead create incentives for energy conservation and reward consumers when they save energy, not force them to pay artificially higher utility rates.

Utilities have a legitimate concern that increased efficiency will cost revenue, but if we learned anything from the mortgage crunch it is this: Government policies that try to alter or ignore the fundamental laws of economics create more problems than they solve. Penalizing consumers for using less energy doesn't seem like the right solution. I hope we can all work together and come up with a better alternative.

I look forward to hearing the witness today and thank you and yield back.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentlelady from California, Mrs. Capps.

OPENING STATEMENT OF HON. LOIS CAPPS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mrs. CAPPS. Thank you, Mr. Chairman, for holding this very important hearing to explore the vital role energy efficiency will play on reducing greenhouse gases and achieving our climate change objectives.

I remember so well the image of one of the CEOs of the big oil companies when the gasoline prices were skyrocketing being challenged, what are we going do about these high prices? He said, I have one word for you: efficiency. And it holds true in our topic here today as well.

I thank our esteemed witness for their testimony on this very important matter.

Energy efficiency is a win-win. By reducing consumption of energy, we save money and we also cut greenhouse gasses. The chairman of our full committee as well as my neighbor from Sacramento, Doris Matsui, have highlighted what has been achieved in California, my State as well, a long-time leader among other States in energy efficiency. We use less energy per capita than any other State in the Nation. As the chairman said, in 1995—since 1975, rather, per capita energy consumption in California has held steady, while in the U.S. as a whole it has grown by 50 percent.

Furthermore, by implementing green energy policies that lower consumption and cut greenhouse gasses, we have managed to spend less. On average, California families now spend $800 a year less on energy than they would have without the efficiency advancements of the last three decades. We have managed to cut also

per capita of carbon dioxide emissions by 30 percent over the last 30 years.

These successes have come as a result of strong standards combined with innovative regulations and innovative achievements. So I thank you, Mr. Chairman, for the leadership of this committee and of our administration for setting some high goals.

As we move forward to craft climate legislation, consider the complementary policies necessary to reduce greenhouse gasses. I hope you will recognize groundbreaking work that is already occurring in California, Massachusetts, and other places and that will build smart policy on their achievements, on the achievements that have been already accomplished in local communities.

Thank you very much, and I yield back.

Mr. MARKEY. The gentlelady's time has expired.

The Chair recognizes the gentleman from Texas, Mr. Burgess.

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

Mr. BURGESS. I thank you for holding this hearing. I look forward to hearing from our panel of witnesses today.

Energy efficiency is exactly the type of issue where we can work together on this committee despite our clear differences on carbon control regimes. Energy efficiency is the type of win-win scenario that people seek in public policy decisions before Congress.

We need to ensure that the consumers of electricity receive the cost savings from energy efficiency and that this does not accrue to the electric utilities. The incentive to implement energy efficiency technology must provide direct benefits to the end users who ultimately pay the rates to families of small businesses and to manufacturers.

Unfortunately, the revenue-decoupling portion of the economic stimulus bill redirected these benefits to the utilities so the consumers pay the same price no matter how much energy they consume or save. I hope that this committee can work together to correct this provision and redirect the benefits of energy efficiency back to rate payers.

This is not just a hypothetical concern with me, Mr. Chairman. A few years ago my wife and I found ourselves building a new home, and the number of things that were available off the shelf for energy efficiency really made an impression upon me—we already heard from a member on the other side—things like siding your house correctly to take advantage of passive solar heating if you are in a climate where that will be of benefit; the ultra-high-efficiency air conditioners that are available nowadays; foam insulation in the walls; Low-E glass; the tankless water heater; the Efficient Attic System.

Our electric utility rates dropped one-half the summer we moved into this house which was the same square footage as the house we had occupied the previous summer. Our natural gas consumption similarly declined by about half, demonstrating the powerful effect of energy efficiency.

This is an area where we can all agree improvements can be made. I want to be certain, though, that the decisions we make in this committee do not increase the cost of development and in-

crease the cost of manufacturing, because the economy right now cannot tolerate that type of convulsion.

I yield back the balance of my time.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from Texas, Mr. Gonzalez.

Mr. GONZALEZ. I waive opening.

Mr. MARKEY. The Chair recognizes the gentlelady from Wisconsin, Ms. Baldwin.

OPENING STATEMENT OF HON. TAMMY BALDWIN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WISCONSIN

Ms. BALDWIN. Thank you, Mr. Chairman.

Over the past 2 years, this subcommittee has heard about emerging technologies, necessary investments in research, and critical infrastructure that must be developed if we are to reduce our energy use and lower our greenhouse gas emissions. We have focused on carbon sequestration, cellulosic ethanol and plug-in hybrid vehicles as solutions to our energy and climate change crises. These are important discussions to have.

In looking toward the future, we cannot lose sight of the significant energy savings that are currently available to us. Today, by having a thorough discussion of energy efficiency opportunities, we draw attention to low-cost strategies that can be used to reduce greenhouse gas emissions.

I am particularly interested in how the industrial sector can optimize its energy use. In December, the Oak Ridge National Laboratory released a report saying that waste energy recovery is, ″One of the most promising options in the U.S. energy efficiency portfolio.″ I am pleased with a number of the provisions included in the Energy Independence and Security Act that encourage waste heat recovery, and I look forward to hearing about our opportunities that we may be able to make available.

Finally, I want to welcome all of our witnesses here today. But one in particular, Mr. Iain Campbell, is here representing Johnson Controls, which is headquartered just outside of my district in Milwaukee, Wisconsin. Johnson Controls is a leader in innovation, building batteries for the next generation of plug-in hybrid vehicles and addressing efficiency in buildings to help manage energy costs, reduce environmental impacts and improve productivity and competitiveness.

I would add that Johnson Controls doesn't just talk the talk. Rather, they have taken significant steps to improve their own efficiencies and reduce their own carbon footprint; and through it all they have continued growing.

I thank you for your company's commitment to environmental stewardship and corporate responsibility and welcome your testimony as well as the testimony of the entire panel that we are very grateful to have before us today.

Thank you, Mr. Chairman. I yield back the balance of my time.

Mr. MARKEY. The gentlelady's time expired.

The Chair recognizes the gentleman from Missouri, Mr. Blunt.

Mr. BLUNT. I think, Mr. Chairman, I will submit a statement later for the record.

Mr. MARKEY. Then that completes all opening statements by the members, and we will now turn to our very distinguished panel and hear from our first witness.

Our first witness is Phil Giudice, who is the Commissioner of the Massachusetts Department of Energy Resources. He has over 30 years of experience in the energy industry and currently serves on the boards of the Regional Greenhouse Gas Initiative and the Massachusetts Renewable Energy Trust.

We look forward to your testimony. Whenever you are ready, please begin.

STATEMENT OF PHILIP GIUDICE, COMMISSIONER, MASSACHUSETTS DEPARTMENT OF ENERGY RESOURCES

Mr. GIUDICE. Thank you, Chairman Markey and the committee, on behalf of Governor Patrick, Secretary Bowles, all of Massachusetts and all of the State energy offices. I thank you not only for your long-standing leadership on energy and climate matters but for your aggressive support of the recently passed stimulus package.

Funding for the State energy program, the Weatherization Assistance Program, the energy efficiency conservation block grants and the appliance energy rebates, among many other program in the stimulus package, will be put to good use in Massachusetts and elsewhere around the country.

In 1990, when the State Energy Efficiency Program Improvement Act was passed, you were the chief sponsor, Chairman Markey. This has allowed the SEP programs to serve as a ready-to-use vehicle across the country for distributing a significant portion of these stimulus dollars. Every year, you have led the effort in the House of Representatives to increase funding for SEP, weatherization and LIHEAP. These are important for Massachusetts and our country. Thank you.

Further, we are proud to strongly support your recently filed Save American Energy Act; and we look forward to working with you, the committee, the Massachusetts delegation, Congress and the administration to advance boldly Federal energy and climate policies this session.

If you take away only one thing from my comments today it is this: Energy efficiency is a proven, reliable and extremely valuable tool for building a greener energy future. It is also a tool that we can quickly deploy to reinvest in our homes, businesses, starting today, in ways that will begin to turn around our economy and in the longer term put the United States at the hub of a 21st century global clean energy economy.

As Governor Patrick has said about Massachusetts, if we get clean energy right, the world will be our customer. And in the context of your consideration of Federal climate legislation it is also clear, based on our long experience in Massachusetts with the efficiency programs and our short-but-valuable experience with carbon caps through the Regional Greenhouse Gas Initiative, that energy efficiency is the best climate mitigation tool that we have and a powerful economic driver for our economies.

I know you are well acquainted with our existing efficiency policies in Massachusetts, but I want to take this opportunity to share

for the record some of the lessons and provide a glimpse of the transformation that is under way in Massachusetts.

Massachusetts has historically had some of the highest costs of energy in the country, but our innovative people have combined to establish us as a leader in efficiency. Our energy productivity of the State is the one of the highest in the Nation, with our economy generating $200 of gross State product for every million BTUs of energy consumed. The U.S. averages $116 for million BTUs consumed.

The efficiency and economic growth can and do go hand in hand in Massachusetts. Massachusetts's long and distinguished record investing in energy efficiency is delivering great results. We have continuously invested for over three decades. We collect about a quarter of a penny for every kilowatt hour. This is distributed by our regulated utilities in wide-ranging and far-reaching energy efficiency programs, totals about $125 million a year, which is about $20 per person in the State of Massachusetts. U.S. total through regulated utility programs are spending about $2.5 billion or about $8. So we are about 2.5 times the national average.

These programs result in saving energy at a cost of about 3.6 cents a kilowatt hour and contribute to an overall savings of 8 percent of the kilowatt hours that we would otherwise be consuming in Massachusetts. So this is a great deal, especially when the annual cost of power from generation in the wholesale market averages 8 or more cents a kilowatt hour.

We are not resting on those accomplishments. In fact, we at this moment are in the process of transforming our energy efficiency infrastructure in our approaches; and this effort is producing remarkable results.

The transformation began with Governor Patrick and our legislature's leadership to fundamentally change the equation for investing in efficiency. Instead of investing a prescribed amount of the 2.5 mills that they were collecting and getting as much energy efficiency as we could with this sum of money, we are now required by law to invest in all energy efficiency that is less expensive than supply sources. We expect this will double, triple or more our efficiency spending and the results that we will be getting from our efficiency programs.

This transformation is largely being accelerated by investing the revenues from our participation in the Regional Greenhouse Gas Initiative. We have had two auctions, and we have generated almost $30 million that are going directly into these programs in Massachusetts and will be further turbocharged by the recently passed Federal stimulus. This will mean more G auditors, more contractors working on insulation in air, ceiling and homes and businesses and improving our building stock, more plumbers and HVAC control technicians to change out the inefficient equipment and put in much more efficient.

All kinds of organizations are taking charge of becoming energy leaders. As you well know, Mr. Chairman, Massachusetts is proud of its professional sports teams; and, in addition to winning six championship banners in the last 7 years, each of our sports teams, the Red Sox and New England Patriots, are doing fantastic things from their energy consumption.

So I ask you at this moment to go much bolder than we will necessarily be comfortable for. Because, in the future, we will look back and wish we were taking bold steps at this time. Thank you.

[The prepared statement of Mr. Giudice follows:]

ENERGY EFFICIENCY AND CLIMATE POLICY

Testimony of
Philip Giudice
Commissioner, Department of Energy Resources
Commonwealth of Massachusetts
before the
Subcommittee on Energy and Environment, Committee on Energy and Commerce

Tuesday, February 24th, 2009

I. Introduction

Thank you, Chairman Markey and members of the Committee, for the opportunity to testify on behalf of the Commonwealth of Massachusetts. I know that Governor Patrick, Secretary Bowles, and residents and businesses across the Commonwealth very much appreciate your strong leadership and accomplishment in addressing both our energy challenges and global climate change. In particular, we are proud to support two bills that you have filed – the Investing in Climate Action and Protection Act (H.R. 6186) and the Energy Efficiency Resource Standard (H.R. 889) – and we look forward to working with you, the Committee, the Massachusetts delegation, Congress and the Administration to advance bold federal energy and climate policies this session.

While the energy and climate challenges we face appear daunting, we have many tools and experiences which when fully deployed will enable substantial progress. The time has come to take bold action. We need policies which will unleash the fullest potential of our country to mobilize solutions for our energy and climate challenges.

If you take away only one thing from my comments today, it is this: energy efficiency is a proven, reliable and extremely valuable tool for building a greener energy future. It is also a tool that we can quickly deploy to reinvest in our homes and businesses – starting today – in ways that will begin to turn around our economy, and in the longer term will put the United States at the hub of a 21st century global clean energy economy. As Governor Patrick has said about Massachusetts, if we get clean energy right, the world will be our customer. And in the context

of your consideration of a federal carbon cap-and-trade program, it is also clear, based on our long experience in Massachusetts with efficiency programs and our short but valuable experience with carbon caps, that energy efficiency is the best cost-containment tool we have.

I know that you are well acquainted with our existing efficiency programs and policies in Massachusetts, but I want to take this opportunity to share for the record some of our lessons and provide a glimpse of the transformation that is underway.

Massachusetts' historically high cost of energy and our innovative people have combined to establish us as a leader in efficiency. Our energy productivity is one of the highest in the nation, with our economy generating $200 of gross state product for every million BTU consumed (US GDP is $116 per million BTU consumed). Efficiency and economic growth can and do go hand in hand in Massachusetts.

Massachusetts' long and distinguished record investing in energy efficiency is delivering great results. We have continuously invested in efficiency for over three decades. For instance, we collect and invest ¼ of a penny from every kWh distributed by our regulated utilities in wide ranging and far reaching energy efficiency programs. This totals about $125 million per year for our electric efficiency programs, which is about $20 per capita (for comparison purposes the US total spend is about $2.5 billion, or about $8.39 per capita). These programs result in saving energy for about 3.6 cents per kWh saved, and contribute to an overall savings of 8% of our kWh consumed. This is a great deal, especially when the annual cost of power from generation in the wholesale market averages 8 cents per kWh in New England.

We are at this very moment in the process of transforming our efficiency infrastructure and our economy in Massachusetts to create a greener energy future for the Commonwealth. This effort is producing remarkable results. This transformation began with Governor Patrick and our legislature's leadership to fundamentally change the equation for investing in efficiency. Instead of investing a prescribed amount and getting all the efficiency we could for a certain sum of money, we are now required to invest in all efficiency that is less expensive than supply sources. With efficiency costing 3.6 cents per kWh and supply costing 8 cents per kWh, we expect to see a likely doubling, tripling, or more in our efficiency spending. Our transformation is being accelerated by investing revenues from our participation in the Regional Greenhouse Gas Initiative, and will be further turbocharged by the recently passed federal stimulus.

This dramatic reorientation of our energy markets – the requirement that electric and gas utilities treat energy efficiency as a resource that that competes with supply from power plants and gas pipelines on the basis of price – has led our utilities to propose 30, 50, even 100 percent increases in their annual energy efficiency investment plans. This will mean more energy auditors working to identify energy saving opportunities in thousands of homes and businesses across the state; more contractors blowing insulation into our old housing stock; and more plumbers pulling boilers from the 1950s out of basements and installing super-efficient modern heating systems that will cut energy use by a third. Even our oil heat industry – not currently regulated – has proposed legislation this session to establish energy efficiency programs for the approximately 40% of homes in Massachusetts that heat with oil. In short, all this will mean vast savings for consumers and businesses from reduced energy use.

Let me give you some examples of what is happening in Massachusetts as a result of this activity. A homeowner named Alex Cheimets is in the final stages of a major renovation. This started – as these things often do – with a small water leak, and ended with a bold project that is expected to reduce his energy use by half or more, through thorough air sealing of the building envelope and adding four to six inches of foam insulation to the sides and roof of his house, as well as installing an air to air heat exchanger and monitoring equipment. His is a typical Massachusetts home – an eighty-year-old two-family house which leaked badly but now will be a model of what is possible.

Let me also tell you about the near zero energy homes available on Coppersmith Way in Townsend, MA. They are being built by Transformations, Inc., a local builder who specializes in super energy-efficient home construction. During the last two years, Transformations has built seven new homes that use less than half the energy of conventional homes, and have solar panels that generate a significant portion of the electricity they do use. And this is only one example of a growing zero net energy building industry – I can point you to at least half a dozen other spots where we are seeing people build or renovate buildings in ways that get us on the path to meeting our carbon targets.

Companies as diverse as EBSCO Publishing in Ipswich and Boston Sand and Gravel, visible from the MBTA Orange Line and I-93 in Boston, have installed significant solar photovoltaic arrays to generate clean electricity on site.

All kinds of organizations are taking action to become energy leaders. As you well know, Mr. Chairman, Massachusetts is proud of its professional sports teams. In addition to winning six championship banners in the last seven years, our local sports teams are dominating the playing field in clean energy as well. The Red Sox use solar thermal energy to heat the water used at Fenway Park. The New England Patriots power the lights at Gillette Stadium with renewable energy, and stadium managers, through paying close attention to site energy use, have cut electricity and natural gas use – and their carbon footprint – by 25% over the last four years.

Efficiency Pays

Massachusetts has a history of success delivering energy efficiency to residential, commercial and industrial customers. Through programs established by both state mandates and the cooperation of the state, utilities, and various stakeholders beginning in the 1980s, we have long had residential energy auditors, insulation contractors, and plumbers making our aging housing stock more energy efficient. And for decades we have had engineers examining our commercial office buildings, city halls, hospitals, and industrial facilities replacing outdated lighting, motors, refrigeration equipment, and more.

The measures covered by the programs have varied over time, but include steps as simple as caulking and weather-stripping leaky doors and windows, and as complex and expensive as switching out a 50-year-old boiler for a brand new energy-efficient one. (In some places we are now piloting super-efficient micro-combined heat and power cogeneration systems that can provide both electricity and heat.) Often, commercial and industrial customers will get a

comprehensive energy audit from experienced engineers that will provide a list of more than a dozen energy efficiency measures that will reduce energy expenses, cut pollution, and improve aging capital.

These programs have been highly cost effective, delivering great benefits to the Commonwealth. These include energy bill savings through direct reductions in energy use by homes and businesses that have made efficiency upgrades. But the benefits go farther than that. Energy efficiency reduces demand for electricity from the regional electricity grid, which means that all these measures significantly reduce pollution from power plants and forestalls the need to build new expensive peaking power plants.

Reducing peak demand by enlisting customer's participation in energy markets has substantial benefits. In Massachusetts almost 15% of our peak demand occurs in just 88 hours per year. With appropriately structured markets, many customers have shown a willingness and ability to reliably reduce their demand for these few hours each year and thereby eliminate the need to build some generation. Through these programs, New England is on its way to meeting 10% of its peak demand with demand-side resources.

Moreover, energy efficiency programs have local economic development effects. Dollars that consumers and business owners don't spend on energy are available to be spent productively in many other ways. Importantly, the dollars spent on these energy efficiency measures are dollars spent improving Massachusetts homes and businesses, through work done by local contractors, with employees from the Commonwealth and surrounding states, rather than sent out of state to pay for coal, oil, or natural gas.

Through delivery of these energy savings to consumers across the state, we are now meeting approximately 8% of our energy needs with Negawatts rather than Megawatts. In fact, we are effectively creating electricity at about 3.6 cents per kWh through efficiency, as compared to 8 cents for the cost of conventional supply.

Making Efficiency Compete With Supply

But we have both the opportunity and the responsibility to do more. On July 2, Governor Deval Patrick signed into law the Green Communities Act, a comprehensive energy reform law developed in close collaboration with our state legislature. The new law dramatically expands energy efficiency's role in the Massachusetts economy, and sets as a goal reduction of energy consumption across the Commonwealth by 10 percent in less than a decade.

Under the new law, the state will make energy efficiency programs compete on price with traditional energy supply. Utility companies (NSTAR, National Grid, Western Mass. Electric, etc.) will be required to purchase all available energy efficiency improvements that cost less than it does to generate power to meet the same energy need, ultimately saving money on consumers' electricity bills. And it will be done not as an add-on to utility bills, but as an integral part of the way utility companies meet their customers' energy needs.

When each electric distribution utility looks at how much electricity it needs to buy from power generators in our competitive wholesale market to meet the demands of its customers, it will be required first to identify all the cost-effective opportunities available to save electricity. That means replacing lighting, air conditioning, and industrial equipment with more efficient models.

Utility companies will offer rebates and other incentives for customers to upgrade lighting, air conditioning, and industrial equipment to more efficient models, whenever those incentives cost less than generating the additional electricity it would take to power their older, less-efficient equipment. Each utility will be required to submit a three-year efficiency investment plan, subject to review by a new Energy Efficiency Advisory Council and approval by the Department of Public Utilities.

Customers who take advantage of the incentives offered by these plans will save money as they reduce how much energy they use and pay for. And all customers will save money from lowering the overall demand for electricity. As a result of the Green Communities Act, we expect to triple or quadruple our energy savings over the next several years.

Let me be clear: it will not be easy to achieve these savings, but it is eminently doable, and it will be far easier than the alternative. Our analysis indicates that the average existing home in Massachusetts uses about 20 - 50% more energy than current codes allow. This is simply because most of our houses were built long ago, without proper weatherization and without modern efficient equipment. We are currently designing programs that will achieve deep energy use reductions in all these older homes. That means lower utility bills, and lower greenhouse gas emissions, along with other pollution. We are also now on a trajectory to adopt aggressive building energy codes that will ensure newly built homes and commercial buildings are much more energy efficient than today's buildings.

One of the keys to our success is the Regional Greenhouse Gas Initiative, or RGGI. This first-in-the-nation cap on carbon pollution has been developed over the last six years by ten northeast states. All large power plants in the northeast are now operating under a carbon cap. Moreover, these states are mostly auctioning the pollution permits, and dedicating much of the revenue to energy efficiency programs that both lower carbon emissions *and* lower the cost of energy. Massachusetts has participated in the first two auctions, generating approximately $28 million dollars, which is at this very moment supporting not only expanded utility efficiency activities but also extra efforts to replace antiquated boilers in the homes of low-income people, and install energy efficiency improvements in schools, city halls, and water treatment plants around the state.

I am happy to share more about our experience in Massachusetts, but let me now turn to questions about federal policy. For your reference I am attaching, as Appendix A, a recent summary of energy and related environmental reforms adopted in Massachusetts.

II. Where We Are and Where We Can Go: Energy Efficiency and Climate

It is clear from our experience in Massachusetts that government-led energy efficiency efforts are needed because of various market failures that prevent us from tapping into all cost-effective energy efficiency measures. In all too many cases, incentives are not aligned for saving energy, despite the fact that saving energy means saving money. Where people who build buildings are not going to pay their operating costs, we miss opportunities to save energy. Where landlords rent to tenants who pay their own utility bills, we miss opportunities to save energy. Where manufacturers are allowed to sell products that waste energy for no productive purpose, we are missing opportunities. In all these cases and more, there is a proper role for government leadership.

At the state level, we currently have a patchwork quilt of activity. A handful of states have long-running and effective programs to help save energy, while other states do little or nothing. Most importantly, none of us are doing nearly enough.

Fortunately, our path forward is relatively clear: aggressive state efficiency programs; strict appliance and equipment standards; and forward-looking building energy codes.

A. Federal Energy Efficiency Resource Standard

We need to get all states moving toward deep energy savings quickly, and a well structured federal Energy Efficiency Resource Standard is an appropriate tool to do so. It will do the most to help states that have yet to develop efficiency programs. If not done properly, however, it could also work against the states that have long been leading the way.

We would argue for following Massachusetts's lead by treating energy efficiency as a resource that competes on a cost basis with other supply options. In Massachusetts we are already seeing exciting results. We would strongly support an Energy Efficiency Resource Standard that moves in this direction. Given that it may be difficult in some places to set up effective efficiency programs in the near term, it makes sense to set resource standards that ramp up quickly over time. Based on our experience, we suggest setting bold aggressive standards.

A federal EERS will also need robust requirements for measurement and verification of energy savings. Massachusetts has built strong measurement and verification (M&V) requirements into our programs. These requirements are crucial for ensuring, and demonstrating to the public, that energy efficiency investments provide the energy savings that are promised. We encourage consideration of a national efficiency M&V and reporting requirement.

We strongly support provisions that ensure energy savings will be delivered to all customers, regardless of their geographic location, and your commitment to treating energy efficiency and renewable energy separately. Energy efficiency, as distinct from renewable energy resources, is available in every state, service territory, home and business across the country, and we should be capturing all of it, for the good of consumers and the environment. Each state's distinct characteristics – climate, economy, age of building stock, etc. – need to be considered in creating effective efficiency programs. In contrast, a national regime of tradeable energy efficiency certificates could undermine effective programs in leading states.

B. Federal and State Appliance Efficiency Standards

A clean energy future is all about making better choices, but government has the opportunity and the responsibility to take stupid choices off the shelves. Manufacturers have simply not cared nearly enough about appliance and equipment energy efficiency. Set top boxes and TVs that consume 100 watts or more power whether they are on or off is an example of this lack of consideration.

As President Obama has noted, appliance and equipment standards can save significant amounts of energy and money, and states need the federal government to act much more quickly and aggressively to adopt product efficiency standards for all products currently in the queue and many others where energy savings are available. In addition, states should have a clear path to adopting standards that are more aggressive than federal standards, where conditions warrant. In our own case, our legislature has mandated the adoption of a furnace efficiency standard applicable for cold states, where differences in furnace efficiency really matter, and we will need a waiver from the existing national-average efficiency standard to finalize it. We hope that Washington will honor our legislature's wishes and enable the Commonwealth and other cold states to adopt furnace standards that make sense for our climate.

C. Building Energy Codes

Finally, we need robust building energy codes to ensure that all new buildings and all major retrofit projects bring buildings up to the most modern energy performance standards. Our current code system is leading to huge amounts of energy waste even in brand new buildings. Massachusetts supports an aggressive regionally tailored national building energy code. The Commonwealth is now on a path to adopt the most recent international energy conservation code (IECC) and automatically update our code whenever the IECC code is updated. But even the international code development process does not guarantee the best result for energy users. We sent a delegation to a recent codes meeting in Minneapolis to support a more aggressive energy code package, and were deeply discouraged by the process and the outcome. Of course, states should be able to adopt more stringent standards, and a national energy code would need to account for regional climate differences, but an aggressive national energy code will address many of the persistent market failures that leave energy saving opportunities on the table.

III. Principles for a Carbon Policy

Finally, I want to state for the record a few of our principles for any federal carbon policy. First, we believe our experience with RGGI shows that auctioning allowances in a carbon cap-and-trade system provides all market participants necessary visibility regarding the cost of carbon, and spurs market innovation. The well monitored and free exchange between buyers and sellers of RGGI allowances has provided all market participants with price clarity. This price clarity can be and is being factored into generators' investment plans, as well as efficiency providers'. All are motivated to find the least cost solutions to meet our carbon goals. Market innovation is being spurred by this new market.

Second, we believe that the best short- and long-term results for consumers will come from allocating as much of the revenue to energy efficiency programs as possible – energy efficiency is the best cost-containment tool we have. We also strongly support allowing states to determine how best to invest auction revenues, with clear requirements to prioritize boosting energy efficiency and addressing increased consumer costs. This would allow states to make decisions based on local conditions and requirements, and to design programs that are consistent and comprehensive for consumers.

IV. Conclusion

I want to conclude by thanking you again, Chairman Markey and members of the committee, for your leadership and for the opportunity to testify today

The time is now to move boldly to create a much greener energy future, one in which we grow our economy substantially by becoming much more productive with the energy we consume.

I strongly believe that energy efficiency is the best tool in the toolbox for tackling our energy and climate challenges, and I fully support your efforts to advance bold federal energy and climate policies this session. Massachusetts stands ready to be your partner in creating our greener energy future.

APPENDIX A: MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS 2008-09 ACCOMPLISHMENTS

CLEAN ENERGY ECONOMY

- Worked with legislative leaders to pass five landmark pieces of legislation that have made Massachusetts a national leader in clean energy innovation and addressing the challenge of global climate change:
    - Green Communities Act, a comprehensive reform of the state's electricity marketplace that promotes a dramatic expansion in energy efficiency, supports the development of renewable energy resources, creates a new greener state building code, removes barriers to renewable energy installations, stimulates technology innovation and helps consumers reduce electric bills. Also creates a new Green Communities program that encourages and helps municipalities go green through energy efficiency investments and renewable energy development.
    - Clean Energy Biofuels Act, which exempts cellulosic biofuels from the state's gasoline tax (first tax incentive in the nation for next-generation, non-food-based gasoline alternative); sets minimum biofuel content for diesel and home heating fuel (the latter a first-in-the-nation requirement), subject to strict lifecycle greenhouse gas emissions reduction standards; and commits the state to developing a Low Carbon Fuel Standard on a regional basis – 10 Northeast states in RGGI and beyond (Pennsylvania) are working with us to begin this work, after signing Letter of Intent announced January 5, 2009.
    - Green Jobs Act, which created a new Clean Energy Technology Center to support R&D, entrepreneurship, and workforce development in an industry of the future. Proposals for Pathways Out of Poverty Grants for training of low- and middle-income individuals for clean energy jobs now being solicited. Expansion of clean energy companies based in Massachusetts this year include Evergreen Solar (700+ manufacturing jobs), Brookfield Power, Beacon Power, and GreatPoint Energy.
    - Global Warming Solutions Act, which combats global climate change by requiring Massachusetts to cap greenhouse gas emissions across the economy by up to a nation-leading 25 percent by 2020, ultimately reducing them by 80 percent by 2050. In addition to cleaning up the environment, the law will stimulate the development of clean energy technologies and jobs. This law builds on Massachusetts's first-in-the-nation requirement of alternatives analysis to reduce greenhouse gas emissions in the state environmental review process.
    - Oceans Act, which requires a first-in-the-nation comprehensive plan to manage development in state waters, balancing natural resource preservation with traditional and new uses. The plan will select appropriate sites for renewable energy development and areas for environmental protection.

Unprecedented public process now well under way, with draft plan due for release this summer.

- Launched Commonwealth Solar, a rebate program that has provided support to more than 400 installations for capacity of over 4 MW in solar power – doubling what was installed statewide at the time Gov. Patrick took office. It has spurred the growth of jobs and companies as well: number of solar installation contractors jumped by a factor of three in one year – from 25 to 75 – plus many more subcontractors. Ramp-up is ahead of initial projections for first year activity, putting the program on a path toward installing 27 MW of solar power in four years, and meeting Gov's goal of 250 MW by 2017.
- Gov. Patrick set goal of 2,000 MW of installed wind power by 2020, up from 6.6 MW currently, citing new mandates that require greater use of renewable energy and sharp reductions in greenhouse gas emissions, and economic opportunity for Mass. to become a hub of wind-energy engineering with one of two DOE-approved Wind Technology Testing Centers in the country, which will be built in Charlestown. Siting Commission created by Green Communities Act will propose ways to siting of wind power developments.
- Took possession of state's first plug-in hybrid vehicle, a retrofitted Toyota Prius capable of 100 MPG. Pilot program will document performance of this next-generation, super-fuel-efficient vehicle technology in state fleet with 20 retrofitted vehicles, and 20 additional plug-in hybrids provided in partnership with private employers to demonstrate commuter benefits of this clean-car technology.
- Convened a Zero Net Energy Buildings Task Force charged with developing guidelines for super-green buildings that produce virtually as much clean energy as they use. Recommendations are to provide specifications for the first state-owned Zero Net Energy building by January 1, 2010; specify an interim standard for state-owned construction that is significantly more stringent than the current Mass. LEED Plus benchmark; and, for private development, point the way toward broad marketability of Zero Net Energy residential and commercial buildings by 2020, and universal adoption of Zero Net Energy buildings for new construction by 2030.
- Began process to establish a "stretch" building code for energy efficiency, which would be available as a local option for municipalities that want to set building standards 20 to 30 percent higher than the statewide building code in energy efficiency.
- Set a goal of making all new malls and "big box" retail stores energy efficient and powered in part by solar energy by 2010, and began dialogue with development community to identify the technical assistance, financing support, and regulatory standards necessary to achieve this goal.
- Issued the Governor's Clean Energy Challenge, a challenge to businesses to reduce their greenhouse gas emissions by 10 percent over the next three years, an initiative developed by the New England Clean Energy Council and the Massachusetts High Technology Council in cooperation with the state's electric and natural gas utilities, to offer recognition to participants who meet or exceed the 10 percent reduction target. Similar Challenge will be issued to municipalities through the Green Communities Program, and ultimately to residential consumers as well.

- With Massachusetts leading, Regional Greenhouse Gas Initiative (RGGI) got under way with first two auctions of greenhouse gas emissions allowances in the country, generating $28.1 million in new revenues that have been put to work funding energy efficiency improvements for households and municipalities, capping greenhouse gas emissions from large electric power plants across the Northeast, and laying the groundwork for a federal cap-and-trade system.
- Announced that, starting with the 2010 model year, all new cars offered for sale in Mass. will carry a label rating their greenhouse gas emissions, as well as smog-forming emissions.
- Launched MassCleanDiesel, the nation's first fully funded statewide program to reduce air pollution from all school buses. The new program will equip up to 5,500 school buses – virtually all the large diesel-powered school buses (those that weigh more than 10,000 pounds, and carry more than 10 students at a time) serving public schools – with pollution-reducing equipment.

Mr. MARKEY. Thank you very much. We appreciate it.

Our next witness is Mr. Thomas King, who is the President of National Grid in the United States. Before joining National Grid, Mr. King spent 10 years with Pacific Gas and Electric Company where he was Chairman and CEO.

Whenever you are ready, please begin.

STATEMENT OF TOM KING, PRESIDENT, NATIONAL GRID USA

Mr. KING. Mr. Chairman, Ranking Member Upton and members of the committee, I want to thank you for including National Grid in this very important hearing on energy efficiency.

May I first congratulate you and your congressional colleagues for your focus and success with important initiatives on energy efficiency renewables, infrastructure such as smart grid, and other critical energy support in last week's stimulus bill.

Mr. Chairman, we are also pleased with the directional approach you have introduced with initiatives that address both Energy Efficiency Resource Standard and renewable energy.

There is no single solution with the overall energy policy. We need more expansive, robust energy efficiency programs. We need new sources of renewable energy, wind, solar biomass, geothermal. We need a comprehensive strategy to address our transmission infrastructure, including policies that will enable us to bring renewable energy to load centers; and we need smart grid technology and smart meters to maximize the potential of current and future energy technologies through efficiency and automation. All of those actions play a critical role in an effective National energy policy.

While the National energy strategy must be multifaceted, my comments today will focus on energy efficiency. Energy efficiency uniquely addresses many of our Nation's core energy issues. It is more cost effective than building new power plants, has the potential to dramatically lower greenhouse gas emissions, and provides consumers with long-term savings on their energy bills.

Let me begin with some simple facts on the cost effectiveness of energy efficiency.

Energy efficiency can cost as little as $0.03 per kilowatt hours saved, while electricity costs $0.06 to $0.12 per kilowatt hour. As a country, we spend about $215 billion annually on production of electricity, but we only invest $2.6 billion on energy efficiency. For natural gas, efficiency costs range $1 to $2 per thousand cubic foot consumed, compared to a typical market cost ranging from $6 to $8 per Mcf. Yet we spend approximately $91 billion annually on natural gas and only $500 million on efficiency of natural gas.

This country must take better advantage of this opportunity and prioritize energy efficiency. National Grid's experience with energy efficiency programs in Massachusetts can be a model for the rest of the country. The successful programs include comprehensive whole house efficiency approaches, energy audits, high efficiency lighting, HVAC installation to ensure efficiency, energy efficiency services to low-income customers, business customer assistance to implement energy savings, and weatherization initiatives.

On the gas side, the programs include high efficiency appliances; weatherization; and system controls, including automatic thermostats.

I congratulate Governor Deval Patrick and the Massachusetts Executive Office of Energy and Environmental Affairs for passing comprehensive energy legislation in Massachusetts, the 2008 Green Communities Act. This provision will allow National Grid to expand our efficiency programs by 300 to 400 percent over the next 5 years.

National Grid, in partnership with other leading energy companies such as PG&E, DT&E, environmental groups such as the Natural Resources Defense Council, and Environmental Defense, worked together with McKenzie & Company to look at energy efficiency. The landmark study found that the U.S. can make substantial emissions by 2030 without damaging the economy with the help of energy efficiency.

The Electric Power and Research Institute recently introduced its own energy efficiency savings analysis. By analyzing the impacts of codes and standards as well as market-driven efficiency, the study shows measurable reductions in energy consumption.

In addition to energy efficiency, we will need a national policy such as a mandatory cap and trade program. As consumers bear the cost of addressing climate change in the form of higher energy prices, climate change policies must be designed to mitigate that impact. One of the most effective and transparent ways to simultaneously address consumer costs and energy efficiency is to distribute allowances to local distribution companies with the mandate that the value be returned expeditiously to the customers to reduce their energy bills.

Current State enforcement power and rigorous open reporting will ensure that all allowance values allocated to the LDCs do benefit the customers. LDCs are uniquely positioned to administer community based energy efficiency programs because they already have the necessary experience, communication channels, marketing expertise, funding and oversight processes and access in place in the market to move things quickly.

National Grid already has efficiency programs in place that are saving customers in New England over $250 million a year. As a result of these programs, National Grid's customers have saved more than $3.6 billion in energy costs. In 2007 alone, our gas program saved 4.6 million thermal units and avoided 27,000 tons of CO_2; and our electricity program saved 380,000 megawatts, avoiding 218 tons of CO_2. This is a total carbon emission equivalent of taking 48,000 cars off the road a year. Expansion of such programs, as a result, creates energy efficiency jobs.

Energy efficiency should act as the foundation of our national energy policy; and, importantly, we need to move quickly. I commend your work and thank you.

Mr. MARKEY. Thank you, Mr. King, very much.

[The prepared statement of Mr. King follows:]

U.S. House of Representatives
"Energy Efficiency: Complementary Policies for Climate Legislation"

February 24, 2009

Testimony of Thomas B. King
President, National Grid U.S.

Mr. Chairman, Ranking Member Upton, and Members of the Committee, I want to thank you for including National Grid in this very important hearing on energy efficiency.

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

May I first congratulate you and your Congressional colleagues for your focus and success with important initiatives on energy efficiency, renewables, infrastructure such as smart grid, and other critical energy support in last week's stimulus bill. The $3.1 billion for state matching grants on energy efficiency and the focus on weatherization and energy efficiency for affordable housing are critical steps towards moving energy efficiency to the forefront of a comprehensive national energy policy.

Mr. Chairman, we are also pleased with the directional approach you have introduced with initiatives that address both an Energy Efficiency Resource Standard (EERS) and renewable energy. While investments in conservation and efficiency are the most affordable way to reduce carbon emissions and energy costs, we must also address the challenging but critical investment needed in renewables.

We have always said, when asked to prioritize between solution strategies, "We need it all." We need more expansive, robust energy efficiency programs. We need significant new sources of renewable energy: wind, solar, biomass and geothermal. We need a comprehensive strategy to address our transmission

infrastructure, including policies that will enable us to bring renewable energy resources, which are often isolated, to dense urban areas and other load centers. We need smart grid technology and smart meters to maximize the potential of current and future energy efficiency technologies to automate the most efficient use of energy and to remotely turn demand off during peak use and pricing periods. All of these actions lower emissions, lower customers' bills and play an important role in an effective national energy policy.

While a national energy strategy must be multifaceted, my comments today will focus on energy efficiency. Our company stands with many other energy providers, particularly those who belong to the Clean Energy Group, and the environmental community in recognizing that energy efficiency uniquely addresses many of our nation's core energy issues – it is more cost-effective than building new power plants, has the potential to dramatically lower greenhouse gas emissions and provides consumers with long-term savings on their energy bills. The importance of energy efficiency as a key component of our national energy policy is underscored by industry-wide energy efficiency commitments made by our leading national trade associations, the American Gas Association and the Edison Electric Institute.

National Grid's experience in Massachusetts demonstrates that energy efficiency expansion is readily available as a solution today with the right mix of policies and incentives. Energy providers like National Grid have decades of success in delivering cost savings and believe those same savings can be readily scaled up on a national level. The certainty available from federal legislation, a state regulatory compact that encourages energy efficiency, the ability to rate base energy efficiency technologies in order to expedite and expand their market penetration and a tax and grant structure designed to stimulate investment will all assure the success of a concerted effort to use energy more efficiently.

Let me begin with the simple facts on the cost-effectiveness of energy efficiency. Energy efficiency can cost as little as 3 cents per kWh saved, while electricity costs 6 to 12 cents per kilowatt hour. Thus, energy efficiency measures are often the most effective way to avoid unnecessary energy supply investments and lower customers' energy bills on a sustainable basis. Despite the obvious advantages of energy efficiency, we spend about $215 billion annually on the production of electricity, but invest only $2.6 billion in securing electricity savings through efficiency programs. The savings are similar for natural gas, where efficiency costs $1 to $2 per thousand cubic feet (Mcf), compared to a typical market cost ranging from $6 to $8 per Mcf. Yet we spend approximately $91 billion annually on natural gas supplies and only $500 million annually on natural gas efficiency.

While spending on energy efficiency is increasing, it remains but a small fraction of what the total country spends on energy requirements, effectively leaving billions of dollars in potential savings on the table. This country must take better

advantage of this opportunity and prioritize energy efficiency. Our country's utility industry can play a central role in implementing this strategy.

We believe National Grid's experience with energy efficiency programs in Massachusetts can be a model for the rest of the country. Our Massachusetts programs date back twenty years on the electric side and fifteen years on the natural gas side. Successful electricity programs have included:

- Comprehensive "whole house" efficiency approaches;
- Energy audits with follow-up services;
- High efficiency lighting;
- HVAC quality installation to assure maximization of efficiency gains;
- Partnerships with local Community Action Agencies to deliver energy efficiency services to low-income consumers, helping them to save energy, reduce fuel bills, and free-up scarce resources for other necessities;
- Business customer assistance to identify and implement energy saving measures and practices that reduce operating costs and to help the businesses become more competitive in the global marketplace; and
- Weatherization incentives.

On the gas side, National Grid's programs include:

- High efficiency appliances (such as 96% efficient furnaces and tankless water heating);
- Weatherization incentives; and
- System controls including automatic thermostats.

I congratulate Governor Deval Patrick and the Massachusetts Executive Office of Energy and Environmental Affairs for passing the first state comprehensive energy and environmental legislation, the 2008 Green Communities Act. The provisions of the act will allow National Grid to expand our energy efficiency programs by 300% to 400% over the next five years, partner in solar initiatives and offer efficiency programs which integrate the delivery of electric and gas efficiency for the first time, an opportunity on which we are already acting.

To see how these types of policies can ultimately be successful, one must only look to California, where the population has grown by 30% with a flatline in per capita energy consumption. This has been achieved through consumer behavior driven by effective energy policy backed by strong state support to achieve these targets.

Energy efficiency must also play a central role in climate change policy, not only because energy efficiency programs are among the most cost-effective ways to reduce greenhouse gas emissions and a critical component of any climate change strategy, but because energy efficiency programs can provide a direct economic benefit to consumers.

National Grid, in partnership with other leading energy companies such as PG&E and DTE, and environmental groups such as Natural Resources Defense Council and Environmental Defense, worked with McKinsey & Co to look at energy efficiency. The landmark study "Reducing U.S. Greenhouse Gases: How Much, At What Cost?" found that the U.S. can make substantial emission reductions by 2030 without damaging the economy with the help of energy efficiency. A chart summarizing the study is attached, and the report itself is available via www.mckinsey.com/mgi/publications/Curbing_Global_Energy/executive_summary.asp.

The Electric Power and Research Institute recently introduced its own energy efficiency savings analysis. By analyzing the impact of codes and standards, as well as market driven efficiency, the study shows measurable reductions in energy consumption. Opportunities in the EPRI study range from commercial lighting to massive reductions in consumption through residential appliances and standby wattage. It demonstrated consumer response to utility based programs to encourage increased adoption of energy efficiency savings. The full EPRI study can be found via http://my.epri.com/portal/server.pt?space=CommunityPage&cached=true&parentname=ObjMgr&parentid=2&control=SetCommunity&CommunityID=277&PageID=0&RaiseDocID=000000000001016987&RaiseDocType=Abstract_id.

Energy efficiency alone will not solve the climate change issue. In addition to energy efficiency, we will need a national policy, such as a mandatory cap-and-trade program. Consumers, however, will ultimately bear the costs of addressing climate change in the form of higher energy prices and climate change policies must be designed to mitigate that impact.

One of the most effective and transparent ways to simultaneously address consumer cost and energy efficiency is to distribute allowances to local distribution companies ("LDCs") with a mandate that the value be returned expeditiously to customers. Accordingly, we support distributing a significant share of the overall allowances to LDCs and requiring them to auction the allowances in a transparent, timely manner. LDCs would use the proceeds to offer consumers incentives for energy efficiency upgrades and distributed generation resources as well as provide rebates to low- and middle-income consumers and small business. These mechanisms will offer immediate financial support to consumers as well as a long-term reduction in consumer energy costs.

Accountability for such a program is essential and should be designed around existing state utility oversight authority coupled with enforcement authority (e.g., financial penalties) and reporting requirements. Leveraging state expertise, resources, and familiarity with LDCs will reduce administrative costs. Real enforcement power and rigorous, open reporting will ensure that all of the allowance value allocated to LDCs benefits consumers and the allowances do not distort competitive electric power markets.

Market distortions should also be minimized by distributing the allowances to LDCs based on a company's proportionate share of electricity sales after adjusting for successful energy efficiency programs. Electricity sales data are publicly reported, providing a transparent mechanism for apportioning emission allowances. Adjusting for energy efficiency will ensure that the LDCs that are most effective in reducing consumption are not subsequently punished with fewer allowances. To further preserve market efficiency, the distribution of allowances to LDCs should be phased out and replaced with a federal auction. As my colleague Ralph Izzo has previously testified, the phase-out should be done within ten years.

LDCs are uniquely positioned to administer community-based energy programs because they already have the necessary experience, communication channels, marketing expertise, funding and oversight processes and access in place to move forward quickly. For example, National Grid already has efficiency programs in place that are saving customers in New England over $250 million annually, after an expenditure of $1.5 billion on efficiency technologies.

As a result of these programs, more than 4.6 million National Grid customer projects have been completed in New England to date, saving more than $3.6 billion in energy costs. This includes converting almost all of Boston's public schools from oil to natural gas, helping cash strapped schools focus their limited resources on education, and residential boiler conversions that reduce CO_2 and other emissions by up to 40%. In 2007 alone, our gas programs saved 4.6 million thermal units and avoided 27,000 tons of CO_2 and our electricity program saved 380,000 megawatts, avoiding 218,000 tons of CO_2. The total carbon emissions equate to 48,000 cars off the road for a year.

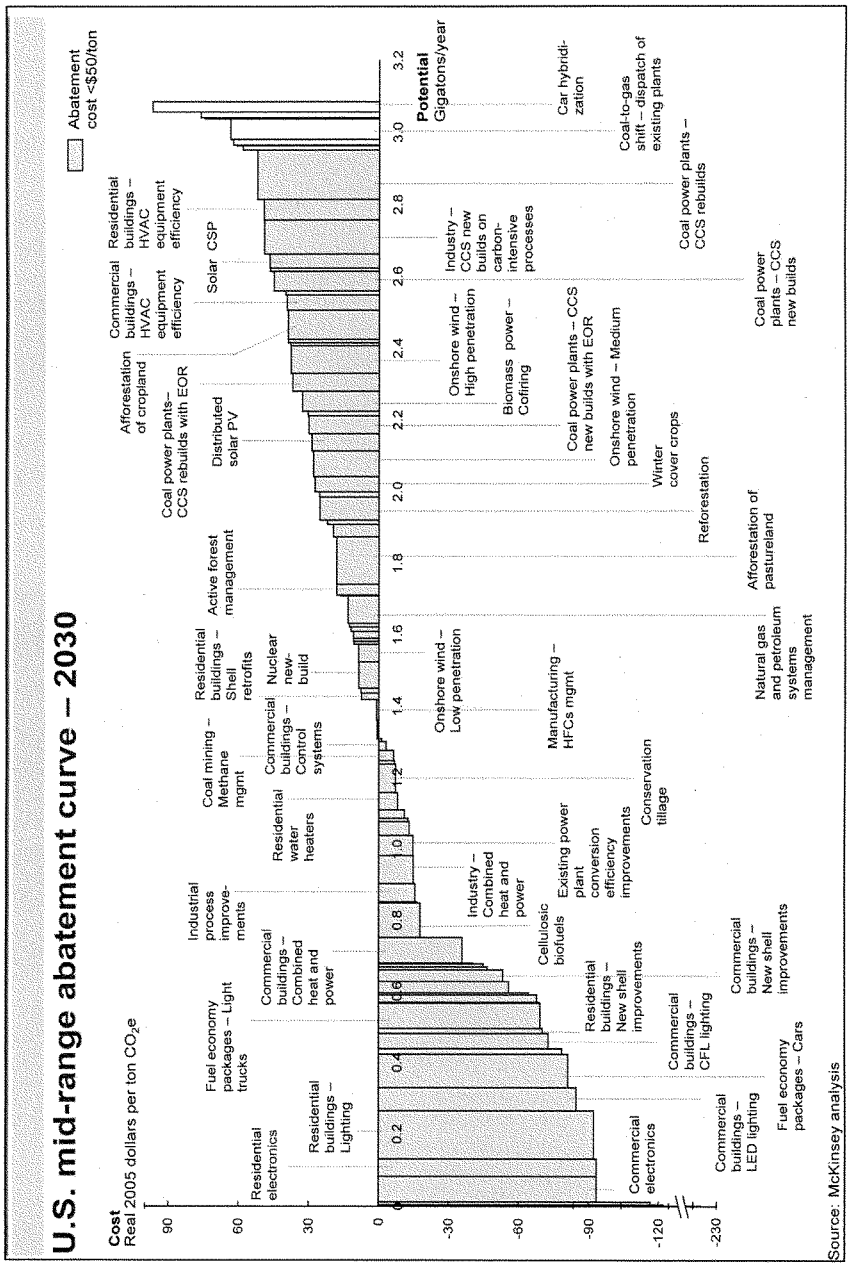
All of these programs are well tested, effective, and readily scalable with the aid of policy mechanisms, such as distributing allowances to LDCs, federal incentives, and energy efficiency standards. Expansion of such programs will result in green jobs, immediate and long-term energy savings, a reduction in our dependence on imported fuel and carbon energy and an effective response to our climate change concerns.

Additionally, these policies will spur the growth of new technologies. For example, the Select Committee on Energy Independence and Global Warming heard testimony last year from the Honda Corporation which has developed high efficiency combined heat and power residential energy units called "Free-Watt". This natural gas fired generator provides electric energy for the home, and captures all of the waste heat from the generating unit. The accompanying heating unit made in the U.S. provides efficient heat to the home, rendering the electric energy essentially "free". The technology has been extremely popular in Japan and has been deployed in Massachusetts, but in very small numbers. With the right policies, like CO_2 allowance distribution to LDCs, we could see a high

volume of units deployed, significantly reducing emissions, fuel use, and home energy costs.

Mr. Chairman and Members of the Committee, we believe the current global recession provides a real opportunity to respond to a multitude of challenges in our economy. Driving economic activity in the energy sector can create significant employment, all here at home, while reducing our dependence on foreign fuels and the release of harmful emissions into our atmosphere. Energy efficiency should act as a foundation of our national energy policy as we take other key steps to develop and implement innovative investments to ensure a reliable low carbon and efficient energy strategy for America. Importantly, these programs can be quickly expanded to provide much needed jobs and energy savings in the near term. The existing programs are not nearly sufficient to reorder our economy for a greener future.

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


U.S. mid-range abatement curve – 2030
Abatement cost <$50/ton
Cost
Real 2005 dollars per ton CO_2e
90
60
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Potential
Gigatons/year
Residential electronics
Residential buildings – Lighting
Commercial electronics
Commercial buildings – LED lighting
Fuel economy packages – Light trucks
Commercial buildings – Combined heat and power
Industrial process improve-ments
Fuel economy packages – Cars
Commercial buildings – CFL lighting
Residential buildings – New shell improvements
Commercial buildings – New shell improvements
Cellulosic biofuels
Industry – Combined heat and power
Residential water heaters
Existing power plant conversion efficiency improvements
Coal mining – Methane mgmt
Conservation tillage
Commercial buildings – Control systems
Manufacturing – HFCs mgmt
Residential buildings – Shell retrofits
Nuclear new-build
Onshore wind – Low penetration
Active forest management
Natural gas and petroleum systems management
Coal power plants– CCS rebuilds with EOR
Afforestation of cropland
Distributed solar PV
Afforestation of pastureland
Commercial buildings – HVAC equipment efficiency
Residential buildings – HVAC equipment efficiency
Solar
Solar CSP
Onshore wind – High penetration
Biomass power – Cofiring
Coal power plants – CCS new builds with EOR
Onshore wind – Medium penetration
Winter cover crops
Reforestation
Coal power plants – CCS new builds
Industry – CCS new builds on carbon-intensive processes
Coal power plants – CCS rebuilds
Coal-to-gas shift – dispatch of existing plants
Car hybridi-zation
Source: McKinsey analysis

Mr. MARKEY. Our next witness is Rich Wells, who is the Vice President of Energy for the Dow Chemical Company. He is a member of the board of directors of the Alliance to Save Energy and in 2008 was appointed to the Michigan Climate Change Action Council by Governor Jennifer Granholm.

Thank you for being with us today.

STATEMENT OF RICH WELLS, VICE PRESIDENT, ENERGY, THE DOW CHEMICAL CORPORATION

Mr. WELLS. Chairman Markey, Representative Upton, and members of the committee, thank you for the opportunity to provide our views on energy efficiency and its role in the future energy and climate change policies in our country.

First, I would like to address the role energy plays for Dow. As one of the largest chemicals and plastics producers, Dow uses the equivalent of 850,000 barrels of oil every day in its global operation. Of this total, approximately half is in the United States. Energy used by Dow is converted into a wide variety of products essential to our economy and our citizens' quality of life. Those products serve as building blocks for everything from pharmaceuticals, insulation, electronic materials, infrastructure and much more.

With energy being a key enabler for all of our products, it is no surprise that the volatility of energy prices over the last 6 years has had a dramatic impact on Dow. In 2002, our total annual energy and feedstock bill was $8 billion. In 2008, that number climbed to over $27 billion.

Dow has an energy efficiency and conservation program which has been refined over the past two decades. This program, through its energy savings, has allowed us to sustain our operation despite these raising energy costs. Let me give you some examples of the impressive results from that program.

We have saved over 1,600 trillion BTUs of energy since 1994, which is enough energy to power every home in California for 1 year. We have saved $8.6 billion in energy costs over the past 14 years, and these energy savings have prevented 86 million metric tons of CO_2 from entering our atmosphere.

Dow's efforts in energy efficiency have been recognized by the EPA, who named our company an ENERGY STAR partner of the year in 2008. We have been involved in energy efficient outreach efforts both in the U.S. and internationally, including China.

Despite being a very energy intensive company, Dow provides products that helps consumers save energy and reduce greenhouse gas emissions. In fact, the emissions avoided by use of Dow thermal insulation are seven times greater than our total corporate emissions.

As you can see, Dow is committed to energy efficiency. It is the quickest, cheapest, cleanest way to extend our Nation's energy supplies and reduce carbon emissions. That is why we recommend Congress implement the following complementary policies for energy efficiency:

First, strengthen building energy codes by 30 percent starting in 2012 and 50 percent by 2020.

These building code improvements could save up to 6 billion metric tons of CO_2 emissions by 2050.

Second, implement a Federal energy efficiency resource standard. Estimates show that by 2020 a Federal EERS could reduce peak electrical demand by 90,000 megawatts, cut CO_2 emissions by 260 million metric tons, and create 260,000 net jobs.

Third, increase the payback periods on low-interest loans to industry for energy-efficiency projects. These projects would improve energy efficiency within the private sector, stimulate the economy, and lower greenhouse gas emissions.

And finally, re-energize the DOE Industrial Technologies Program. Strengthen the program by placing greater emphasis on early-stage R&D, as well as expanding focus on cogeneration and recycled energy.

Dow supports the prompt enactment of an environmentally effective and economically sustainable cap-and-trade program. As a member of USCAP, Dow supports an 80 percent reduction in CO_2 emissions by the year 2050. However, we need to be thoughtful when designing climate policy. Too strong a price signal on carbon in the short term could accelerate fuel switching from coal to natural gas in the power generation sector. Such a movement could trigger a steep demand for natural gas, dramatically driving up prices and harming manufacturers, including Dow. Combined with other well-designed climate policy elements, complementary energy efficiency measures can lessen the impact of fuel switching under a cap-and-trade program.

In conclusion, Congress should pass cap-and-trade legislation with complementary measures in order to drive energy efficiency through all phases of climate policy. If we fail to do so, we risk negative impacts and burdens on all sectors of our economy, including our manufacturing base.

I thank you for the opportunity to speak with you today, and I will be happy to answer your questions when it is appropriate. Thank you.

[The prepared statement of Mr. Wells follows:]

The Dow Chemical Company

STATEMENT FOR THE RECORD

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
COMMITTEE ON ENERGY AND COMMERCE

HEARING ON

Energy Efficiency: Complementary Policies
for Climate Legislation
February 24, 2009

Submitted By:
Rich Wells
Vice President, Energy

About Dow

The Dow Chemical Company appreciates the opportunity to submit these written comments to the Subcommittee on Energy and Environment, Committee on Energy and Commerce.

Dow was founded in Michigan in 1897 and is one of the world's leading manufacturers of chemicals and plastics. We supply products to customers in 160 countries around the world, including hundreds of specialty chemicals, plastics, agricultural and pharmaceutical raw materials for products essential to life. About half of our employees are in the US, and we help provide health benefits to more than 34,000 retirees in the US.

Dow is committed to sustainability. We have reduced our absolute levels of greenhouse gas (GHG) emissions 22% since 1990, and we are committed to do even better in the future. Our ambitious 2015 sustainability goals underscore this commitment.[1]

Dow is an energy-intensive company. We use energy, primarily natural gas and natural gas liquids, as a feedstock material to make a wide array of products. For its global operations, Dow uses the energy equivalent of 850,000 barrels of oil every day. This amount is more than the oil consumption of some countries, such as The Netherlands or Australia.

Because roughly half of our operating costs are energy costs, Dow is actively investigating and moving forward on alternate feedstock materials such as glycerin to propylene glycol (for use in antifreeze) and soy to polyols (for use as cushioning in furniture).

Despite being energy-intensive, Dow products help consumers save energy and reduce GHG emissions. For the home or business, our insulation and polyurethane foam sealants can reduce home and business energy costs by 20%-30%. For saving energy on the road, our new diesel particulate filter technology, enabling improved environmental performance and fuel efficiency. We also offer plastics, composites, and adhesives to help make cars stronger and lighter, while improving overall gas mileage. For the industrial sector, we have saved energy by down-gauging industrial stretch film (PE), a process of making a plastic film thinner but stronger, so that less plastic (and feedstock energy) can be used while getting the same benefits in use.

These examples provide an overview of the benefits of Dow products. Additionally, we have begun work to validate the contribution our products have through Life Cycle Assessment (LCA). Using a third-party validated LCA, we are pleased to report the net reduction in greenhouse gas (GHG) emissions resulting from the use of Dow thermal insulation in residential and commercial buildings and in industrial pipeline applications. The avoided emissions from the use of these products are seven times greater than our total corporate emissions. This calculation was made by quantifying the GHG emissions at all stages of the life cycle of the Dow insulation product and comparing these with the

[1] To learn more about Dow's commitment to sustainability, go to our website at www.dow.com.

GHG emissions savings from the use of the insulation products in buildings and pipe systems.

Need for Complementary Policies to Cap and Trade

As a member of the U.S. Climate Action Partnership (USCAP), Dow supports prompt enactment of environmentally effective, economically sustainable and fair climate change legislation to reduce U.S. greenhouse gas emissions sharply by mid-century. The centerpiece of legislation should be an economy-wide cap and trade program. This market-based approach is the best way to put a price on carbon and ensure that short- and long-term emissions targets are met.

USCAP launched its landmark report, titled *A Call for Action*[2], in January 2007, which lays out a legislative framework for climate protection. Most recently, USCAP released *A Blueprint for Legislative Action*, which provides consensus recommendations for climate protection legislation. USCAP includes a total of 31 businesses and environmental organizations.[3] The coalition recognizes that the United States faces an urgent need to reinvigorate our nation's economy, make the country more energy secure, and take meaningful action to slow, stop, and reverse GHG emissions to address climate change. Thoughtful and comprehensive national energy and climate policy will help secure our economic prosperity and provide American businesses and the nation's workforce with the opportunity to innovate and succeed.

USCAP recommends an array of complementary policies in addition to cap and trade. The purpose of these complementary policies is to (1) spur the development and deployment of low-carbon technologies to achieve emission reductions that would otherwise not occur in a timely manner under cap and trade alone and (2) avoid disproportionate negative impacts to certain sectors of the economy and/or regions of the country.

Energy efficiency plays a key role in many—but not all—of these complementary policies. Energy efficiency represents a relatively low-cost solution to the challenge posed by rising GHG emissions—not to mention the significant issues of energy dependence and volatile energy prices. In addition, aggressive energy efficiency efforts today can help address the so-called "dash to gas".

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[2] *A Call for Action* and *A Blueprint for Legislative Action* can be found at www.us-cap.org.

[3] The current members of USCAP are: Alcoa; Boston Scientific Corporation; BP America, Inc.; Caterpillar Inc.; Chrysler LLC; ConocoPhillips; Deere & Co.; Dow; Duke Energy; DuPont; Environmental Defense Fund; Exelon Corporation; Ford Motor Company; FPL Group; General Electric; General Motors Corporation; Johnson & Johnson; Marsh, Inc.; Natural Resources Defense Council; NRG Energy; PepsiCo North America; Pew Center on Global Climate Change; PG&E Corporation; PNM Resources; Rio Tinto; Shell Oil Company; Siemens Corporation; The Nature Conservancy; World Resources Institute; and Xerox Corporation.

Preventing a "Dash to Gas"

The growing body of science of global warming suggests that aggressive action is needed to reduce GHG emission levels in the atmosphere. Legislation introduced in Congress over the last few years supports aggressive US reductions in the short-term. USCAP recommends a 2020 target that is 14%-20% below 2005 emission levels, in line with President Obama's recommended target.

How can the US achieve such a target by 2020? One approach would be several years of negative economic growth. Aside from being politically unacceptable, such a "solution" would do nothing to spur low-carbon technologies needed to achieve the deep, long-term reductions that will be needed to solve this global problem.

One of the easiest, and most likely, ways to meet aggressive, short-term emission reduction targets is through fuel switching from coal to natural gas in the power sector. A strong price signal on carbon would exacerbate such a movement, which is already underway even in the absence of a US cap and trade program.

The fuel-switching solution could be economically ruinous for those industrial businesses and consumers dependent on affordable natural gas, if natural gas supply does not keep pace with rising demand, or if natural gas supply lags significantly behind demand. Recent US history suggests this is a plausible scenario.

Natural gas prices have skyrocketed more than 460% over the last eight years. The increase in price has significantly contributed to the US manufacturing sector losing over 3.7 million jobs, the chemical industry losing nearly 120,000 jobs[4], and the permanent loss of nearly half our fertilizer production capacity. The manufacturing sector, which has limited fuel switching ability, has become the shock absorber for high natural gas costs. For the forest products industry, energy is the third largest manufacturing cost—up fifty percent in recent years for pulp and paper mills. For some mills, the cost has eclipsed employee compensation.

Dow first expressed alarm about high natural gas prices in 2002. At that time, our total annual energy and feedstock bill was $8 billion. In 2008, our energy bill was $27 billion. Our energy expenditures are by far the largest component of our production costs, and equate to about half of our total revenues.

Policies that increase natural gas demand will make this already bad situation even worse. For example, policies that mandate corn-based ethanol will increase demand for natural gas. One billion gallons of ethanol require the use of 28 billion cubic feet of natural gas.

[4] The chemical industry uses 1.93 trillion cubic feet (TCF) of natural gas annually, representing 8% of US natural gas consumption. The majority of steam boilers and cogeneration units in the manufacturing sector are powered by natural gas. The remainder is for feedstock purposes. Due to the historic abundance and low cost of natural gas in the USA, natural gas has been vital to domestic chemical production.

Another example is climate change legislation. Natural Gas Council models predict that climate change legislation will increase natural gas demand by as much as 10 trillion cubic feet (TCF) per year.

Congress has been enticed into over-reliance on natural gas before. The Clean Air Act Amendments of 1990 were enacted with the belief that natural gas would be the clean fuel of the future and would be cheap and plentiful. Unfortunately, Congress did not anticipate the run-up in natural gas prices and the resulting demand destruction in the industrial sector.

Before we repeat this mistake and consider creating new demand for natural gas, we need to consider complementary policies to minimize fuel switching. Such policies should aggressively promote energy efficiency, especially with respect to the largest users of natural gas: the power sector and the building sector.

We view the recent softening of natural gas prices to be associated with the dramatic demand destruction caused by the weakening economy. According to EPA/DOE analyses, cap and trade legislation will increase the demand for natural gas at least in the near-term (prior to 2030), as power companies find it economical to fuel switch from coal to less-CO_2-intensive natural gas. In the longer-term, fuel switching is of less concern as new technology is deployed to cost-effectively address GHG emissions from coal-fired power plants.

In designing a cap and trade program, several different elements (targets and timetables, cost containment, complementary policies) will impact the degree of fuel switching, and Congress should keep all of these in mind as it develops a climate policy. Dow recommends that any US climate policy be designed in ways to minimize fuel switching.

Complementary Policy Recommendations: Energy Efficiency

The most important complementary policy is one that aggressively promotes the cleanest, most reliable, and most affordable "fuel"—energy efficiency. We acknowledge the significant "down payment" made in the stimulus bill on energy efficiency, but we stress the need to do more if we are going to meet the ambitious GHG reduction target set by the President.

Dow has been a pioneer in energy efficiency and has been recognized for its leadership. Since 1994, Dow has saved 1,600 trillion BTU of energy through the company's energy efficiency program. This savings is equivalent to the energy needed to generate the electricity used in all the residential houses in California for one year. Dow's energy efficiency program has resulted in energy savings of $8.6 billion dollars and has prevented 86 million metric tons of CO2 from entering the atmosphere.

If the U.S. adopted a similar economy-wide goal, the country could save the BTU equivalent of all of its oil imports from the Middle East.

According to a 2007 report from the National Petroleum Council, available efficiency technology could reduce energy use 15 to 20 percent if applied today.

In Dow's view, the most important sectors in which to seek improvements in energy efficiency are those that use large amounts of natural gas: buildings and homes, the power sector, and industrial operations. Such a focus will help to minimize increases in natural gas prices due to cap and trade. In this section, we list those policies that we believe could make the biggest difference in the near-term.

Aggressively Promote Energy Efficiency in Buildings

Congress should establish a national goal of increased model building codes of at least 30% by 2012 and at least 50% by 2020, based on the 2006 International Energy Conservation Code (IECC). Congress should provide incentives to states that adopt these model energy efficiency codes in a prescribed timeline upon a determination by the Department of Energy. The 30% target is based on a goal set by the American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) for the pending 2010 update of their model commercial building code. The 50% goal is a qualification level for energy efficiency tax credits adopted by Congress in 2005. As new codes are finalized, states were directed to either adopt these model codes or their own state-specific equivalents. Funding and technical assistance to states was authorized. In order to meet long-term energy goals, it is important that new buildings be as energy-efficient as is economically justified, since it will be much more expensive to retrofit these buildings after they are completed. This provision should be adopted in 2009.

We are also supportive of other policies that can advance energy efficiency in buildings and homes:

- Congress should expand EPA's Home Performance with Energy Star program to stretch nationwide (it currently operates in only 22 states) and should encourage much greater participation in the program by establishing rebates for homes that undertake comprehensive energy efficiency retrofits.

- Congress should give serious consideration to a provision in the draft Dingell-Boucher bill to expand the Energy Star building labeling program to include homes and additional types of commercial buildings. These labels let building owners, prospective purchasers, and prospective tenants know how the energy performance of a building compared to other similar buildings in the area. The intent is to motive building owners to upgrade their buildings, and to help prospective purchasers and tenants select efficient buildings.

- Congress should adopt long-term extensions of the tax credit for high efficiency new homes, efficient heating, cooling and water heating equipment, and heavy-duty hybrid vehicles.

Emphasize Efficiency in Portfolio Standards

Aside from changing the regulatory structure, portfolio standards have been adopted by 18 states as one way to promote energy efficiency in the power sector. Under a federal Energy Efficiency Resource Standard (EERS), retail distributors would be required to obtain energy savings from customer facilities, distributed generation installations, or their own distribution systems in amounts equal to a specified percentage of base year sales of electricity (energy) or natural gas. The requirements apply to retail distributors, including unbundled distribution utilities or fully integrated generation and distribution utilities that have annual sales over a set level of megawatt hours of electricity or cubic feet of natural gas.

Currently, new conventional base-load production sources generate electricity at a rate between $0.073 and $0.135 per kilowatt-hour.[5] At a cost of $0.03 per kilowatt-hour saved, efficiency improvements are significantly less expensive than building new plants and power lines and burning more fuel. Implementing a national EERS would commit every state to utilizing this least-cost resource, establish a baseline level of cost-effective and achievable energy savings, and reduce carbon dioxide emissions far beyond the level achievable by those states currently acting alone.

The American Council for an Energy-Efficient Economy (ACEEE) estimates that by 2020, a federal EERS could reduce peak electric demand by about 90,000 megawatts[6]—equivalent to 300 power plants that each have a 300 megawatts capacity. Carbon dioxide emissions reductions would total approximately 260 million metric tons in 2020—equivalent to taking 43 million automobiles off the road (for a year), and 260,000 net jobs would be created. Furthermore, utility customers would save a net $144 billion, with the proposed EERS producing a benefit-to-cost ratio of about 3:1.

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

Provide Significant Investment Capital for Low-Interest Loans

A scarcity of investment capital is a serious impediment to energy efficiency projects at industrial sites, power plants, and in residential and commercial buildings. Our experience with energy efficiency efforts is that it is difficult to justify an industrial project whose sole purpose is energy efficiency unless the payback period is two years or less. The current economic downturn has raised the bar even higher for energy efficiency projects. And this situation is not unusual across industry or even for homeowners.

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[5] See Lazard, 2008, *Levelized Cost of Energy Analysis — Version 2.0*, http://www.narucmeetings.org/Presentations/2008%20EMP%20Levelized%20Cost%20of%20Energy%20-%20Master%20June%202008%20(2).pdf.

[6] These savings are in addition to savings now required under state EERS's.

To remedy this serious problem, the federal government ought to consider creating a large pool of capital (at least tens of billions of dollars) designated for energy efficiency projects with a longer payback period (e.g., between two and eight years). The funds would be loaned to homeowners, commercial entities where the payback period coincides with the expected return on investment due to lower energy costs, and leaves the borrower revenue neutral. Such a program would ensure the availability of funding for projects that would otherwise not be undertaken, while creating many new jobs.

Re-Energize Existing Industrial Energy Efficiency Programs

The DOE Industrial Technologies Program (ITP) offers a wide range of important benefits to the manufacturing sector:

- The program provides training for the next generation of manufacturing energy efficiency engineers through the Industrial Assessment Program. Graduates of this program have a proven track record of being able to perform in jobs much more quickly than students without the experience. These students also become sensitive to identifying and implementing energy efficiency opportunities.

- The program has the ability to convene representatives from a wide range of companies to work on manufacturing issues as a whole, without raising anti-trust concerns.

- The program's cooperative RD&D efforts have been valuable to industry by allowing industry and government to work together to target research that meets the needs of manufacturing industries, resulting in near-term impacts.

Dow supports the ITP, which is currently the only federal program that supports energy efficiency in the manufacturing sector. To strengthen the program, we recommend the Committee follow the recommendations of the recently published corporate peer review report for the ITP program. In particular, these recommendations support a major increase in the budget level, a greater emphasis on early-stage R&D including an emphasis on efficient use of feedstock material and alternative feedstocks. In addition, we recommend the following:

- Expand the program to focus on cogeneration (combined heat and power--CHP) and recycled energy as important opportunities.

- Develop closer relationships to manufacturing company representatives to ensure that ITP activities meet the needs of the manufacturing sector.

- The program should be coordinated with NIST MEP Centers and DOE CHP Regional Application Centers to maximize synergies between program offerings and minimize redundancies.

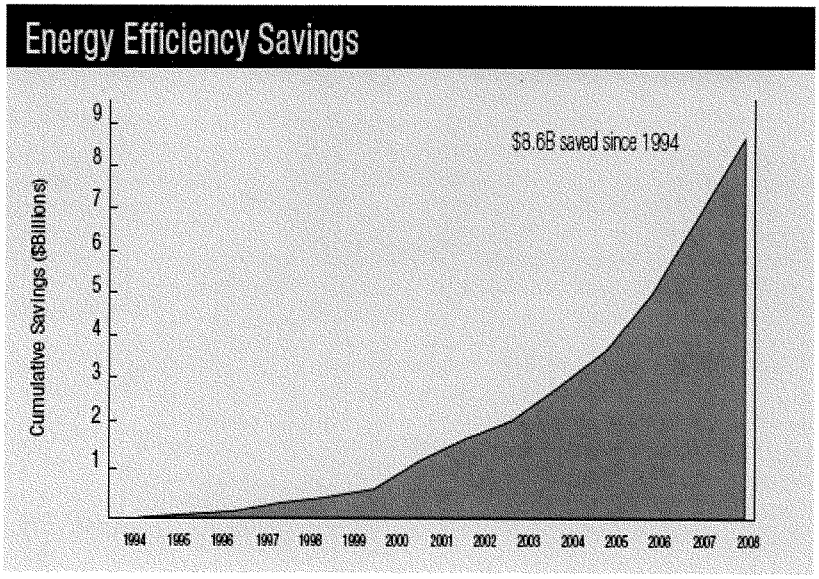
Conclusion

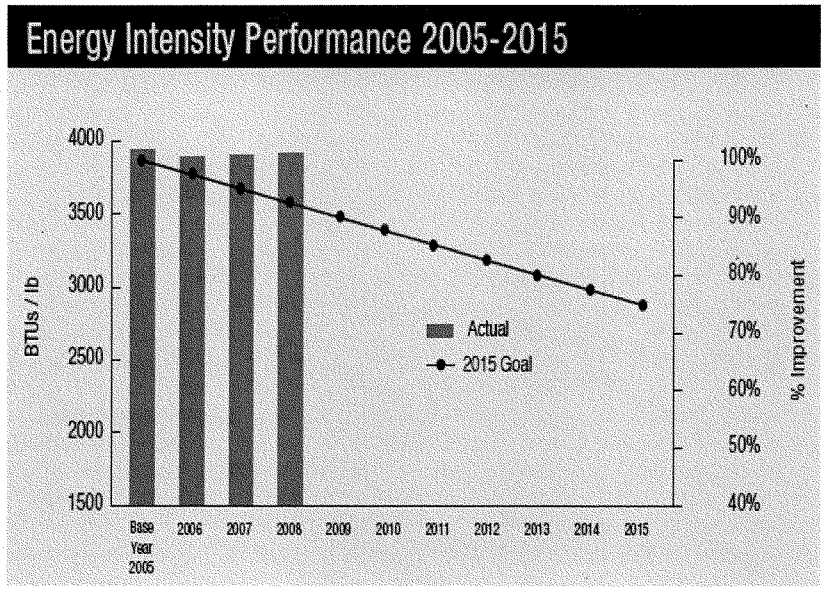
Congress should pass cap and trade legislation with complementary policies to drive energy efficiency through technology development and deployment. Aggressive energy efficiency efforts will help lessen demand for natural gas, aiding the US manufacturing sector and residential consumers. Recommended policies include significant capital funding of private sector energy efficiency projects, portfolio standards that emphasize energy efficiency, and improvements in model building codes. Should Congress enact legislation placing a price on carbon, some of the revenue could be used to fund energy efficiency efforts, such as those described in this testimony.

Appendix: Dow and Energy Efficiency

The Dow Chemical Company is a recognized industry leader in energy management. Energy efficiency has been part of our heritage since the very early years of our company, when Dow helped pioneer the use of industrial combined heat and power, also known as cogeneration. In conventional power plants, a significant portion of the energy is lost (usually through cooling towers or flue gas) in the process of electricity generation. In contrast, cogeneration captures more of the heat, utilizing less fuel, which has a significant impact on greenhouse gas emissions and improved air quality relative to conventional utility power. Cogeneration typically uses 20% to 40% less fuel than separate steam and power generation because energy is captured and used that would otherwise be wasted.

In recent years, through a companywide focus on energy efficiency, we have dramatically increased our energy efficiency -- and exceeded an aggressive, long-term corporate energy efficiency goal. Since 1994, we have reduced our energy intensity 22% worldwide. Our cumulative energy savings have reached approximately 1,600 trillion BTUs, and we have avoided 86 million metric tons of carbon dioxide emissions. Figure 1 shows how our $1 billion investment in energy efficiency has returned more than $7 billion in energy savings. We are very proud of the fact that EPA has recognized Dow as their 2008 Energy Star "Partner of the Year".





Dow's energy efficiency and conservation initiative relies strongly on our structured approach to resource conservation and energy intensity reduction. At the core is the sustained commitment and support of Dow's corporate leadership. The overall Energy Efficiency and Conservation effort within Dow is driven by a Global Energy Efficiency Leader, who has full responsibility and accountability for implementing and managing an aggressive global energy conservation plan. The energy conservation leader sponsors technology center and site energy efficiency teams and networks throughout the company to identify energy saving opportunities, develop long-term energy improvement plans, and implement projects.

In addition, each business unit at Dow is responsible for aligning its goals and plans to the corporate goal on energy efficiency. Focal points within each business unit are responsible for driving energy efficiency within their respective technologies. Energy efficiency is further driven by the energy conservation teams at our 13 largest energy-consuming sites, which account for over 90% of Dow's energy usage. These local teams actively engage employees in energy efficiency improvement projects at their sites and drive an energy efficiency mindset and culture at the local level.

Our efforts to improve energy efficiency have been so positive that we are involved with many external organizations to expand the scope of our activities. Two examples:

- Dow joined with Lawrence Berkley National Laboratory and China's Energy Research Institute to develop a program aimed at supporting small- and medium-sized companies' goal to reduce energy intensity and improve energy efficiency.

- Dow is working with the U.S. National Association of Manufacturers' (NAM) and the Department of Energy to promote energy efficiency best practices by helping to develop a database aimed toward NAM's 13,000 member companies. NAM is the largest U.S. industrial trade association, representing small and large manufacturers in every industrial sector.

Mr. INSLEE. Thank you, Mr. Wells. And I know about your great work. There is an interesting book that has said really good things about Dow. I will tell you about that later.

Mr. Campbell?

STATEMENT OF IAIN CAMPBELL, VICE PRESIDENT AND GENERAL MANAGER, JOHNSON CONTROLS INC.

Mr. CAMPBELL. Chairman Markey and members of the subcommittee, thank you for the opportunity to provide testimony on complementary policies for climate legislation.

Johnson Controls is a world leader in providing energy-efficiency products, technologies, and services for buildings, and we would like to share an on-the-ground view of the opportunities and barriers to energy efficiency.

Some refer to energy efficiency as the fifth fuel, a new source of energy that we can tap to drive economic growth. We believe that energy efficiency should be considered the first fuel, as it saves consumers and businesses money through lower energy consumption and represents the lowest-cost source of energy using technologies widely available today.

In the first of three key points that we wish to make, we believe that a variety of complementary policies are needed to drive energy efficiency. In addition to putting a price on carbon, we support time-of-use pricing and smart-grid investments to give energy users and their building management systems the information that they need to make smart decisions.

We support energy-efficiency resource standards, such as the legislation Representative Markey has recently introduced. Such a standard would dramatically ramp up efficiency investments while providing a path for utilities to cost-effectively decrease their overall emissions.

Building codes and equipment standards represent important policy levers. We support policies to provide incentives for the purchase of the highest-efficiency equipment to drive innovation and enable manufacturing scale. We also support the introduction of a system to label building performance to help better inform current and perspective building owners and ultimately increase demand for high-performance buildings.

With approximately 1 billion square feet of annual new construction, establishing complementary policies to enhance energy efficiency in new buildings is an important step. But, to the second of our three key points, these opportunities are dwarfed by the prospects of enhancing energy efficiency in the approximately 72 billion square feet of existing nonresidential building stock.

There are a range of barriers that prevent raising of energy-efficiency levels in existing buildings that have effectively been addressed in the public sector using an approach known as performance contracting. Performance contracting is a competitive, market-based approach to delivering energy and operational savings that leverages public funding with private investment. This programmatic approach to retrofitting buildings can combine energy efficiency and renewable energy in a single, cost-effective project. The energy performance guarantees provided under these contracts

ensure transparency and accountability for project outcomes, a critical element of any successful energy and climate policy.

Performance contracting has been successfully applied in the public sector for over 20 years. Examples include the University of Massachusetts in Amherst, where a $42 million investment, funded through public and private sources, delivered $56 million in guaranteed energy and operational savings as well as an improved learning environment for students and faculty alike. And Wyandotte Public Schools in Michigan implemented a combination of energy-efficiency retrofits, technology upgrades, and solar PV installation that delivered significant savings and helped the school district become the first in Michigan to be fully certified under the EPA's ENERGY STAR program.

While performance contracting has been successful in the public sector, there are barriers to the adoption of this model in the private sector: the mismatch of incentives between property owners and tenants, the frequency of turnover in building ownership, and the requirement to use building assets as collateral to secure loans.

To address this, we recommend establishing a program that would encourage large-scale, deep retrofitting of privately owned, commercial buildings. The program should provide incentives for efficiency improvements, in the form of rebates provided to building owners or their agents in proportion to verified and sustained performance improvements, and loan guarantees to help attract capital from private sources to fund those improvements.

A third and final point is that these complementary energy-efficiency policies have the potential to create a substantial wave of new green-collar jobs across the country. Developing this workforce will require a combination of public and private investment, along with the creation of certification programs to ensure that workers have the right skills and training to engineer, install, and maintain energy-efficiency projects.

Finally, let me note that included in my written testimony are a number of consensus recommendations from a coalition of energy-efficiency organizations, including Johnson Controls, entitled, ″Reducing the Cost of Addressing Climate Change Through Energy Efficiency.″

In closing, Johnson Controls believes in the need to increase the Nation's focus and investment in energy efficiency. Energy efficiency must be the first priority in addressing climate change as a way of containing the cost of climate protection and creating new jobs. It is imperative as a Nation that we focus on efficiency now. It has never been more important.

On behalf of Johnson Controls, thank you again for the opportunity to testify.

[The prepared statement of Mr. Campbell follows:]

Testimony of Iain Campbell

Vice President and General Manager,

North American Service and Global Workplace Solutions

Johnson Controls Inc.

House Subcommittee on Energy and Environment

Hearing on

"Energy Efficiency: Complementary Policies for Climate Legislation"

February 24, 2009

Introduction

Chairman Markey and Members of the Subcommittee on Energy and Environment, thank you for the opportunity to provide testimony on complementary policies for climate legislation. My name is Iain Campbell, and I am Vice President and General Manager within the Building Efficiency Business of Johnson Controls, Inc, a global multi-industry company with sales of $38 billion in 2008.

In this testimony I would like to share our views on energy efficiency from the perspective of our Building Efficiency Business. We are a world leader in providing energy efficiency products and services within commercial and industrial buildings. Specifically, in our work we manufacture, install, operate,

service and retrofit the technical systems and equipment that consume – and control – energy in buildings. Based on this "on-the-ground" view of the opportunities and barriers to energy efficiency, we would like to make three key points in this testimony:

1. Complementary policies, including an Energy Efficiency Resource Standard, are a critical component of any effective and comprehensive climate change policy
2. These policies must focus on unlocking the vast energy efficiency potential within the existing commercial and industrial building market ; it is our view that the performance contracting approach represents a proven and highly effective model
3. Finding and training workers to do the important work of improving energy efficiency within buildings across the United States is a central and significant challenge. It also represents a significant opportunity for our citizens.

About Johnson Controls and the Building Efficiency Business

Johnson Controls is the global leader that brings ingenuity to the places where people live, work and travel. By integrating technologies, products and services, we create smart environments that redefine the relationships between people and their surroundings. Our team of 140,000 employees creates a more comfortable, safe and sustainable world through our products and services for more than 200 million vehicles, 12 million homes and one million commercial buildings. We have three main businesses:

- Power Solutions – We are the largest producer of automotive batteries in the world and are producing and developing new advanced battery systems for hybrid and plug-in hybrid electric vehicles.
- Automotive Experience – We make automotive interiors using sustainable manufacturing techniques to help make driving more comfortable, safe and enjoyable.
- Building Efficiency – We provide products and services to public and private sector customers to optimize energy use, and improve comfort and security for buildings and homes.

In my role I am responsible for three businesses uniquely focused on driving energy efficiency. The first, the Technical Service Business, focuses on maintaining, repairing and replacing building automation systems as well as heating, cooling and refrigeration equipment. These activities are a critical part of ensuring the building systems deliver the best outcomes using the least amount of energy. The second, the Solutions Business, is specifically focused on delivering deep energy savings at the whole-building level in a self-funding manner. This work is typically delivered in what's known as "performance contracting". We have been delivering performance contracting for over 20 years, with over 1900 projects executed, and $4B in energy performance guarantees, and over 11 million metric tons of GHG emissions avoided since 2001. We are increasingly integrating small-scale renewable technologies into these projects. The third, the Global Workplace Solutions Business, offers integrated facility management for Fortune 500 companies, managing more than one billion square feet worldwide. In this business we manage massive property portfolios for the world's leading

companies across the globe, focusing on providing the highest level performance using the fewest resources.

Johnson Controls and our Perspective on Climate Change

We believe that businesses can and should incorporate responses to climate change into their core corporate strategies by taking concrete steps in the U.S. and abroad to establish and meet greenhouse gas (GHG) emission reduction targets, and/or invest in low and zero GHG products, practices and technologies.

As a result, and starting with our own footprint, we have joined the EPA Climate Leader Program, and have pledged a 30% carbon intensity reduction from 2002 to 2012 within our own facilities. We are already making important progress toward this goal, relying primarily on energy efficiency improvements across our operations to meet it. We are also members of the Pew Center Environmental Leadership Council – the largest U.S.-based association of corporations focused on addressing the challenges of climate change.

We are also helping our clients and partners take action against climate change. We employ people across a wide variety of job classes to drive energy efficiency improvements in existing and new buildings every day and in every state across America. We are also partners on many of the cutting-edge technology initiatives designed to attack climate change. For example, our industrial refrigeration systems are a critical component in virtually all carbon capture and sequestration projects currently underway. Finally, our hybrid car battery systems are critical part of the current and next-generation plug-in hybrid transportation systems.

In sum, we are a company deeply committed and financially involved in driving energy efficiency in our own and our customers' operations. We hope this background and experience will provide useful insights and suggestions to the committee.

Role of Energy efficiency

Energy efficiency should be the first priority in addressing climate change. It is imperative to promote efficiency in order to contain the cost of climate protection policies. A new working paper including a set of consensus recommendations to cut the cost of addressing climate change through energy efficiency is attached to this testimony.[1]

Some refer to energy efficiency as the fifth fuel, a new source of energy that we can tap to drive economic growth. We believe energy efficiency should be considered the first fuel, and everyone's first step in reducing carbon emissions. Efficiency means getting more valuable services from our energy resources, not sacrifice or deprivation. Energy efficiency is the fastest, cheapest, and cleanest energy source.

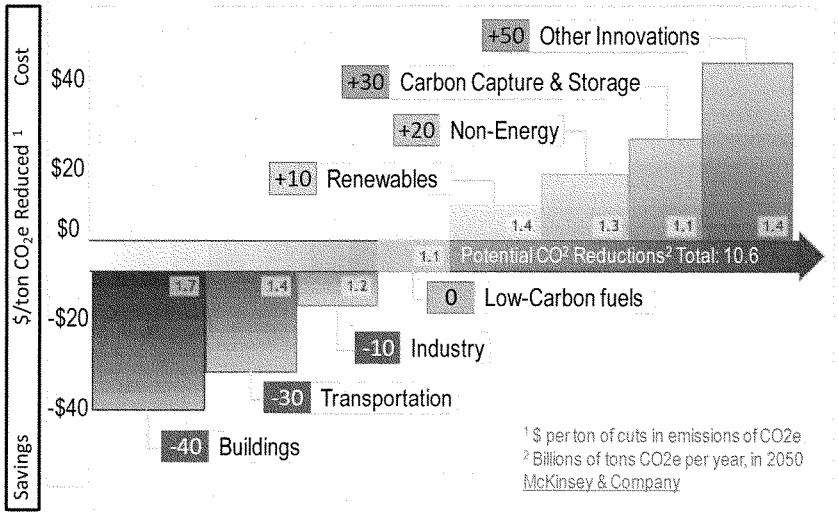
Cost effectiveness

There is broad consensus that energy efficiency reservoir is large and can be tapped at low cost. Studies by the Intergovernmental Panel on Climate Change (IPCC) conclude that the potential to reduce emissions through energy efficiency is very large in several sectors, with a particularly large opportunity in the

[1] Energy Efficiency in Climate Change Working Group (2009) "Reducing the Cost of Addressing Climate Change Through Energy Efficiency" Consensus recommendations for future federal climate legislation in 2009 from a broad coalition of groups that includes Johnson Controls [ATTACHED].

buildings sector.[2] Not only is the potential impact of energy efficiency large, it is also the least-cost way of meeting emission reduction targets.

"Cost curve" analysis published by a variety of organizations including the McKinsey Global Institute, Natural Resources Defense Council, and the World Wildlife Fund suggest that some carbon abatement strategies actually have a "negative cost" or a positive net present value—that is, the savings over the lifetime of an investment more than pay for the initial cost.[3] The majority of these "negative cost" measures are improvements to the efficiency of our buildings, vehicles, and factories.



[2] Intergovernmental Panel on Climate Change (Working Group III to the Fourth Assessment Report of the IPCC), Climate Change 2007: Mitigation 9, 10 tbl.SPM.3 (Bert Metz et al. eds. 2007), available at http://www.ipcc.ch/ipccreports/ar4-wg3.htm.

[3] See for example McKinsey & Co (2009) "Pathways to a Low Carbon Economy: Version 2 of the Global Greenhouse Gas Abatement Cost Curve"; Natural Resources Defense Council (2009) "CAP 2.0 Policy Brief: Kick Starting Building Efficiency";

The conclusion of the McKinsey & Co. analysis is that the measures necessary to stabilize greenhouse gas concentrations in the atmosphere at 450 parts per million have a net cost near zero, as a result of the "negative cost" energy efficiency measures.

Good for consumers and businesses

Improving efficiency is good for everyone. Efficiency improvements not only reduce emissions, but also save consumers and businesses money. Energy prices are escalating and would continue to rise with a price on carbon. Energy efficiency will reduce the impact of climate policies on consumer's energy bills. It will lower energy spend for American businesses large and small, enabling them to better compete in the global economy. Smarter, more efficient buildings not only have lower utility bills, but also improve health, safety, and comfort.

Creates good domestic jobs:

Complementary energy efficiency policies have the potential to create a substantial wave of new domestic green-collar jobs districts across the country. Efficiency improvement projects are relatively labor-intensive and require local skilled workers.

Increased energy efficiency investment activity will allow companies like Johnson Controls to provide opportunities for many new workers at all levels to join our team. Meeting the world's energy and climate challenges will require thousands of new building technicians, building operators, energy engineers, construction crews, and manufacturing workers.

According to the American Council for an Energy Efficient Economy, "a 20 percent to 30 percent energy efficiency gain within the U.S. economy might lead to a net gain of 500,000 to 1,500,000 jobs by 2030."[4]

Technology available today:

A wide variety of energy-efficient technologies are available and cost-effective today. Global climate dynamics do not allow us to take a "wait and see" approach or to wait for a silver bullet technology breakthrough. While R&D to develop new technologies is certainly valuable, it is far more important to break down the barriers to the deployment of cost-effective technologies that are already available to us.

Compared to other climate solutions, energy efficiency improvements have rapid impacts. Efficiency projects don't face multi-year lead times or potential delays due to community resistance or legal disputes. We don't have to conduct long studies to build certainty that efficiency will indeed reduce emissions. Our company realizes energy savings opportunities for customers in a few short months through whole-building retrofits. Energy efficiency resources available today can be the bridge fuel to the low-carbon economy we need in coming decades.

Variety of complementary policies needed

Johnson Controls supports a comprehensive federal policy approach to reduce global climate risks.

[4] Laitner, J., McKinney, V. (2008) "Positive Returns: State Energy Efficiency Analyses Can Inform U.S. Energy Policy Assessments." American Council for an Energy-Efficient Economy. Report Number E084.

First, energy prices must reflect the full costs to society so that consumers and businesses make decisions based on the true economics. We support putting a price on carbon, encouraging time of use pricing, and making smart grid investments to give energy users the information they need to truer and more complete economic decisions. These policies will create a market pull for climate protection investments.

Although a price on carbon is essential, it alone is not sufficient to capture the full economic potential for efficiency-driven emission reductions due to a number of well-known market barriers to capturing the potential of energy efficiency, such as such as split incentives and lack of information. Complementary policies are needed to improve energy efficiency at the scale and speed necessary to confront the global climate challenge.

One of the most valuable complementary policies is an Energy Efficiency Resource Standard (EERS) such as the legislation Representative Markey has recently introduced. An EERS consists of electric and gas end-use savings targets for retail utilities, with flexibility to achieve them through a market-based trading system. Such a standard, supported by appropriate measurement and verification protocols, would dramatically ramp-up efficiency investment while helping utilities to find low-cost ways to decrease their overall emissions.

A comprehensive set of complementary policies would both stimulate demand for energy efficiency as well as raise minimum performance standards. Building codes are an important policy lever and should be increased to reflect the life-cycle cost effectiveness of available technology and design/construction practices. Voluntary high performance building codes, often based on green

building rating systems, should be incentivized based on the additional energy and emissions reductions they achieve. At Johnson Controls, we have achieved LEED Gold certification for our Building Efficiency headquarters and are targeting LEED Platinum for our entire Corporate and Power Solutions campus. Funding to help educate builders and enforce building codes is also important.

Equipment standards are another important policy that addresses the problem of mismatched financial incentives between builders and owners. As a major HVAC equipment manufacturer, we see the business impact of these mismatched incentives through the low volume shipments of our most efficient models. Incentives that would create additional demand for the industry's highest efficiency products would drive additional research and development, increased manufacturing efficiencies and allow minimum equipment performance standards to be increased over time.

Lack of information on energy efficiency and operating costs is another key barrier to energy efficiency. Standard and effective performance labeling of buildings and equipment, in a manner similar to the European Union, would help educate current and prospective building owners and create additional demand for energy efficiency.

Technology can also provide critical information to building owners and operators to help them reduce energy use, particularly during critical periods of high energy demand. SmartGrid technology, with supporting utility rate structures, will allow electricity prices to more accurately reflect the true cost of generation, transmission and distribution. Enabling technology, such as smart meters and integrated building management systems, can provide building

owners and operators with real-time feedback on current energy consumption and reduction opportunities. These systems can also automatically respond to energy price and other signals to reduce demand, use stored energy or increase on-site generation. Policies that incentivize the accelerated development, demonstration and deployment of smart grid and smart building technology are encouraged.

Additional incentives are needed for existing buildings

With 1.08 billion square feet of new construction forecasted for this year alone[5], establishing complementary policies to enhance energy efficiency in new buildings is an important step[6]. But these opportunities are dwarfed by the prospects of raising energy efficiency in the approximately 72 billion square feet of existing building stock. Identifying complementary policies to unlock the unique energy efficiency potential within the existing building market is critical.

There are a broad range of barriers that prevent the raising of energy efficiency levels in existing buildings. One critical barrier is a series of incentive mismatches. The mismatches begin with energy generators that are incentivized to produce more energy (not use less); the mismatches follow on to building owners who are incentivized to spend less up front on energy intensive equipment (even if it costs them more in the long term); to tenants who are not incentivized to ask for more energy efficient equipment because they may not be around long enough in the building to reap the benefits.

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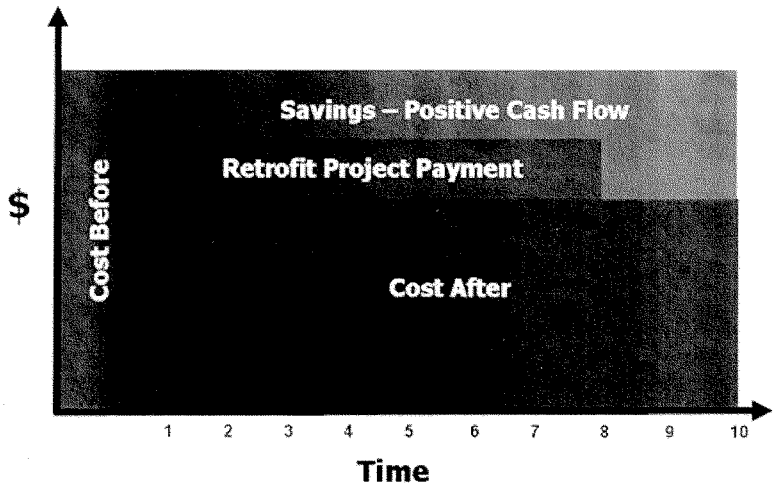
[5] 2009 McGraw Hill Construction Outlook Report

[6] DOE, Commercial Building Energy Consumption Survey (CBECS); http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/detailed_tables_2003.html

There are other barriers that contribute to prevent large scale energy efficiency. These include: (1) the relatively-low priority of energy efficiency improvements against other capital investments within a business despite having positive cash flow; (2) a complex and lengthy process of analyzing the opportunity, developing acceptable projects, implementing them, and then ensuring savings are realized; and (3) lack of information, expertise and confidence on how to monitor and verify projects to ensure that they deliver promised energy savings. These barriers have been effectively overcome in the public sector using performance contracting.

Performance contracting is a successful model

Performance contracting has been a successful model for implementing energy efficiency retrofits in the public sector for over twenty years. In this program, energy and operational savings over a specified time period are used to fund infrastructure improvements through a lease arrangement provided by a third-party financial institution. The projects are typically designed such that the annual energy and operational savings are greater than or equal to the required payments over the term of the contract.



The performance contractor takes complete turn-key responsibility for the project including preliminary energy audits, detailed design and engineering, business case analysis, installation, commissioning, performance measurement and verification. These projects include a variety of building improvements including lighting and mechanical system retrofits, technology upgrades, renewable energy installations, operator training and occupant education. The energy and operational savings are guaranteed by the contractor over the term of the contract. After the completion of the contract, all of the energy and operating savings revert back to the building owner.

Performance contracting provides a number of advantages that are important elements of a successful energy and climate policy. This programmatic approach to existing building retrofits results in significantly greater energy reductions and lower long-term operating costs. The ability to bundle short

payback improvements (e.g., lighting retrofits) with longer payback improvements (e.g., solar panels) into a single project provides a cost-effective way of investing in clean energy technology.

Performance contracting is a competitive, market-based approach that leverages public funding with private investment. The energy performance guarantees provided by the contractor are backed up by a rigorous measurement and verification process based upon international standards. This performance-based approach should be a model for all federal and state energy programs seeking to assure accountability and reward demonstrated accomplishment.

To provide some examples of the performance contracting model, a few case studies are useful.

Performance Contracting Case Studies

University of Massachusetts

Amherst, Mass.

For instance, under a 10-year performance contract beginning in 2005, Johnson Controls implemented over 45 energy conservation measures worth $42 million at the University of Massachusetts. The measures are guaranteed to more than pay for themselves over the life of the contract. Johnson Controls conducted a detailed audit to refine the costs and savings estimates for each conservation measure. More than 300 electric, water and steam meters were installed throughout the campus, which allowed us to establish a baseline for energy use and to measure the effectiveness of improvements.

Improvements include adding electric cogeneration at the power plant, installing electrical infrastructure upgrades, adding variable speed drives to

motors, and upgrading fume hoods. New, more energy efficient chillers were installed, steam lines were replaced, lighting retrofits were made and water conservation measures were implemented.

Technology implementation includes extensive use of the Johnson Controls Metasys® building management system for improved monitoring and control of equipment throughout the campus, maximizing energy savings, cost savings and comfort. In summary, this single campus will include:

- A $42 million investment in energy savings projects
- $56 million in guaranteed energy and operational savings over a 10-year contract term
- A reduced deferred maintenance backlog
- Significant long-term savings, allowing the university to invest in new projects
- An improved learning environment for students and staff

Johnson Controls is supporting the University of Massachusetts during the 10-year contract with a full time performance assurance specialist. The specialist's primary responsibility is the measurement and verification of energy savings. As an energy consultant, the specialist works closely with university staff to identify and quantify additional energy savings opportunities.

Johnson Controls also participates in campus outreach programs, such as offering training classes in energy conservation, which are provided to the dorm Resident Assistants, along with providing informational packages that are distributed to new students. Energy conservation contests between dorms have highlighted the role each of us can play in reducing energy use, reinforcing the

economic and environmental importance of energy and water conservation in the campus community.

Wyandotte Public Schools
Wyandotte, Mich.

The Wyandotte Public Schools district serves 4,700 students in 11 facilities spanning more than 900,000 square feet. The district has been working with Johnson Controls since 1998, implementing three back-to-back performance contracts that have allowed significant building and energy efficiency improvements while delivering $6.9 million in cost savings to the district.

Johnson Controls replaced windows and doors at the high school, conducted many upgrades and enhancements to the heating and cooling systems, and installed a Metasys® building management system at all schools. The roof at the middle school was replaced and a 10 kilowatt solar photovoltaic system was installed.

The high school was restored to its role as the centerpiece of the Wyandotte community. In addition to energy savings, the photovoltaic system provides students with first-hand experience in learning about solar energy. Johnson Controls involvement included helping to develop a curriculum to teach about energy efficiency and sustainability. As a result of these efforts, the Wyandotte School District became the first district in Michigan to be fully certified under the US Environmental Protection Agency's ENERGY STAR® program.

Oak Ridge National Laboratory

Oak Ridge, Tenn.

In August of 2008, Oak Ridge National Laboratory (ORNL) signed an $89 million energy savings performance contract with Johnson Controls to apply advanced energy conservation solutions, including a biomass gasification system, to the campus. The project was the first signed initiative of the U.S. Department of Energy's Transformational Energy Action Management (TEAM) Initiative, which is an action plan to dramatically transform the DOE's energy, environmental and transportation management.

The project's cornerstone is a wood gasification biomass system, which will take the place of the existing natural gas steam plant and steam distribution system. By using woody biomass from the region as the main energy source for the facilities, ORNL will reduce fossil fuel consumption by 80 percent. Furthermore, the biomass plant will significantly reduce greenhouse gas emissions – enough to be equal to planting 32 million trees.

Johnson Controls is delivering an innovative suite of energy efficiency solutions, including the installation of a "super boiler," advanced electric metering, energy efficient lighting, water conservation measures, compressed air cooling, comprehensive HVAC improvements and a Metasys® building management system to ensure that mission critical standards are maintained.

The new "super boiler" will be up to 94 percent efficient. This is a significant improvement when compared to traditional large-scale boilers, which often operate in the 50 to 60 percent efficiency range. The water conservation measures will also reduce water usage by more than 115 million gallons annually,

resulting in a long-term reduction of 16 percent. As a whole, the entire project will reduce energy intensity in the labs and office buildings by 30 percent, meeting ORNL's long-term energy reduction goal and significantly contributing to the goals of the TEAM initiative.

It is estimated that the biomass gasification system, "super boiler," and energy efficiency improvements will generate $8 million annually in energy and operational savings. As a result, ORNL expects to save more than $144 million over the 18 year term of the contract.

To kick off the energy efficiency upgrade project, Johnson Controls participated in an energy efficiency & sustainability education event at the lab, handing out information packets about the planned upgrades and educating employees regarding ways each of us can reduce energy use and live more sustainably.

Incentives Needed for Private Sector Retrofit Projects

While performance contracting has been successful in the public-sector, there are additional barriers to adoption in the private-sector. The mismatch of incentives between property owners and tenants and the frequency of ownership turnover results in requirements for extremely short investment paybacks. To address this, we recommend establishing a program that would encourage large scale, deep retrofitting of privately owned commercial buildings or portfolios of buildings. The program should provide incentives for efficiency improvements based on demonstrated energy reductions of no less than 20%. Increased incentives should be available to encourage 30% or greater reductions. The

incentive would take the form of a rebate per square foot and would be provided to building owners, or their agents, on an annual basis after measurement and verification.

Another barrier is the availability of third-party financing because of difficulty in using building assets as collateral to secure the loans. A loan guarantee, proportional to the targeted energy savings level, should be established to help attract capital from private sources to fund the improvements.

Availability of skilled labor both an opportunity and a challenge

There is a huge job creation potential associated with investments in energy efficiency in existing buildings. The Center for American Progress estimates that a $100B in "green" investment has the potential to create 935,000 direct jobs, 586,000 indirect jobs, and 496,000 induced jobs. In the building retrofit sector, the primary job creation is in skilled workers needed to perform the retrofits.

Building retrofit projects require understanding of both new technology and the financial implications of energy efficiency projects.

Large numbers of additional energy engineers are needed. As stated by ACEEE, " A new generation of energy efficiency practitioners, researchers, and policymakers needs to be trained and deployed to solve the problems we face."

For skilled labor, this means the creation of certificate programs (similar to NABCEP North American Board of Certified Energy Practitioners, the certification for solar installers) to ensure supply of workers with the right skills to install, commission and service energy efficiency projects. Potential providers of these

programs could include: military, unions and trade associations, revitalized vocational education in public schools, technical colleges and community/workforce development programs.

Public and private investment is needed to provide education at multiple levels. Skilled trade workforce education can be delivered through trade associations, revitalized vocational education programs, and military training programs.

Johnson Controls, Inc. has made a commitment to training employees in the Building Efficiency business globally. Employees at all levels are learning about green building technology and energy efficiency. We are training the next generation of mechanics and technicians through our Career Connect program. Johnson Controls, Inc. now has over 500 LEED Accredited Professional's around the globe.

Hybrid and Plug-in Hybrid Electric Vehicles (HEV and PHEV)

We feel it is important to identify one additional efficiency opportunity related to transportation: hybrid electric vehicles (HEV) and plug-in hybrid electric vehicles (PHEV). Currently, most hybrid vehicles operate on nickel metal hydride batteries. Johnson Controls is the first to begin producing lithium ion batteries for commercially available HEVs – the Mercedes S Class and the BMW 7 Series. For the future, Li-ion is the chemistry of choice for PHEVs because it is lighter, more powerful and takes up less space. Recently, Ford announced at the DC Auto Show, its partnership with us to have Johnson Controls provide the battery system for Fords PHEV.

The recent economic stimulus legislation passed by Congress, the American Recovery and Reinvestment Act, begins a comprehensive approach to provide incentives for advanced battery technology and PHEVs. It includes funding for: advanced battery manufacturing; converting the federal fleet to energy efficient vehicles; state and local governments to purchase fuel efficient trucks and buses, and to install needed infrastructure for PHEVs; targeted manufacturing and consumer purchase tax incentives; and continued research, development and deployment of advanced vehicle technology.

Climate change legislation should build upon this approach and continue to provide incentives to develop advanced battery manufacturing, stimulate production of PHEVs, and develop the Smart Grid technologies necessary to ensure that maximum benefits are derived from the electrification of our vehicle fleet. This will be critical to our addressing our carbon abatement challenge, reducing our dependence on oil, and to strengthen our energy and national security position.

Summary

Thank you for inviting us to introduce you to our company, and to share our perspective on complementary policies for climate legislation. As you consider options for addressing climate change, we hope this testimony will provide useful insights and recommendations.

As a world leader in providing energy efficiency products and services within commercial and industrial buildings, we believe we have a unique "on-the-ground" view of the opportunities and barriers to energy efficiency. From this

vantage point, we would like to summarize three key points made in this testimony:

1. Complementary policies, including an Energy Efficiency Resource Standard, are a critical component of any effective and comprehensive climate change policy
2. These policies must focus on unlocking the vast energy efficiency potential within the existing commercial and industrial building market ; it is our view that the performance contracting approach represents a proven and highly effective model
3. Finding and training workers to do the important work of improving energy efficiency within buildings across the United States is a central and significant challenge. It also represents a significant opportunity for our citizens.

We strongly believe in the need to increase the nation's focus and investment in energy efficiency. Energy efficiency should be the first priority in addressing climate change as a way of containing the cost of climate protection policies and creating new jobs. We need to focus on efficiency now...it's never been more important.

Thank you again for the opportunity to testify.

Reducing the Cost of Addressing Climate Change Through Energy Efficiency

February 2009

Consensus Recommendations for
Future Federal Climate Legislation in 2009

Supporting Groups

Alliance to Save Energy
American Council for an Energy-Efficient Economy
American Institute of Architects
Environmental and Energy Study Institute
Environment Northeast
Johnson Controls, Inc.
National Association of Energy Service Companies
Natural Resources Defense Council
Real Estate Roundtable

Contents

Executive Summary

National climate change legislation faces the challenge of achieving deep reductions in GHG emissions while limiting both national economic costs and consumer costs from the program. A carbon cap-and-trade program, most frequently discussed, would provide a much needed market price for carbon. However, since one of the principal aims of cap-and-trade programs is to lower the overall societal cost of greenhouse gas emissions reductions, it is crucial to design the national cap-and-trade system so that it inherently taps the lowest-cost emission reductions available to the economy.

Experience in numerous states shows that efficiency improvements on average cost about 3 cents per lifetime kilowatt-hour saved[1] compared to about 7 cents to over 13 cents per kilowatt-hour for conventional electricity generation.[2] Energy efficiency reduces the cost of cap-and-trade because less new energy facilities are needed and also because a smaller portion of existing facilities need to be upgraded to help meet emissions ceilings. A cap-and-trade program that maximizes the role of end-use energy efficiency in buildings, industry, and transportation systems, will, therefore, cost less and achieve more than a program that simply focuses on generators through a carbon cap and carbon price. Although a carbon cap is essential to ensure that the U.S. meets its emissions reduction goals, its impact on carbon price alone will not achieve sufficient reductions in energy use due to a number of well-known market barriers. Therefore, additional policies supporting energy efficiency must be implemented to achieve more rapid carbon reductions at a lower cost to consumers and the American economy.

This document focuses on how a cap-and-trade system can be designed to accelerate investments in energy efficiency. This summary provides an overview of recommendations which support the inclusion and advancement of energy efficiency in climate change legislation including suggestions on funding, complementary policies, low income programs, third-party and end-user programs, research, development and demonstration, and evaluation, measurement and verification.

I. Energy Efficiency Funding in a Climate Bill: How Much to Whom

Investment is needed rising to about $15-20 billion each year for energy efficiency deployment programs and policies in the residential, commercial, and industrial sectors. While some of this funding could be provided from utility rates, most should be from auction or allocation of carbon allowances. This is in addition to more than $6 billion each year needed for low-income energy efficiency programs, $8 billion for transportation policies and programs, and $3 billion for clean energy R&D.[3]

Such funding should ramp up over about 5-7 years, then remain at a sustained level. States and utilities should be provided funds to start and grow energy-efficiency programs as soon as possible, and before the cap has begun through appropriations and borrowing or early allocation of allowances.

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[1] Kushler, York and Witte, 2004, *Five Years In: An Examination of the First Half Decade of Public Benefits Energy Efficiency Policies.* Report U042. Washington, DC: American Council for an Energy-Efficient Economy.

[2] Lazard. June 2008. *Levelized Cost of Energy Analysis — Version 2.0*: http://www.narucmeetings.org/Presentations/2008%20EMP%20Levelized%20Cost%20of%20Energy%20-%20Master%20June%202008%20(2).pdf

[3] A separate coalition is making recommendations for additional funding for transportation programs. This coalition also has recommendations for additional funding for energy efficiency research and development programs.

Initially, a substantial majority of the energy efficiency funding should go to states and utilities, allowing for a wide variety of energy efficiency policies and programs, with the balance going to specific federal and local government programs. State PUCs and consumer-owned utility governing boards should have oversight of funded utility programs, and should be able to redirect funding for utility programs to the state or to other efficiency providers. Funding should be distributed through a combination of size-based and performance-based allocation. State PUCs and consumer -owned utility governing boards should coordinate energy efficiency programs with State Energy Offices to maximize customer outreach and leverage available resources from the states.

The performance metric for states should be based on overall improvements in energy use over a specified period of time, if possible, or, alternatively, through verified energy savings from policies and programs. A portion of the performance-based allocation to states should require that states adopt and achieve compliance with strong building energy codes and that they adopt utility rate structures that reward utilities at least as well for energy efficiency as for energy supply.[4]

II. Energy Efficiency Complementary Policy Recommendations

Complementary energy efficiency policy recommendations could be included in either an energy bill or a climate bill. These policies, however, do not include short-term measures that might be included in an economic stimulus bill and do not specifically address the carbon cap or distribution of funds in climate change legislation and, as such, are complementary to the cap. We recommend the following:

- Implement an energy efficiency resource standard requiring utilities and states to meet 15% of electricity sales and 10% of natural gas sales by 2020 through energy efficiency programs, improved building codes and equipment efficiency standards, combined heat and power, and distribution efficiency.[5]
- Develop advanced building energy codes to reduce energy use of new buildings by at least 30% starting in 2010 and 50% starting in 2020, encourage states to adopt, implement, and enforce the codes, and provide greater technical assistance and funding for states and code-setting organizations.
- Clarify the process by which DOE revises appliance and equipment standards, including its authority to set multiple performance standards for a product; to consider the impact of carbon emissions and energy savings on energy prices; to strengthen the "rebuttable presumption test" for setting standards for highly cost-effective efficiency savings; to allow state building energy codes greater flexibility to address equipment in new buildings; and to set standards on "BR" reflector lamps.
- Extend and enhance federal tax incentives that promote energy efficiency to help introduce new technologies into the marketplace, increase the market share of energy-efficient products, and lower their cost for consumers.
- Expand the Home Performance with EnergyStar program nationwide and provide a performance-based rebate to homeowners to undertake comprehensive energy efficiency retrofits of existing homes.
- Establish a federal incentive program to encourage large scale, deep retrofitting of private and publicly owned commercial buildings, with incentives for building owners for efficiency

[4] This could, for example, be achieved with two threshold requirements for performance-based funding for states: 1) fully comply with the requirements in the codes legislation that was in Sec. 401 of H.R. 6899 (and Sec. 612 of the Boxer Substitute to Lieberman-Warner) in 2008, and 2) adopt electricity and natural gas rate structures and resource plans that DOE believes fully meet the goals of Sec. 532 of EISA.

[5] See Energy Efficiency Resource Standard (EERS) for Retail Electricity & Natural Gas Distributors, 2009, American Council for an Energy-Efficient Economy, available at http://aceee.org/energy/national/FederalEERSfactsheet_Jan09.pdf.

improvements based on demonstrated energy savings of no less than 20%, with incentives calibrated to encourage 30% savings or greater.

- Expand the existing Industrial Assessment Center program and establish a new Building Assessment Center program to train engineers, building scientists and technicians to identify and implement energy-efficiency improvements in commercial and institutional buildings.
- Develop a national model to implement coordinated building energy efficiency labeling and energy use disclosure programs for homes and commercial buildings and encourage and assist states, counties and local governments in using this national model in local programs.
- Develop a comprehensive energy-efficient mortgage program, through the use of interest rate buy-downs or other means as deemed appropriate, to motivate buyers to purchase more efficient homes or upgrade the efficiency of their newly-purchased homes.
- Implement a program to support the replacement of pre-1976 manufactured housing with ENERGY STAR-rated manufactured housing units.
- Ramp up funding to at least $500 million annually for investments dedicated exclusively to energy efficiency in multi-family housing within the HOME Investment Partnership Program (HOME), which supports construction of new and substantially renovated moderate-income housing.
- Expand the definition of energy savings performance contracts (ESPCs) to include new construction and leased buildings, exempt ESPCs from the Enhanced Competition requirements included in the FY2008 National Defense Authorization Act, and add the use of alternative financing for energy projects to the Office of Management and Budget Energy Scorecard.
- Ensure the use of realistic fuel prices and current EPA label values in setting fuel economy standards and achieve an average of at least 42 miles per gallon by 2020.[6]

III. Low Income Programs

The national Weatherization Assistance Program (WAP) network must be expanded to meet the goal of weatherizing 1,000,000 homes each year on a timeline that allows for orderly transition and ramp-up of staff and production. Funding increases for the WAP should be phased in over a three-year cycle, beginning at $1.5 billion, and then sustained at $5.0 billion per year.

Congress should establish a new program at DOE to offer competitive grants for innovative projects to improve the efficiency of multifamily and manufactured housing with funding authorization of about $50 million in the first year, rising to about $500 million in year 5. Follow-up programs should have authorizations above $1 billion. We also recommended that an additional $500 million be invested in the Home Investment Partnership Program annually, specifically for energy efficiency investments in rental housing. Additionally, grants should be provided to private owners who implement energy efficiency measures in housing assisted through project-based Section 8 and other similar subsidy programs.

For the low income transportation sector, we recommend a Crusher Credit which would offer the owner of an inefficient vehicle a voucher redeemable toward the purchase of an efficient vehicle (new or used) or for transit fare credit. Vehicles turned in under this program would be retired, accelerating the transformation of the U.S. vehicle stock into a more efficient one. A climate bill should also include funding for pilot projects that provide new, innovative transit services, or enhancements of existing services, for locations and populations that are currently underserved by transit. The FTA should administer the program, with funding beginning at $100 million per year and increasing over time.

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[6] If EPA label values were the basis for measuring manufacturers' CAFE compliance, the target fuel economy for fuel economy in 2020 would be lower than 42 miles per gallon.

IV. Third-party and End-user Programs

Well-designed, national, performance-based incentives are needed to accelerate dramatic improvement in whole-building energy efficiency. These national programs have particular value to owners of portfolios of buildings in multiple states, large developers, and national energy service companies. We propose the following two program structures:

1. A Super Efficient Buildings Incentive (SEBI) program that creates an incentive structure for existing privately and publicly owned buildings that undergo deep retrofits that significantly improve measured energy performance, and for new buildings that far exceed the required minimum code performance. In the case of residential buildings, the program may be administered through state/utility programs.

For existing buildings, in order to receive federal incentives, a building would need to demonstrate no less than 20% improvement in efficiency from a deep energy efficiency retrofit and from changes to building operation. New buildings would receive a federal incentive for meeting established above-code energy goals for building type and size.

2. A "Super-Efficient Equipment and Appliances Deployment Program" that establishes incentives for retailers, manufacturers and distributors in the United States as reward for increasing market share of high efficiency building equipment, high-efficiency consumer electronics, and high-efficiency household appliances with the goal of minimizing life-cycle costs for consumers and maximizing public benefit.

V. Research, Development & Demonstration

We recommend an immediate increase in regular appropriations for energy efficiency and renewable energy technology RD&D in the federal budget, in advance of the enactment of any climate change legislation, together with supplemental funding derived from allowance value in a future climate bill. We recommend an initial doubling within a three year time frame of funding for clean energy RD&D, starting with the FY 2010 appropriations cycle for the Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE), DOE Office of Science; and DOE Office of Electricity Delivery and Energy Reliability.[7]

In addition to increased standard appropriations funding, $3 billion annually funded through a climate change program should be allocated to clean energy RD&D to develop the technologies required to reduce GHG emissions and reduce the cost of lowering emissions. Congress should also provide greater definition to ARPA-E to ensure that the focus of research will be in clean technology programmatic areas and to ensure that ARPA-E is structured to serve the competitive diverse energy sector.

VI. Evaluation, Measurement and Verification

Climate legislation should include a directive to EPA to develop rules for evaluation, measurement and verification of changes in energy use and greenhouse gas emissions induced by energy efficiency policies, programs and projects in a manner that balances evaluation costs and benefits and takes into account existing domestic and international evaluation protocols. We specifically propose that EPA provide direction related to challenging issues such as additionality, market effects and measure persistence.

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[7] This funding should be specifically targeted for use towards Energy Efficiency in these offices.

VII. TRANSPORTATION

A section which discusses policy recommendations regarding transportation systems, including CAFE standards and reduced vehicle miles traveled, and additional funding recommendations is currently under development with a number of transportation policy advocate groups. This section will either be included in a later version of this working paper or it will be issued as a separate document.

VIII. CONCLUSION

The most cost-effective method of reducing greenhouse gas emissions is through energy efficiency which provides "avoided tons" of carbon at the lowest cost. Incorporating the suggested energy efficiency programs and policies into climate change legislation will accelerate emissions reductions while reducing the costs associated with a carbon cap. The recommendations discussed above will reduce energy use on the order of two percent per year after an initial ramp up period, reaching approximately 30% energy savings by 2030.[8] The full report provides in-depth details on all of the above recommendations.

[8] Savings values are based on approximately 1.5% savings per year with additional savings achievable through building codes, equipment efficiency standards, an EERS, and other policies, with comparable savings in the transportation sector.

ENERGY EFFICIENCY — THE CORNERSTONE OF A U.S. CARBON CAP-AND-TRADE PROGRAM

Overview

National climate change legislation faces the challenge of achieving deep reductions in GHG emissions while limiting both national economic costs and consumer costs from the program. A carbon cap-and-trade program, most frequently discussed, would provide a much needed market price for carbon. However, since one of the principal aims of cap-and-trade programs is to lower the overall societal cost of greenhouse gas emissions reductions, it is crucial to design the national cap-and-trade system so that it inherently taps the lowest-cost emission reductions available to the economy. Efficient end-use technologies in buildings, industry, and transportation systems will provide the lowest-cost resources available to lower GHG emissions – *thus a central aim of cap-and-trade design must be to deliver end-use efficiency in diverse applications across buildings and industry, and in transportation systems nationwide.*

Efficiency is a key part of cost containment in a national cap-and-trade program.

This document focuses on how a cap-and-trade system can be designed to accelerate investments in energy efficiency, which would permit more rapid carbon reductions at a lower cost to consumers and the American economy. The discussion follows four key points:

(1) Energy efficiency is the low-cost equivalent of a "carbon scrubber" for homes and commercial buildings[9] and for the electric power sector. Improved vehicle efficiency is also the lowest-cost means of reducing emissions from the transportation sector. It is the most important resource to look to as the bridge fuel to the low-carbon economy we need in coming decades;

(2) Energy efficiency is the *key to cost containment* in a GHG cap-and-trade program. Although adding a carbon price signal to the cost of electricity and heating fuels is necessary and will have some energy-efficiency benefits, cap-and-trade programs that try to reduce emissions through price alone will be much more costly per ton reduced than a cap-and-trade program that includes proven techniques to deliver low-cost efficiency resources. At the consumer level, there are a number of well-documented and very serious market barriers to the cost-effective deployment of efficiency investments across the economy. For this reason, many low-cost savings opportunities remain untapped and higher power and fuel prices alone will not reduce demand nearly enough to meet our carbon goals. At the generator level, only a very high carbon price would make a meaningful change in the dispatch of the existing generation fleet. At the level of consumer demand and generation high prices required in the absence of efficiency programs to produce the deep reductions now called for by climate scientists would impose unnecessarily high costs on consumers and the economy[10];

(3) Careful cap-and-trade designs can contain the cost of GHG reductions by allocating allowances for consumer benefit and investing allowance values in programmatic efficiency measures. Congress should build on this state and regional experience by (a) auctioning

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[9] "Energy efficiency" in buildings and industry also includes well-designed combined heat and power (CHP) applications. Since CHP systems use the waste heat from electric generation to provide thermal energy for heating, cooling, or industrial systems, they can reduce the building's total emissions burden, as compared with stand-alone systems for electric generation and thermal load. The difference between those separate energy demands and the CHP energy demand is an improvement in end-use efficiency and a reduction in total emissions.

[10] For more detail on these points see Richard Cowart, "Carbon Caps and Efficiency Resources: How Climate Legislation Can Mobilize Efficiency and Lower the Cost of Greenhouse Gas Emission Reduction," 33 Vermont Law Review 201-223 (2008).

allowances and investing auction revenues to improve the energy fitness of homes and businesses across the nation; (b) creating an "efficiency allocation" of carbon credits to the states and utilities, a portion of which is performance based; and (c) enacting complementary policies to promote cost-effective energy efficiency investments.

The Efficiency Reservoir is Large and Can be Tapped at Low Cost

National climate legislation will necessarily cover power and fuel use in buildings as major components of the move to a lower-emissions economy. Energy consumption in buildings, including direct consumption of electricity and fossil fuels, accounts for nearly half of all of the nation's GHG emissions.[11]

The *emissions reduction potential from efficiency* in these sectors is also significant. Intergovernmental Panel on Climate Change (IPCC) studies reveal that across many sectors, the efficiency potential is quite large; in particular, the buildings sector provides one of the largest sources of GHG emission reductions occurring through efficiency actions.[12] A recent study by the McKinsey consulting firm found that by 2030 energy efficiency from buildings, transportation and industry could account for 40% of the U.S. carbon dioxide emissions reduced by that year.[13] There are now many studies documenting that with policy commitments, aggressive efficiency investments can meet most of the expected growth in U.S. energy demand.[14] Accelerated energy efficiency technology development and deployment can arrest the growth in GHG emissions that would otherwise occur with continuing demand growth, especially in the power sector.[15]

In addition to being quite large, the efficiency reservoir *can be tapped at low cost.* In electricity markets, the efficiency savings potential has been shown to be on the order of 25% of total electricity usage[16] at a levelized cost of about three cents per kilowatt-hour (kWh).[17] Using efficiency efforts with levelized costs above three cents per kWh but below the average cost of supply would yield additional savings. This is much less than the average national retail price of electricity, currently more than 8 cents per kWh.[18] This is also less than the marginal generation cost of new power plants, estimated, depending on the technology, to cost 5 to 10 cents per kWh or more.[19] Energy efficiency reduces the cost of cap-and-trade as less new energy facilities are needed

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[11] Architecture 2030, *The Building Sector: A Hidden Culprit*, available at http://www.architecture2030.org/current_situation/building_sector.html.

[12] Intergovernmental Panel on Climate Change (Working Group III to the Fourth Assessment Report of the IPCC), Climate Change 2007: Mitigation 9, 10 tbl.SPM.3 (Bert Metz et al. eds. 2007), available at http://www.ipcc.ch/ipccreports/ar4-wg3.htm (follow "Chapter 11: Mitigation from a cross-sectoral perspective") [hereinafter Mitigation]. This is partly attributable to the fact that the IPCC's methodology includes electricity generation related GHG emissions in the end-use sectors rather than in the energy supply sector. *Id.* at 10

[13] McKinsey and Company, "Reducing US Greenhouse Gas Emissions: How Much At What Cost?" available at http://www.mckinsey.com/clientservice/ccsi/pdf/Greenhouse_Gas_Emissions_Executive_Summary.pdf

[14] *Id.*

[15] *Id.*

[16] *See* Maggie Eldridge, et al. *Energy Efficiency: The First Fuel for a Clean Energy Future — Maryland's Resources for Reducing Electricity Needs,* ACEEE, *available at* http://aceee.org/pubs/e082.htm.

[17] *See* Martin Kushler et al., *Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies*, 29, 30 tbl.5 (2004), *available at* http://www.aceee.org/pubs/u041.htm (stating that the efficiency programs in the aggregate are very cost-effective, with savings ranging from $0.023 to $0.044/kWh).

[18] Energy Information Administration, Total Electric Power Summary Statistics (Aug. 25, 2008), http://www.eia.doe.gov/cneaf/electricity/epm/tablees1a.html.

[19] Lazard, Levelized Cost of Energy Analysis – Version 2.0 at 2 (2008), *available at* http://www.narucmeetings.org/Presentations/2008%20EMP%20Levelized%20Cost%20of%20Energy%20-%20Master%20June%202008%20(2).pdf.

and a smaller portion of existing facilities need to be upgraded to meet emissions ceilings. Energy efficiency is thus the equivalent of a low-cost "carbon scrubber" for the power sector.

And the efficiency resource grows with time, as new technologies become feasible in the market due to programs that overcome market barriers. These new technologies go beyond the potentials documented in the studies mentioned here[20].

Investing Carbon Credits in Efficiency – a GHG Cost-Containment Strategy

Recapturing and recycling generator and fuel price increases to consumers will lower the consumer cost of a carbon capture program. But in what form should those benefits be returned to consumers? Some consumer advocates propose that revenues from the sale of carbon credits should be returned to consumers in the form of rate rebates. For low-income households in particular, some form of direct transfer payments to offset increased costs may be a necessary component of the climate program. However, overall, direct consumer payments alone will not produce the best long-term results for consumers.

The best outcome for consumers as a whole, and the best way to lower the societal cost of carbon reduction, is *to invest substantial carbon credit revenues in low-carbon resources*—especially low-cost energy efficiency measures. There is solid evidence for this conclusion. As a general matter, well-designed efficiency programs can deliver five to seven times more GHG savings for a given rate increase, than the rate increase alone would have delivered.[21] At the same time, it reduces the burden on consumers of higher costs by lowering bills. Modeling runs conducted for the Regional Greenhouse Gas Initiative revealed that increasing the region's spending on energy efficiency was the key to lowering the overall economic cost of RGGI's planned carbon reductions. That study found that doubling investments in energy efficiency throughout the RGGI region would lower projected load growth by two-thirds by 2024.[22] Efficiency would also reduce carbon emissions, holding them roughly constant during the same period—compared to a 15% rise in the base case. Recycling carbon revenues through efficiency investments was found to greatly reduce the cost of meeting the RGGI cap, actually reducing the average annual household power bill by over $100.[23]

The RGGI cost models and efficiency proposals have been examined in numerous state rulemakings and legislative and administrative decisions across the 10-state RGGI region. It is instructive that in every RGGI state, energy efficiency is the primary use chosen to receive RGGI allowance proceeds. As of December 2008, across the ten-state RGGI region, approximately 90% of total allowances will be auctioned, with as much as 80% of auction revenues dedicated to investments in end-use energy efficiency.

Similarly, a study by the American Council for an Energy-Efficient Economy in December 2007 found that energy efficiency and renewable energy investments could reduce the wholesale price of

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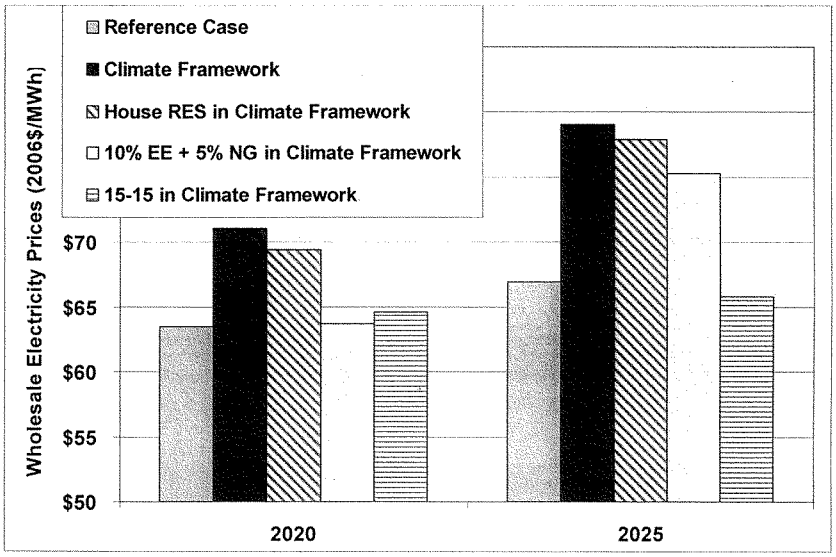
[20] D.Goldstein. " Extreme Efficiency: How Far Can We Go If We Really Need To". Proceedings of the 2008 ACEEE Summer Study on Energy Efficiency in Buildings"

[21] Richard Cowart, *supra* note 2 at pp.212-215. This is a dramatic difference, but the explanation is straightforward. Demand for electricity is relatively inelastic, and market barriers to end-use efficiency block investments by building owners, tenants, and even industrial customers. On the other hand, efficiency standards and programs by utilities, governments, and industry consortia can deliver significant savings at costs well below the marginal cost of new power sources. Thus, consumer response to a given carbon price premium is relatively weak compared to reductions from codes, standards, and efficiency programs.

[22] William Prindle, et al., Energy Efficiency's Role in a Carbon Cap-and-Trade System: Modeling Results from the Regional Greenhouse Gas Initiative iii (2006), *available at* http://aceee.org/pubs/e064.pdf?CFID=1812522&CFTOKEN=798299427.

[23] *Id.*

electricity under a greenhouse gas cap-and-trade system, since these investments, reduce demand for conventional resources, allowing more expensive projects to be deferred or canceled. Moreover, efficiency as a zero-carbon resource also lowers the *demand for carbon permits*, lowering both the direct and indirect costs of carbon allowances on the power system. ACEEE's findings are summarized in the figure below. The study revealed that the proposed "Climate Framework" would raise wholesale power rates (second bar) above the reference case (first bar), but that a 15% Renewable Electricity Standard plus a 15% Energy Efficiency Standard would offset those costs, and by 2025 could actually lower wholesale power costs slightly below the reference case levels (fifth bar).[24]



Notes: Reference cast is EIA's 2007 Annual Energy Outlook reference case. Climate framework is the Bingaman-Specter proposal from 2007. House RES is a 15% renewable energy standard by 2020, of which 4% can be efficiency. 10%+5% are energy efficiency performance standards in 2020 for electricity and natural gas respectively. 15-15 is a 15% renewable energy standards and a 15% energy efficiency standard in 2025.

Conclusion

In sum, cap-and-trade (and the price signal this will generate) addresses a market failure called externality costs, but other barriers to energy efficiency will cause underinvestment in energy efficiency. Additional market interventions will still be necessary to address other market barriers, such as split incentives and lack of information. Since energy efficiency is a low cost carbon abatement resource[25], the overall cost of abatement will be much lower if market barriers that lead

[24] W. Prindle, et al., December 2007, *Assessment of the House Renewable Electricity Standard and Expanded Clean Energy Scenarios*, ACEEE, available at http://www.aceee.org/pubs/e079.htm.
[25] McKinsey and Company, *supra* note 6.

to underinvestment in energy efficiency are addressed.[26] Program designs to accomplish this are described in the following sections.

[26] *See*, for example, W. Prindle et al., December 2007, *supra* note 18 (finding that in a cap and trade environment, wholesale electric prices are lower with extensive policy-driven energy efficiency investments than if we just relied on the market to drive efficiency improvements).

Recommendations
The following recommendations discuss a number of specific elements of energy efficiency and how such elements can be an effective method of reducing the cost of climate change. Recommendations on how much funding, and how to allocate it, are also included. These recommendations are in no particular order of priority as all are important aspects deserving consideration. In addition to funding, complementary policies are also a necessary component to successful climate change policy. Such complementary policies could be included in a climate change bill or broken out into various provisions of an energy bill.

I. ENERGY EFFICIENCY FUNDING IN A CLIMATE BILL: HOW MUCH TO WHOM

Amount of Energy Efficiency Funding
Investment is needed rising to about $15-20 billion each year for energy efficiency deployment programs and policies in the residential, commercial, and industrial sectors. While some of this funding could be provided from utility rates, most should be from allocation or auction of carbon allowances. This is in addition to more than $6 billion each year needed for low-income energy efficiency programs, $8 billion for transportation policies and programs which will be detailed in a separate, forthcoming working paper, and $3 billion for clean energy R&D. [27]

It is important to capture as much cost-effective energy efficiency as possible in order to meet climate goals and reduce the cost of a cap-and-trade program. A carbon cap is essential to ensure that the U.S. meets its emissions reduction goals, but its impact on carbon price alone will not achieve sufficient reductions in energy use due to a number of well-known market barriers. Therefore, it also is necessary to fund energy efficiency policies and programs. We believe an aggressive but achievable long-term goal is new savings each year of 1.5-2% of electricity, direct natural gas, and fuel oil use (compared to a no-action baseline) through deployment programs and state codes and policies. The most aggressive state programs achieved verified savings of about 1.75% of electricity sales last year, and over 1% annual savings over longer periods. Several states have adopted targets of 2% annual savings or more. While there is less experience with natural gas and fuel oil programs and less estimated potential from such programs,[28] there is a large savings potential for these fuels through state building energy codes. We estimate that the combination of recommended programs and policies will cumulative achieve approximately 30% energy savings by 2030.

Assuming a reasonable ramp-up, such savings would yield an estimated reduction of 760-950 million tons of CO_2 in the year 2030. Of course this is in addition to savings that would be achieved through the carbon price due to the emissions cap. This would largely capture the cost-effective carbon abatement potential from energy efficiency found in the mid-range estimate of the widely-cited McKinsey study in the buildings and industrial sectors, which totaled about 950 MMT CO_2.

We can estimate the investment needed to achieve these savings based on extensive program experience. While they range widely, typical program costs[29] yield a total investment cost of $34-

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[27] A separate coalition is making recommendations for additional funding for transportation programs. This coalition has recommendations for additional funding for energy efficiency research and development programs.
[28] See Joe Loper, Selin Devranoglu, Steve Capanna, and Mark Gilbert, *Energy Efficiency Potential in American Buildings*, May 2007, available at www.ase.org/files/3799_file_building_efficiency.pdf.
[29] Assumes estimates from ACEEE based on reviews of electricity and natural gas programs, and of fuel oil opportunities: typical investment cost for electricity of $0.40/annual kWh, for natural gas of $4/annual therm, and for fuel oil of $8.20/annual gallon (note these are one-time costs for yearly savings over, typically, 10-20 years), Also assumes that government and utility programs will need on average to pay for about 40% of the cost (with customers

44 billion per year. Government programs would only need to pay a portion of this, yielding an annual requirement of $17-22 billion. But building codes and other policies usually have somewhat lower government costs per unit of energy saved. Not all of this amount needs to come from carbon allowances. It would be reasonable to assume substantial funding from utility rates, as customers would receive most of the economic benefits through reduced utility bills. Such ratepayer funding of energy efficiency programs currently is an estimated $3.7 billion per year, and rising.[30]

We count low-income energy-efficiency assistance separately as these programs are much more expensive per amount of energy saved (in part because the government typically pays all the costs), but they are vital to help low-income households afford increased energy costs due to a carbon price. The National Association for State Community Services Programs (NASCSP) has estimated that weatherization programs could weatherize one million low-income homes for $3.8 billion each year. We believe roughly an additional $2 billion each year is needed for other low-income energy-efficiency programs, as specified below in Section III regarding Low Income Programs.

Large Scale Program Ramp Up

Funding for energy efficiency programs should ramp up over about 5-7 years, then remain at a sustained level. States and utilities should be provided funds to start and grow energy-efficiency programs as soon as possible, and before the cap has begun. Appropriations for energy efficiency programs should be increased immediately to allow earlier growth. In addition, funds from a carbon cap can be used for efficiency as soon as a bill is passed either through early allocation/auction of credits or through borrowing credits from future allocations.

We are proposing energy efficiency programs roughly 4-5 times the size of current state and utility programs. The trained personnel, specialized equipment, and program designs needed to effectively invest such a level of new funds effectively simply do not exist today and need time to be created. Thus we suggest that funding for the energy efficiency programs be ramped up to our recommended levels over about 5-7 years (if the levels are reduced, then less time will be needed). The weatherization program already has a presence in all areas and an established training program, and is expanding under FY09 appropriations; thus it may need less time to ramp up.

Receipt and Use of Energy Efficiency Funding

Initially, a substantial majority of the energy efficiency funding should go to states and utilities, with the balance going to specific federal programs and to local governments. State PUCs and consumer-owned utility governing boards should have oversight over funded utility programs, and should be able to redirect any funding for utility programs to the state or to other providers. The state and utility funding should be allowed for a wide variety of energy efficiency policies and programs that are shown to reduce energy use and greenhouse gas emissions. State PUCs and consumer-owned utility governing boards should coordinate energy efficiency programs with State Energy Offices to maximize customer outreach and leverage available resources from the states.

Historically in this country most energy efficiency deployment programs have been run by utilities and state agencies. They have extensive experience in some parts of the country, including with evaluating and improving programs. They also have established relationships with their customers or citizens, and knowledge of local conditions. In addition, investor-owned utilities have oversight

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paying the balance), and adds 25% onto the government and utility investment to pay for marketing, technical assistance, evaluation and other program administration costs,.

[30] Consortium for Energy Efficiency, 2008. See http://www.cee1.org/ee-pe/2008/us_combo.php.

from public utility commissions. States have the potential to achieve much more cost-effective savings through building codes and other policies. We urge that most funding be provided through these established mechanisms, and that funding be available to both states and utilities.

Federal programs are needed for purposes that are most effectively addressed nationwide. We also support funding for local governments, with focus on demonstrated performance in achieving energy efficiency as discussed below.

To allow needed innovation, states and utilities should be given broad discretion in deciding how best to use the funds for energy efficiency, with strong incentives for demonstrated reductions in energy use. It is important that funding be available to help states adopt, implement and enforce building energy codes and other policies, as these policies are often the most effective way of achieving energy savings, as well as for deployment programs. Even if the funding is distributed based on achieved savings, we believe there still should be a requirement that the funds be used for energy efficiency.

Funding Distribution Among States/Utilities
Funding should be distributed through a combination of size-based and performance-based allocation. Funding in the first three years should be entirely based on population and on use of electricity, natural gas, and fuel oil in an appropriate baseline period. Funding should then transition to be based three-fourths on demonstrated reductions in energy use, and the remaining fourth on population and historical energy use.

The performance metric for states should be based if possible on improvement in macroeconomic indicators of energy use in that state (such as overall energy use in a sector normalized for weather and economic activity) over the previous three years. Verified energy savings from policies and programs could also be used as the metric. There also should be a cap on funding per unit of energy saved.

A portion of the performance-based allocation to states should require that states adopt and achieve compliance with strong building energy codes and that they adopt utility rate structures that reward utilities at least as well for energy efficiency as for energy supply.[31]

States and utilities must have a strong incentive to maximize energy and cost savings and greenhouse gas emission reductions. Otherwise they may focus on other goals in using this money. However, in the first few years many states and utilities will have a limited track record, and implementers who perform poorly should have some ability to improve their record and "get back in the game." In order not to create an incentive to increase energy use, the size metric should be energy use in a base period corrected for changes in population and/or economic activity.

While a performance-based distribution will use funds most effectively, accurately measuring the reductions in energy use and greenhouse gas emissions that are due to efficiency policies and programs can be difficult, especially for innovative approaches to transforming entire markets. Almost all such programs (but not most policies) are evaluated today, but the protocols and savings estimates vary. Thus the performance measurement may be most accurate and effective if the state

[31] This could, for example, be achieved with two threshold requirements for performance-based funding for states: 1) fully comply with the requirements in the codes legislation that was in Sec. 401 of H.R. 6899 (and Sec. 612 of the Boxer Substitute to Lieberman-Warner) in 2008, and 2) adopt electricity and natural gas rate structures and resource plans that DOE believes fully meet the goals of Sec. 532 of EISA.

actions collectively can be tied to overall indicators. However, as energy use is affected by many other factors, state distributions may be highly variable and have little to do with what the states did, and it may be necessary to use estimated program and policy savings. If funds are directed both to states and to utilities, then the distribution to utilities should be based on estimated savings from their programs, and the utility savings should then be subtracted from the savings attributed to states.

The performance-based distribution should give credit for state and utility programs funded from other sources and for policies that do not require funding. Besides rewarding beneficial actions, this will give a strong incentive to use ratepayer funds as well as allowance funds.

II. ENERGY EFFICIENCY COMPLEMENTARY POLICY RECOMMENDATIONS

Note: These recommendations pertain to an energy or climate bill and do not include short-term measures that might be included in an economic stimulus bill. Short-term recommendations are provided on a complementary list prepared by many of the same organizations.

Energy efficiency resource standard

Congress should establish an energy efficiency resource standard (EERS) for electric and natural gas utilities, both investor- and consumer-owned. An EERS is a performance standard requiring utilities and states to meet a portion of their customers' needs through energy efficiency instead of by constructing new generation, transmission and distribution facilities. The EERS should require utilities to achieve energy savings increasing to 15% of electricity sales and 10% of natural gas sales by 2020, through efficiency programs, improvements to building codes and equipment efficiency standards, combined heat and power, and distribution efficiency. The EERS policy is modeled after the renewable electricity standard (RES), which is a performance standard used to promote the use of renewable energy. This would build on President Obama's platform to set a target to reduce electricity use by 15% by 2020 and the Schumer-Landrieu proposal from the 2007 Senate energy bill debate. Obama's 15% by 2020 goal, which we endorse, and Schumer-Landrieu's 10% by 2020 goal are similar, as Obama's proposal and our proposal include savings from building codes and equipment efficiency standards, while the Schumer-Landrieu proposal does not.[32]

Advanced building energy codes

Congress should establish targets for the residential and commercial model energy building codes to increase their energy efficiency savings by at least 30% by 2010 and 50% by 2020. The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) is responsible for developing the commercial model energy code, and the most recent version is ASHRAE 90.1-2007. The residential energy code is developed by the International Code Council (ICC) and the most recent version is the 2009 International Energy Conservation Code (IECC). The states should be encouraged to adopt and enforce the updated codes. Congress should provide the DOE sufficient resources to provide technical assistance and funding for the adoption, implementation and enforcement of the codes. Congress should direct DOE to assist ASHRAE and ICC in publishing voluntary building codes that are more stringent than the model energy building codes -- or "stretch code" -- so that states that want to use a more aggressive code than the model codes will have a technically robust code to use. Code development requires significant resources and technical capacity that many states do not have.[33]

Appliance and Equipment Standards

Federal minimum efficiency standards have been set by Congress on more than 40 products. New legislation should add a few additional products, based on negotiations now underway with industry to develop consensus recommendations on several products. New legislation should also clarify aspects of the process by which DOE periodically revises these standards including: clarifying DOE's authority to set multiple performance standards for a product (this was in the House and Senate 2007 energy bills, but dropped from the final bill); directing DOE to consider the impact of

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[32] See Energy Efficiency Resource Standard (EERS) for Retail Electricity & Natural Gas Distributors, 2009, American Council for an Energy-Efficient Economy, available at http://aceee.org/energy/national/FederalEERSfactsheet_Jan09.pdf.

[33] For more information on Advanced building energy codes, see the Building Codes Assistance Project at http://www.bcap-energy.org/.

carbon emissions and the impact of the energy savings on energy prices when setting standards; strengthening the "rebuttable presumption test" for setting standards when efficiency savings are highly cost-effective; allowing state building energy codes greater flexibility to address equipment in new buildings; and setting standards on "BR" reflector lamps, a major loophole in current DOE standards.

Energy efficiency tax incentives

Congress should extend and enhance certain federal tax incentives that promote energy efficiency. Tax incentives are commonly used at the federal level to influence consumer and business purchasing decisions. The incentives can help introduce new technologies into the marketplace and increase the market share of energy-efficient products by lowering their cost for consumers. Tax incentives also lower manufacturers' production risks and effective investment costs. As production volume and sales increase, the technologies become more readily available and affordable, allowing the tax incentives to be phased out. And by attracting the attention of manufacturers, distributors, retailers, and consumers through a multi-year and nationally consistent program, tax incentives can help markets embrace new energy-saving technologies.

Congress should adopt long-term extensions of the tax credit for energy-efficient gas and electric heating and cooling equipment, the tax credit for energy-efficient new homes, and the tax credit for purchase of heavy-duty hybrid vehicles. A new tax credit for efficiency upgrades to existing homes should also be established that is based on the amount of energy saved. The amount of the efficient commercial buildings tax deduction should be increased from $1.80 to at least $3 per square foot. Congress should also make certain policy changes to the energy efficiency tax incentives that will increase their effectiveness.

Energy efficiency home retrofits

Congress should establish a program that provides a rebate to homeowners or any party obtaining an owner's consent to undertake an efficiency retrofit of an existing home. The rebate should be performance based, rewarding higher levels of energy efficiency savings with higher rebates under a good (10% savings), better (20% savings) and best (30% savings or more) model. The program would utilize existing effective retrofit programs to the greatest extent practicable. The program would be administered by the states, with EPA providing program direction, and include support for the training of contractors and home energy auditors/raters who would help implement the program.

Commercial building efficiency retrofits

Congress should establish a program administered by EPA that would encourage the near term launch of large scale, deep retrofitting of private and publicly owned commercial buildings or portfolios of buildings. The program would provide an incentive to building owners for efficiency improvements based on demonstrated energy savings of no less than 20% with incentives calibrated to encourage 30% savings or greater. An established benchmarking program designated by EPA would be utilized to document and verify performance and the incentive would take the form of a rebate per square foot. A loan guarantee, proportional to the targeted energy savings level, would be established to enable upfront investment in energy efficiency projects. Payment of the incentive would be granted annually upon completion of the efficiency project and would be conditioned on verification of actual performance over a three year period.

Industrial and Building Assessment Centers

In order to help train the engineers, building scientists and technicians who are needed to identify energy-efficiency improvements in today's factories and commercial and institutional buildings, the existing Industrial Assessment Center (IAC) program should be expanded, and a new program of

Building Assessment Centers (BAC) established. The IAC program, which trains industrial engineers at universities and provides them with practical hands-on experience by providing free energy audits to industrial firms should be expanded to include additional centers and to establish a new program of satellite centers based at community colleges. A similar BAC program should be established based at universities (for training engineers, architects and building scientists) and satellite community colleges (for training technicians and trades). Today's commercial and institutional buildings have increasingly sophisticated controls and need trained building scientists and technicians to help design and operate them.

Building labeling

Congress should develop a national model to implement coordinated building energy efficiency labeling and energy use disclosure programs for homes and commercial buildings and encourage and assist states, counties and local governments in using this national model in local programs. Such programs would require all buildings to have publicly accessible certificates or other disclosure showing the building's energy efficiency potential compared to a reference building, the individual building's performance among similar buildings as determined by a national benchmarking tool, and/or the availability of transit services within walking distance of the building. The Dingell-Boucher discussion draft includes language discussing this subject.

Energy-efficient mortgages

Congress should direct the program administrator to work with the Government Sponsored Enterprises (GSEs) (e.g. Fannie Mae and Freddie Mac) to develop a comprehensive program, through the use of interest rate buy-downs or other means as deemed appropriate, to motivate buyers to purchase more efficient homes or upgrade the efficiency of their homes. The program should include incorporating the impact of energy efficiency into the mortgage underwriting process and their appraisal practices. The administrator should develop guidelines to ensure that the program gives priority to low and middle-income consumers and that the incentives are proportionate to the cost of the efficiency improvements.

Multifamily and manufactured housing

Retirement of old manufactured homes

Congress should implement a focused program supporting the replacement of pre-1976 manufactured housing with ENERGY STAR-rated manufactured housing units or more energy efficient site-built ENERGY STAR housing. There are approximately 2.2 million pre-1976 manufactured housing units still in use. These units waste an inordinate amount of energy. Direct interest rate subsidies and subsidies on the delivery price of the new ENERGY STAR homes would be instituted, with these incentives being scaled with the level of energy savings achieved beyond Energy Star. In general, these housing units are primarily rural and low-income.

HOME Investment Partnership Program

The HOME Investment Partnership Program (HOME) supports construction of new and substantially renovated moderate-income housing. Investments dedicated exclusively to energy efficiency investments in multi-family housing would target an important under-served part of the population. The normal 25 percent match for the program would be eliminated for energy efficiency improvements in order to facilitate quick investments. Congress should enact funding authorization, ramping up to provide at least $500 million annually.

Additional recommendations included in the low-income section could, alternatively, be considered complementary policies.

Energy service performance contracting in the federal government
Congress should 1) expand the definition of energy service performance contracts (ESPCs) to include new construction and leased building; 2) exempt ESPCs from the Enhanced Competition requirements included in the FY2008 National Defense Authorization Act, since these contracts are "pre-competed;" 3) add the use of alternative financing for energy projects to the Office of Management and Budget Energy Scorecard.

Vehicle fuel economy
Congress should ensure the use of realistic fuel prices in setting fuel economy standards; achieve an average of at least 42 miles per gallon by 2020. Base Corporate Average Fuel Economy (CAFE) standards on current EPA label values rather than 1975 testing protocol—the label values, which are roughly 20% lower than CAFE values on average, better reflect typical performance.[34]

[34] If EPA label values were the basis for measuring manufacturers' CAFE compliance, the target fuel economy for fuel economy in 2020 would be lower than 42 miles per gallon.

III. LOW INCOME PROGRAMS

Overview

The focus of the following low-income recommendations is on developing program concepts that address low-income energy efficiency in the context of a climate bill. Recommendations relate to three general areas: weatherization assistance program (with primary focus on owner-occupied, single-family homes), rental, multifamily and manufactured housing and transportation.

Weatherization Assistance Program

The national Weatherization Assistance Program (WAP) network must be expanded to meet the goal of weatherizing 1,000,000 homes each year. This expansion must occur on a timeline that allows for an orderly transition and ramp-up of staff and production. We suggest that the funding increases for the WAP be phased in over a three-year cycle and then sustained for the duration of the project. In fiscal year 2008, the WAP will use about $665 million in total funding to weatherize 150,000 homes.

A three-year funding increase would be as follows:[35]

Year (in Program Year e.g. PY 2009 is April 2009 to March 2010)	Funding level	Increase in Number of Local Agencies	Increase in Work Force – i.e. direct staff positions in all disciplines	Increase in Production[36]
Year One (PY 2009)	$1.85 billion	from 900 to 1,100	from 13,000 to 21,000	from 150,000 to 370,000 homes
Year Two (PY 2010)	$3.2 billion	from 1,100 to 1,300	from 21,000 to 33,000	from 370,000 to 631,000 homes
Year Three (PY 2011)	$5.0 billion	from 1,300 to 1,500	from 33,000 to 46,000	from 631,000 to 1,000,000 homes

The expenditure for each home is determined by the selection of measures allowable, the attention to health and safety measures during the Weatherization process, and the types of housing stock identified and included in the production scenario. Currently, the WAP spends an average of $4,000 to complete a full scope of energy efficiency and health and safety protocols. The figure will need to be adjusted to $5,000 per unit to allow for a full array of shell retrofit and baseload measures to maximize the reduction of carbon emissions while reducing the added burden of climate change legislation on the poorest families in America. Either funding levels or production could vary as the costs per home allowance are altered to include other measures.

The replacement of old and inefficient heating and cooling equipment is allowable within the scope of the current WAP. Often this measure is left untreated because of cost factors and insufficient funding. Climate change funding should be used to promote this and other targeted measure known to have a high payback for investment and/or significant energy savings - like refrigerator replacements, attic and sidewall insulation, and re-lighting. The caution is that all allowable measures should be installed when at the home so that no missed opportunities occur.

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[35] A more rapid ramp-up was recently proposed in the *Weatherization Assistance Program Economic Stimulus Expansion Plan Discussion Paper*, The National Association for State Community Services Programs, December 2008.

[36] This is based on an average cost per home of $5,000.

Rental, Multifamily and Manufactured Housing

National Grants to Improve Efficiency in Multifamily and Manufactured Housing

Congress should establish a new program at DOE to offer competitive grants for innovative projects to improve the efficiency of multifamily and manufactured housing. Saving energy is more difficult in multi-family and manufactured housing and such housing is disproportionately used by low- and moderate-income families. There are some successful local programs, but the number of programs being operated are few and far between. For example, creative programs could be developed to encourage retirement of old manufactured homes, to invest in efficiency upgrades for new or existing publicly assisted housing, or to institute multifamily building heating system retrofits. Given the limited experience to date, now is the time to encourage a variety of innovative approaches, to evaluate these approaches, and based on these evaluations to then develop broader programs. Congress should enact a funding authorization of about $50 million in the first year, rising to about $500 million in year 5. Follow-up programs should have authorizations above $1 billion.

Efficiency-specific Funding for Home Investment Partnership Program

The Home Investment Partnership (HOME) Program is a grant program administered by states and cities mainly for the rehabilitation and construction of rental and owner-occupied homes for low-income families. HOME has a highly successful 15-year track record and strong bipartisan support in Congress and among governors and mayors. We suggest that an additional $500 million be invested in the Home Investment Partnership Program annually. This additional funding should be dedicated exclusively to energy efficiency investments in rental housing. The 25 percent match normally required for this program should be eliminated for these energy efficiency improvements.

Grants for Energy Efficiency in Section 8 Housing

Grants should be provided to private owners who implement energy efficiency measures in housing assisted through project-based Section 8 and other similar subsidy programs. The grants should go only to owners who agree to continue participation in the housing subsidy program during the useful life of the improvements. $500 million per year should be provided for this purpose.

Transportation Sector

Crusher Credit

A Crusher Credit would offer the owner of an inefficient vehicle a voucher redeemable toward the purchase of an efficient vehicle (new or used) or for transit fare credit. Vehicles turned in under this program would be retired, accelerating the transformation of the U.S. vehicle stock into a more efficient one. A program of this kind has been proposed for the years 2009-2012.

For purposes of a climate bill, we propose an extension of the Crusher Credit, for low-income vehicle owners only. Defining features of the program would include:

- Vehicles eligible for crushing would be model year 2007 and earlier vehicles having a fuel economy of less than 18 miles per gallon.
- The value of vouchers would range from $1,500 to $4,500, depending on the vintage of the vehicle to be retired and whether the voucher is used to purchase a new vehicle, a used vehicle, or transit fare credit.
- Vehicles to be purchased must:
    - be of model year 2004 or newer and meet emissions standards that are average or better under EPA's Tier 2 program and
    - have fuel economy (when new) that exceeded the applicable CAFE standard for the relevant vehicle class by at least 25%.

The full Crusher Credit program for 2009-2012 has been estimated to cost $1-2 billion per year. Assuming ten percent of voucher recipients are from low-income households, the cost of the low-income program would begin at $100-200 million per year and decline gradually over time as the stock of pre-2008, inefficient vehicles declined.

Transit assistance

A climate bill should include funding for new, innovative transit services, or enhancements of existing services, for locations and populations that are currently underserved by transit. Dispersion of both residential and employment sites over many decades has led to widespread car-dependence, even among those who can ill-afford vehicle ownership costs. On the other hand, the demand for transit is growing at the same time that revenue restrictions are causing transit agencies to reduce service and increase fares.

A competitive program for local governments should be established to fund pilot projects that provide new or improved transit or paratransit service to low-income populations that currently have no viable alternative to commuting by car. The FTA should administer the program, which should be funded at $100 million per year to start, with an increase over time as the pool of high-quality project proposals expands.

IV. THIRD-PARTY AND END-USER PROGRAMS

Overview

The focus of the third-party and end-user program recommendations is on developing program concepts that ensure appropriate and effective national-scale incentives for mobilizing private investment to advance the deployment of significantly improved energy efficiency in existing and new buildings (including through the adoption of more efficient appliances and equipment used in buildings.) These national programs have particular value to owners of portfolios of buildings in multiple states for which the inevitable variation that comes with participating in dozens of different state and utility programs makes participation a challenge. These national programs also provide a vehicle to obtain energy savings in states and utility territories where programs are not yet extensive. Even in states with some building efficiency incentives, these national programs provide a useful model for performance-based incentives.

Recommendations are in two consolidated areas: 1) buildings, including energy service company (ESCO) provisions that are aimed at ensuring a nationally consistent approach and opportunity for private sector efficiency delivery and 2) appliances and equipment. In addition to these buildings and appliance efficiency programs, a program for the industrial sector is being developed; details will be provided in a later version of this document.

Energy Efficiency in Buildings

The following describes the overall policy framework envisioned to create incentives for more rapidly capturing greater energy efficiency in buildings—new and existing, commercial and residential.

Overall Policy Framework

The Super Efficient Buildings Incentive (SEBI) creates an incentive structure (which could include direct allocation of allowance value, tax deductions or credits, low interest loans, loan guarantees or other credit enhancements) for existing privately and publicly owned buildings to dramatically improve their efficiency. Such improvements would need to be substantial, verifiable, additional, and enforceable. The level of the federal incentive would be determined by the administrator. Building owners would choose between participating in this federal incentive program or participating in state/utility level incentives programs; "double-dipping" would not be allowed.

The opportunity to achieve efficiency potential in buildings is so great and the barriers so engrained that we need federal level incentives in addition to state and utility programs. Well-designed, national, performance-based incentives are needed to accelerate dramatic improvement in whole-building energy efficiency. Such incentives may also serve as models for state and utility programs and facilitate the kind of uniformity in metrics and benchmarking tools that will encourage companies with buildings in multiple jurisdictions to undertake comprehensive portfolio-wide upgrades.

Through an efficient buildings incentive program, commercial and residential buildings[37] that undergo deep retrofits that significantly improve measured energy performance and new buildings that far exceed the required minimum code performance would receive an economic incentive. In addition, a federal loan guarantee would be made available to facilitate the upfront investment needed for retrofit projects.

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[37] In the case of residential buildings, the program may be administered through state/utility programs.

Existing Buildings
For existing buildings, in order to receive federal incentives, a building would need to demonstrate no less than 20% improvement in efficiency compared to that building in its previous state with reference to a base year. Existing building incentives would be available in two distinct ways:

(1) Incentive for demonstrated energy savings resulting from a deep energy efficiency retrofit. A federal incentive would be granted based on the percentage of annual energy consumption saved by a retrofit and not attributable to changes in building operations. Verification and documentation of achieved energy savings of no less than 20% would be required.

(2) Incentive for energy savings resulting in whole or in part from changes to both building hardware and operation. A federal incentive would be available to buildings that reduced their energy consumption in any year by more than 30% with reference to a base year's consumption, while accounting for other relevant factors (such as vacancy level and weather). An established energy benchmarking tool would be used to determine initial improvement and sustained improvement over each of the three years *[or other specified number of years]* following the base year. The incentive would be awarded in annual or periodic increments to ensure that improvements are being sustained.

New Buildings
New buildings would receive a federal incentive for meeting established above-code energy goals for building type and size. Metrics could be based on percent above code or percentile compared to similar projects.[38]

The amount and nature of the economic incentive would be established in such a way as to provide greater rewards to those projects that achieved the greatest improvements in energy performance. In addition, in distributing the incentives, priority shall be given to projects that result in measurable and verifiable greenhouse gas reduction benefits not encompassed within the metrics described above, including but not limited to benefits such as location efficiency, reductions in embodied energy of construction materials, and on-site renewable energy generation.

For both new and existing buildings, incentives contemplated by the SEBI would be fully assignable by building owners or their authorized agents (including relevant government agencies) to third party providers with responsibility for undertaking (or funding) the activity necessary for the owner to qualify for the incentives.

Incentives for Efficient Appliances and Equipment
The purpose of this program is to increase sales and market share of more efficient products that already exist in the market place. Depending on the product type, both retailers and manufacturers have a role to play in increasing sales of high efficiency products. Given the range of products that would be covered under a Super-Efficient Equipment and Appliances Deployment Program (SEAD), we believe there is merit in giving the administrator the discretion to establish awards for both the retailer/distributor and the manufacturer. Appendix A includes suggested legislative language and also describes further details on how this incentive program should be structured.

[38] A starting point may be 30% and 50% above 90.1-2004. This latter level now earns federal tax incentives.

Overview

A "Super-Efficient Equipment and Appliances Deployment Program" will establish incentives for retailers, manufacturers and distributors in the United States as reward for increasing the sales by the retailers and distributors of high efficiency building equipment, high-efficiency consumer electronics, and high-efficiency household appliances through marketing strategies such as consumer rebates, with the goal of minimizing life-cycle costs for consumers and maximizing public benefit.

Focusing the incentive upstream at the retailer and manufacturer levels is the cheapest way to design the program. Consumers overall benefit more from an efficiently designed program than a program that is limited to only giving a subset of consumers direct rebates. Retailers and manufactures have core expertise in marketing and selling products; they also have greater ability to influence product manufacturing decisions than do individual consumers. By targeting incentives towards retailers and manufacturers, we can leverage a range of marketing strategies to increase market share of these highly efficient products. For example, retailers and manufactures have the flexibility to use price reductions, rebates, creative promotion strategies or a combination of these to achieve greater sales of more efficient products. The benefit to consumers is getting efficient appliances into their hands, which saves them money, reduces global warming pollution, and can decrease energy prices. As happens today, efficiency programs can decide to continue to offer consumer rebates as an additional way to drive purchase of efficient products, as long as they deem that to be cost-effective.

The determination of whether the incentive is directed to the retailer, manufacturer or a combination of the two, depends on the product type and the characteristics of the product's supply chain. For example, incentives for residential and commercial HVAC equipment should be available to manufacturers to pass on through their distribution channel partners, since there are no retailers in these markets and the distribution channels can be quite complex.

The size of each reward for each product-type shall be determined by the Administrator, in consultation with the Secretary of Energy, State and utility efficiency program administrators, and national laboratories.

Each retailer and distributor participating in the program will be required to report on a confidential basis for program-design purposes—
(1) the number of products sold within each product-type; and
(2) wholesale purchase-price data.

The Administrator will make cost-effectiveness[39] a top priority in distributing incentives pursuant to this section. The Administrator will also establish procedures to ensure that the combined incentives under this program and those offered at the state and local level are not combined to exceed cost-effectiveness targets.

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[39] In this context the term "cost-effectiveness" means a measure of aggregate savings equal to the product obtained by multiplying—(i) the net number of highly-efficient pieces of equipment, electronics, and appliances sold by a retailer, manufacturer or distributor in a calendar year; by (ii) the savings during the projected useful life of the pieces of equipment, electronics, and appliances, including the impact of any documented measures to retire low-performing devices at the time of purchase of highly-efficient substitutes.

Additional Principles for Incorporation in the National Super Efficient Appliance Deployment Program

Potential criteria for determining what products/product categories would be included:

The following are factors that should be considered in determining the product categories that would be included in this incentive program.

- What percentage of overall energy use does product represent? Prioritize based on this.
- What is the energy savings opportunity? i.e. what is the range between most efficient vs. least efficient/baseline.
- Products that already have energy rating systems like Energy Star, Energy Guide or FEMP.

Potential incentive criteria:

- The following are potential criteria that could be used in determining the incentive level for each product category.
- Top 10% most efficient products in each category based on commercially available products – reassessed annually. Or top 5 -10% of most efficient products based on units shipped – reassessed every 3 years.
- Efficiency criteria should be based on a relatively broad size category e.g. for refrigerators category sizes compare all full size refrigerators against each other.

Potential guidelines for determining incentive amounts:

The following are areas where additional research and guidance will need to be developed to ensure effective implementation of this program.

- Based on scale of energy savings, i.e., how much energy does this save?
- Shall not exceed x% of product price. This amount shall be determined based on further research and analysis.
- Mechanism to ensure that no single product within a category receives all of the benefit. This may be achieved by limiting the number of distinct products eligible for each category.
- The administrator will need to establish procedures to ensure that there is no "double-dipping" of incentives between state/utility programs and this federal program. These guidelines could establish, for example, procedures to communicate updates regarding the federal program on a regular basis to local efficiency programs, and a requirement for local efficiency programs that offer incentives for product categories covered by the federal program to submit justification confirming that these additional incentives are cost effective.

Program Administration:

- EPA in consultation with DOE

V. RESEARCH, DEVELOPMENT & DEMONSTRATION

Overview
Clean energy technology research, development, and demonstration (RD&D) should have a prominent place in climate legislation. Past investments in energy RD&D have produced significant advances in energy efficiency and other clean energy technologies. Public investment in energy-related RD&D, however, has not kept pace with the need for new technologies that will help us achieve the ambitious goals of a greenhouse gas (GHG) emission reduction program.

A major commitment to RD&D, at least on the scale of magnitude of the investment in RD&D following the oil embargo of the early 1970s, must be undertaken immediately in order to develop advanced clean energy technologies. We advocate an immediate increase in standard appropriations for energy efficiency and renewable energy technology RD&D in the federal budget, together with supplemental funding derived from allowance value and auction proceeds in a future climate bill.

Recommendations
Due to years of under-funding of energy RD&D in the federal budget, we believe it is critical that appropriations for RD&D for energy efficiency, renewable energy and clean distributed generation technologies be increased starting with the FY 2010 budget cycle, ***in advance*** of the effective date of any climate legislation. We believe the immediate increase in standard appropriations is necessary to "ramp up" energy RD&D in anticipation of supplemental RD&D funding in the future climate legislation.

Thus, we strongly recommend an initial doubling within a three year time frame of funding for RD&D, starting with the FY 2010 appropriations cycle for the following program categories:

- Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE);
- DOE Office of Science; &
- DOE Office of Electricity Delivery and Energy Reliability.[40]

The increase in RD&D funding commencing with FY 2010 appropriations should be sustained and predictable in the budget notwithstanding the enactment of a climate bill containing funding for RD&D, i.e. funding for RD&D under a climate bill should not replace regular appropriations in the future. We strongly urge the incoming Administration to reflect the increase in RD&D funding in its FY 2010 and subsequent budget requests.

Beyond the increase in funding through standard appropriations, we recommend that a portion of future allowance value under a climate change program be allocated to energy RD&D. Because of the importance of RD&D to our ability to develop the technologies that will be required to reduce GHG emissions and reduce the cost of lowering emissions, we recommend that a percentage equivalent to $3 billion annually, over and above standard appropriations (and assuming the increase recommended above in RD&D appropriations will have already occurred), be set aside for climate related RD&D for the same programs previously identified within DOE, namely EERE; the Office of Science; and the Office of Electricity Delivery and Energy Reliability; and for a new RD&D entity within DOE such as ARPA-E.

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[40] This funding should be specifically targeted for use towards Energy Efficiency in these offices.

We estimate, based upon figures provided in the Boxer Substitute (S. Amdt. 4825) to the Lieberman-Warner bill that the figure of $3 billion annually for RD&D will be approximately 2% of total allowance value and/or auction proceeds. We emphasize that this level of funding is supplemental to standard appropriations and assumes the increase recommended above.

Our recommended figures for clean energy RD&D investment would bring us to the investment levels achieved during the energy crisis of the 1970s. These figures are similar to what experts have been recommending using other methods.

ARPA-E Component
With regard to ARPA-E, we welcome the opportunity for the DARPA success story to be replicated within the context of DOE. We strongly recommend that the Congress provide greater definition to ARPA-E, in order to ensure that the focus of research will be in clean technology programmatic areas set forth above as well as to ensure that ARPA-E is structured to serve the competitive energy sector as opposed to DARPA which provided technologies only to DOD. Attracting the right people will be critical to the success of ARPA-E in the future, and we are confident that DOE will be careful to select program managers who are capable of overseeing an entity that has the ability to span multiple stages, from very basic to applied research, and in areas that are otherwise too cross-cutting or multi-disciplinary to fit within the DOE system. ARPA-E should put emphasis on high risk, high reward and exploratory research that has not been adequately funded by DOE up to this time.

Limited Deployment Intended
RD&D does not include full deployment; the RD&D activities supported by this allocation would include only limited deployment activities. Entities capable of deployment, such as the private sector, states or utilities tasked with deployment under a GHG regime or similar, should be involved at an early stage in any applied R&D programs for smooth transition. This is an effort to avoid the "valley of death" and, concurrently, eliminate any overlap with other efforts under a climate bill.

Emission Reduction Goals
Only energy efficiency and renewable energy RD&D consistent with emission reduction goals should be supported by the RD&D allocation under a climate bill. Energy research that is not focused on reduction of greenhouse gas emissions should not be part of the investment portfolios supported by this funding.[41]

Oversight
Instead of creating a separate entity to oversee the RD&D funds, these funds could be channeled, through a multi-year appropriations process. We strongly recommend that the RD&D programs described herein be funded similar to the way in which programs in the Transportation and/or Farm bills are funded, and subject to authorization only once every five years.

We recommend that DOE report to Congress by June 30, 2010 proposing a mechanism for the National Academy of Sciences and other organizations to undertake third party evaluation of RD&D programs.

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[41] Efficiency and renewable energy research that supports greenhouse gas reductions indirectly such as smart grid and energy storage technologies should be included in the scope of investment.

Methodologies
In arriving at the recommendation for supplemental RD&D funding in the climate bill, we have considered a number of sources and reports. Most of these methods do not readily fit our purposes because they evaluate total RD&D investment including deployment programs, do not separate investments in clean energy technology RD&D from other energy technology investments and some, such as the Schock method, require assumptions that would require further justification.

Another possible method is using the incremental approach which is to double funding and then see whether the spending can be absorbed effectively. If the conclusion (by the National Academy of Sciences or a comparable organization) is that the money is being spent effectively, the incremental method would advocate doubling the funding for RD&D again.

Another method is to use a historical approach to calculate how successful past RD&D efforts have been and allocate funds to current RD&D efforts accordingly. The National Research Council report, "Energy Research at DOE: Was it Worth It? Energy Efficiency and Fossil Energy Research 1978 to 2000," concludes that $30 billion in economic benefits accrued from the $1.6 billion of DOE investment in energy efficiency RD&D. The report concluded that energy efficiency RD&D had a benefit to cost ratio of 19. We could determine how much funding we would need to achieve the current climate change goals by looking at the historical success of clean energy programs. This inevitably requires us to assume the same amount of success from future RD&D efforts, which will not necessarily be the case.

We also considered the Congressional Research Service report entitled, "The Manhattan Project, the Apollo Program, and Federal Energy Technology R&D Programs: A Comparative Analysis," which was written and updated on September 24, 2008 by Deborah D. Stine, Specialist in Science and Technology Policy at CRS. This report examined the national investment in R&D during critical periods when energy technology was at the forefront of public policy. The report noted that annual average long term (1974-2008) DOE energy technology R&D funding was approximately $3 billion (in 2007 constant dollars). In comparison, the annual average funding (in 2007 constant dollars) for the Manhattan Project was $4 billion and the DOE energy technology program at its peak (1975-1980) was $7 billion (also in 2007 constant dollars). The annual funding for the Manhattan Project and for the Apollo Project (in 2007 constant dollars) was higher as a percentage of gross domestic product than that for the average long term DOE energy technology program. At the time of peak funding, the percentage of gross domestic product spent on energy technology RD&D during the 1970s was only one fourth that spent on either the Manhattan Project or the Apollo program.

Conclusion
Looking at past RD&D efforts, we conclude that it is both feasible and desirable, at a minimum, to replicate the peak investment of 1970s and, beyond that, to augment our national investment in energy technology RD&D to meet the unprecedented challenge of climate change.

VI. Evaluation, Measurement and Verification

Overview

This provision, detailed in Appendix A, directs EPA to develop and enforce rules for evaluation of energy and greenhouse gas impacts from energy efficiency projects, programs and policies that receive free allowances or auction revenues from the climate legislation. It does not specifically address evaluation associated with the creation of carbon offsets, which is generally covered in other areas of climate cap-and-trade bills.

Good evaluation is important in order to verify the amount of energy savings and GHG abatement that states and utilities achieve, to verify cost-effectiveness of investments, and to help program planners and managers better understand how programs are working in practice and how they can be improved to increase energy savings, GHG abatement achieved, and improve cost-effectiveness.

We propose that climate legislation include a directive to EPA to develop rules for evaluation, measurement and analysis of changes in energy use induced by energy efficiency policies, programs and projects in a manner that balances evaluation costs and benefits and takes into account existing domestic and international evaluation protocols. We specifically propose that EPA provide direction related to challenging issues such as additionality, market effects and measure persistence. The rules would be due 18 months after enactment.

See Appendix A for proposed legislation language regarding evaluation, measurement and verification.

VII. TRANSPORTATION

A section which discusses policy recommendations regarding transportation systems, including CAFE standards and reduced vehicle miles traveled, is currently under development with a number of transportation policy advocate groups. This section will either be included in a later version of this working paper or it will be issued as a separate document. Further, additional ideas are being developed by a broad group of transportation experts. Additional funding recommendations will be forthcoming through these efforts.

APPENDIX A: PROPOSED LEGISLATIVE LANGUAGE

SEC. XXX. EVALUATING ENERGY AND GREENHOUSE GAS IMPACTS FROM ENERGY EFFICIENCY

(a) DEFINITIONS.—In this section:

(1) IMPACT EVALUATION.—The term ''impact evaluation'' means the determination of the changes in energy use and greenhouse gas emissions induced by a specific policy, program or project.

(b) RULES.—

(1) IN GENERAL.—The Administrator, in consultation with States, utilities, and other stakeholders, shall develop and enforce rules for evaluation, measurement and analysis of changes in energy use and greenhouse gas emissions induced by energy efficiency policies, programs and projects.

(2) SCOPE.—The rules shall be used by States, utilities, and other entities receiving allowances or allowance proceeds under this Act related to energy efficiency or energy use.

(c) REQUIREMENTS.—

(1) ENFORCEABILITY, ASSURANCE AND COST MANAGEMENT.—The Administrator shall develop rules under subsection (b) so that the rules—

(A) are enforceable;

(B) balance risk management, certainty of estimated impacts, and implementation costs; and

(C) provide sufficient direction relating to methodologies and assumptions, including measure persistence, market transformation impacts, and the extent to which the savings would have occurred without the allowances or proceeds under this Act, to ensure reasonable uniformity among various States and entities and consistency in results.

(2) USE OF EXISTING PROTOCOLS.—To the maximum extent practicable, in developing rules under subsection (b), the Administrator shall consider existing and evolving domestic and international protocols and guidelines.

(3) DEADLINE.—The Administrator shall promulgate the rules under subsection (b) not later than eighteen months after the date of enactment of this Act.
(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated such sums as are necessary to carry out this section.

SEC. XXX. SUPER-EFFICIENT EQUIPMENT AND APPLIANCES DEPLOYMENT PROGRAM

(a) IN GENERAL.—The Climate Change Technology Board shall establish and administer a program, to be known as the ''Super-Efficient Equipment and Appliances Deployment Program'', to distribute the emission allowances allocated pursuant to section 811 among retailers, manufacturers and distributors in the United States as reward for increasing the sales by the retailers

and distributors of high efficiency building equipment, high-efficiency consumer electronics, and high-efficiency household appliances through marketing strategies such as consumer rebates, with the goal of minimizing life-cycle costs for consumers and maximizing public benefit.

(b) SIZE OF INDIVIDUAL REWARDS.—The size of each reward for each product-type shall be determined by the Climate Change Technology Board, in consultation with the Administrator, the Secretary of Energy, State and utility efficiency program administrators, and national laboratories.

(c) REPORTING.—Each retailer and distributor participating in the program under this section shall be required to report to the Climate Change Technology Board, on a confidential basis for program-design purposes—

(1) the number of products sold within each product-type; and

(2) wholesale purchase-price data.

(d) COST-EFFECTIVENESS REQUIREMENT.—

(1) DEFINITIONS.—In this subsection:

(A) COST-EFFECTIVENESS.—The term ''cost-effectiveness'' means a measure of aggregate savings equal to the product obtained by multiplying—

(i) the net number of highly-efficient pieces of equipment, electronics, and appliances sold by a retailer, manufacturer or distributor in a calendar year; by

(ii) the savings during the projected useful life of the pieces of equipment, electronics, and appliances, including the impact of any documented measures to retire low-performing devices at the time of purchase of highly-efficient substitutes.

(B) SAVINGS.—The term ''savings'' means megawatt-hours of electricity or million British thermal units of other fuels saved by a product, in comparison to projected energy consumption based on the efficiency performance of displaced new product sales.

(2) REQUIREMENT.—The Climate Change Technology Board shall make cost-effectiveness a top priority in distributing emission allowances pursuant to this section.

APPENDIX B: COMMITTEE PARTICIPANTS

I. ENERGY EFFICIENCY COMPLEMENTARY POLICY RECOMMENDATIONS
(Jim Presswood, NRDC, coordinator)

ACEEE: Steve Nadel, Suzanne Watson, and Therese Langer
AIA: Andrew Goldberg
ASE: Lowell Ungar and Brad Penney
BSCE: Lisa Jacobson
Cascade Associates: Jennifer Schafer
EESI: Carol Werner
ENE: Derek Murrow and Sam Krasnow
Johnson Controls, Inc.: Mark Wagner
NASEO: Jeff Genzer
NRDC: Lane Burt
Real Estate Roundtable: Roger Platt
Sierra Club: David Hamilton

II. ENERGY EFFICIENCY FUNDING IN A CLIMATE BILL: HOW MUCH TO WHOM
(Lowell Ungar, ASE, coordinator)

ACEEE: Therese Langer and Steve Nadel
ASE: Joe Loper and Brad Penney
NASEO: Jeff Genzer
Cascade Associates: Jennifer Schafer
Environment America: Rob Sargent
ENE: Derek Murrow and Peter Shattuck
NAESCO: Don Gilligan
NRDC: Yerina Mugica and Jim Presswood
RFF: Karen Palmer
Sierra Club: David Hamilton

III. LOW INCOME PROGRAMS
(Yerina Mugica, NRDC, coordinator)

ACEEE: Steve Nadel and Suzanne Watson
ASE: Sally Larson, Joe Loper, Brad Penney, Kateri Callahan and Lowell Ungar
Environment America: Emily Figdor
ENE: Derek Murrow
NASCSP: Bob Adams
NASEO: Jeff Genzer
NEADA: Mark Wolfe
NRDC: Lane Burt and Jim Presswood
RAP: Rich Cowart
Sierra Club: Leslie Fields and David Hamilton

IV. RESEARCH, DEVELOPMENT & DEMONSTRATION
(Brad Penney, ASE and Suzanne Watson, ACEEE, coordinators)

ASE: Selin Devranoglu

ASERTTI: David Terry
Cascade Associates: Jennifer Schafer
EESI: Carol Werner
NRDC: Jim Presswood

V. EVALUATION, MEASUREMENT AND VERIFICATION
(Joe Loper, ASE, coordinator)

ACEEE: Marty Kushler, Therese Langer and Steve Nadel
BSCE: Lisa Jacobson
David Nemtzow
ENE: Derek Murrow
LBL: Ed Vine
NAESCO: Don Gilligan
NASEO: Jeff Genzer
NEEP: Julie Michaels and Elizabeth Titus
NRDC: Dale Bryk
RAP: Rich Cowart and Rich Sedano
Steve Kromer
Steve Schiller

VI. THIRD-PARTY AND END-USER PROGRAMS
(Yerina Mugica, NRDC, coordinator)

ACEEE: Laura Furrey, Suzanne Watson, and Steve Nadel
AIA: Andrew Goldberg
ASE: Joe Loper, Lowell Ungar and Brad Penney
BSCE: Lisa Jacobson
Cascade Associates: Jennifer Schafer
The Dow Chemical Company: Peter Molinaro
EESI: Ellen Vaughan
ENE: Peter Shattuck and Derek Murrow
Environment America: Rob Sargent
Johnson Controls, Inc.: Clay Nesler and Mark Wagner
NAESCO: Don Gilligan
NASEO: Jeff Genzer,
NRDC: Dale Bryk, Jim Presswood, Lane Burt and Jennifer Henry
Real Estate Roundtable: Roger Platt
Sierra Club: David Hamilton
USGBC: Jason Hartke and Bryan Howard

VII. TRANSPORTATION
(Therese Langer, ACEEE, coordinator)

Mr. INSLEE. Mr. Campbell, excuse my failure to introduce you to the group.

Mr. Campbell, who just gave us a really interesting discussion, is vice president and general manager of the North America Service and Global WorkPlace Solutions for Johnson Controls.

Thank you very much.

The next witness is Dr. John Anderson, president and CEO of the Electricity Consumers Resource Council. His organization represents large industrial electricity consumers from virtually every sector of the manufacturing community.

Thank you, Dr. Anderson.

STATEMENT OF JOHN ANDERSON, PRESIDENT, ELECTRICITY CONSUMERS RESOURCE COUNCIL

Mr. ANDERSON. Thank you very much, Mr. Chairman and Mr. Upton and members of the subcommittee, for the opportunity to be here today.

I don't have to tell the members of this subcommittee that we are in troubled times. And these times are especially troubling for manufacturers. Speaking personally, I don't see a light at the end of this very dark tunnel in the near future.

As this subcommittee and Congress debate energy policy, I urge you to think very carefully about what the proposed policies will do to the electricity cost for consumers, whether industrial consumers will be able to bear these costs, and if instead they will have to close additional manufacturing facilities and move to lower-cost locations. We want to avoid that situation.

Which brings me to the subject of this hearing, energy efficiency. At the outset I emphasize that ELCON does not doubt that many opportunities exist to improve energy efficiency of manufacturing processes and that such improvements would help reduce greenhouse gases. However, most large industrial facilities are beyond the point where substantial savings can be achieved with plug-and-play measures, such as high-efficiency lightbulbs or insulation or motors. The next level of efficiency gains are achieved when entire industrial processes are retooled or rebuilt and options are explored, such as combined heating and power. These are big-ticket items requiring very large outlays of capital over long periods of time.

Further complicating this problem is the current credit crunch. The core issue is, can utility financing of energy-efficiency investments compete with large industrial's own ability to raise capital on its own in normal capital markets? A question we ask consistently, are utilities better banks than banks are? And that may be a difficult question to answer today, but we don't think so.

Again, I emphasize the industrial customers are strong advocates, even activists, of cost-effective energy efficiency. Such manufacturers are in a constant quest to reduce the operating cost to increase competitiveness. But, at the same time, large industrial customers have historically not supported legislative or regulatory mandates for utility-implemented energy efficiencies. Such programs are both costly and not designed in a manner that would achieve maximum efficiency gains.

I raise four other related issues that are often discussed in the context of achieving greater energy efficiency, and I address them in much more detail in my written statements.

First is the energy-efficiency resource standards that has already been mentioned today. ELCON has not taken a formal position on the EERS. We certainly support measures that result in the implementation of cost-effective energy efficiency. However, there are some very basic questions that any EERS would raise, and those I touch on in my written comments. If an EERS is actually implemented, we strongly urge that industrial facilities be exempt, recognizing that they already have taken significant energy-efficiency steps and knowing that this is not the time to layer additional costs on manufacturers.

The second issue I raise is revenue decoupling, which is one that has been mentioned several times here already. The debate over the stimulus bill demonstrated the great opposition to federally mandated revenue decoupling from both small and large customers alike. We disagree with the advocates of revenue coupling for several reasons.

First, we believe that revenue decoupling disrupts and distorts the utility's core business functions—to produce and deliver electricity in an efficient manner—and is not a particularly effective way of promoting energy efficiency. Moreover, there are better ways to deliver cost-effective energy efficiency, such as with a third-party entity rather than a utility. There is no basic conflict between implementation of energy efficiency through an independent third party and the loss of revenues for a utility.

Second, several States have found decoupling to be a failure once policy recognizes that a cool summer or a warm winter or an economic downturn triggers increased revenues to the utility even if no efficiency gains are made.

Third, we question why a regulated public utility that has been given a monopoly service territory by a State should be rewarded for implementing an efficiency program that is required by either Federal or State mandates. We believe they have an obligation to serve and should be given an opportunity to recover prudently incurred costs and earn a return that reflects risk they incur but no more.

And, finally, many proponents of decoupling hold California up as a poster child for energy efficiency, at least partially because decoupling advocates assert that per-capita consumption of kilowatt hours in California was reduced. However, California also implemented an inverted rate structure that may have, in and of itself, brought about more energy efficiency than decoupling that was implemented and then taken away and then put back. And California's very high electric rates have contributed to the tremendous loss of manufacturing in the State. It is not hard to reduce electricity consumption if you take away your manufacturing base and put people out of work.

The third issue I raise is demand response. And I am not going to go into that in detail in my oral statements, but I urge to you look at it. We think it has a tremendous potential, and it ought to be considered along with energy-efficiency measures.

And the fourth issue is the utilization of combined heat and power, which was mentioned at least once. Manufacturing industries have been leaders in this effort. Unfortunately, companies planning to increase their CHP production have been disappointed by a recent rulemaking process at the Federal Energy Regulatory Commission, or FERC.

Specifically, ELCON worked with members of this subcommittee, led by Representatives Barton, Boucher, and others, in drafting compromise language, the intent of which was to continue certain incentives for combined heat and power as provided for under PURPA until truly competitive markets were established. Unfortunately, things just didn't work out as expected. FERC's rule, in essence, discontinued those incentives for any facility operating in one of the FERC-approved RTOs or ISOs.

This rule will clearly hinder CHP growth. We strongly urge Congress to either reconsider the language in EPACT 2005 to more accurately reflect congressional intent or address this issue in an oversight hearing.

In conclusion, I return to where I started. Basic manufacturing in the U.S. is in terrible shape. Despite the well-intentioned stimulus package, I have seen no projections that manufacturing output will increase in the near future. Yet many in Congress and elsewhere seem intent on implementing several new and substantial energy initiatives. All have noble goals, but many will work to the detriment of industrial companies and their employees.

I applaud the subcommittee for seeking to make our energy market more efficient, but I ask the subcommittee, when considering energy legislation, to examine the total impact of its proposals, including its impacts on the manufacturing sector. I urge you to consider several specific recommendations that are in my written testimony.

I thank you again for the opportunity to be before you today and look forward to your questions.

[The prepared statement of Mr. Anderson follows:]

Statement of Dr. John A. Anderson
President and Chief Executive Officer
Electricity Consumers Resource Council (ELCON)

At a Hearing on
"Energy Efficiency: Complementary Policies for Climate Legislation"

Before the House Energy and the Environment Subcommittee

February 24, 2009

Mr. Chairman, Mr. Barton, thank you for the opportunity to be back before this Subcommittee again.

By way of background, ELCON is the national association of large industrial consumers of electricity. We were established in 1976 – in large part due to issues that were being discussed in the context of legislation in 1978, PURPA, that came out of this Subcommittee's predecessor. For over thirty years we have supported legislative and regulatory policies to promote electricity policies that provide lower cost, more reliable electricity to all consumers. ELCON members come from virtually every segment of the manufacturing community.

I don't have to tell the Members of this Subcommittee that we are in troubled times. And those times are especially troubling for manufacturers. Since December 2007, roughly 1 million manufacturing jobs have been lost. Some have been lost to foreign lands, where the cost of operations may be less, and some have been lost due to decreased demand as the economy has stumbled so dramatically. But regardless, I have never seen the manufacturing segment of our economy is such bad shape. And, speaking personally, I don't see a light at the end of this very dark tunnel in the near future.

The poor economy is one reason why manufacturers are so concerned about the emphasis that this Congress and this Administration are putting on energy policy. Roughly ten years ago, before this Subcommittee, an ELCON witness from an automobile company testified that electricity was the largest controllable cost at each of his facilities. Labor and material purchase contracts were national; taxes and other items were fixed; and electricity was thus the largest controllable cost. More recently we have seen manufacturing facilities close in several states with the companies attributing those closings directly to high electricity costs. As this Subcommittee and this Congress debate energy policy, I urge you to think carefully about what the proposed policies will do to electricity costs for consumers, whether industrial consumers will be able to bear those costs or if, instead, they will close additional manufacturing facilities and move operations to lower-cost locations.

My bottom line is rather simple: The overarching principle of government policies and mandates to promote energy efficiency in the industrial sector should be to 'first, do no harm.'

ENERGY EFFICIENCY

That brings me to the subject of this hearing – energy efficiency and how it complements, or does not complement, an overall climate change policy.

At the outset, I emphasize that ELCON does not doubt that many opportunities exist to improve the energy efficiency of manufacturing processes – and that such improvements would help reduce green house gases.

However, most large industrial facilities are beyond the point where substantial savings can be achieved with plug-and-play measures such as high efficiency light bulbs, insulation or motors. The next level of efficiency gains are achieved when entire industrial processes are retooled or rebuilt, and fuel substitution options are exploited such as CHP. These are big ticket items requiring very large outlays of capital—and not all that capital gets appropriated to purely energy efficiency technologies. In fact it is often very difficult to isolate the energy efficiency "measure" because the technologies are integrated with the entire production process. Further complicating this problem is the current credit crunch.

The cost effectiveness of energy efficiency investments will ultimately depend on how the measures are financed and other competing investments of the company. Competing investments may be health care costs, environmental compliance costs and efforts to promote sustainability, worker training costs, R&D for the next generation of products, etc.

ELCON's primary objective as an organization representing large industrial electricity consumers has always been to carefully scrutinize policies that mandate utility financing of energy efficiency. The core issue is can utility financing of energy efficiency investments compete with a large industrial's own ability to raise capital on its own in normal capital markets. In other words, are utilities better banks than banks?

The answer in most cases is no because utility programs include special costs—which are often quite substantial—that other forms of financing do not include, such as lost revenue recovery, revenue trackers such as decoupling or incentive payments to utility managers or shareholders. These extra costs—which are hidden in bills and recovered from utility ratepayers—inflate the effective cost of capital for the use of these funds.

It is a widespread myth that utility "investments" in energy efficiency improvements of their ratepayers are funded the same way as utility investments in new generating capacity. This is not true. To fund new generating plants utilities borrow money or issue stock, or a combination of the two. Customers do not pay until the new generator is actually producing power. However, to fund energy efficiency programs utilities borrow money from their customers—usually all ratepayers—and return the money in the form of financial rebates or other forms of subsidies to only a few of those ratepayers. In return for this banking role, utilities are typically allowed to keep a substantial portion of the funds as an inducement for administering the programs. As mentioned earlier, this can take the form of lost revenue recovery, decoupling or direct incentives to shareholder with ROE adders. In other words, only a fraction of each dollar taken from ratepayers is returned to the ratepayers – and then only to participating ratepayers, not

all. Ratepayers that increased energy efficiency at their own expense still pay for the benefits received by the participants.

Whether ratepayers participate in the programs or not, these hidden costs can make the investments to the customer less cost effective than if they financed the investments without utility aid. From the customer's perspective they are giving utilities money that could have been used for more energy efficiency investments.

Again, I emphasize that industrial consumers are strong advocates – even activists – of cost-effective energy efficiency. In fact, for many manufacturers energy efficiency (or EE) really is the "first fuel." Such manufacturers are in a constant quest to reduce operating costs to increase competitiveness. They make investments to improve energy efficiency on a regular basis. But, at the same time, large industrial customers have historically not supported legislative or regulatory mandates for utility-implemented energy efficiency as such programs are both costly and not designed in a manner that would achieve maximum efficiency gains.

From the perspective of industrial electricity users, I assert the following:

- Utility-administered programs simply cannot be designed to meet the specific needs of a large industrial facility where energy efficiency improvements are intertwined with complex industrial process and the facility's unique operational characteristics.

- Utility-administered programs tend to emphasize inflexible mandates without considering whether the intended results can be more cost effectively obtained by other means, such as distributed generation or combined heat and power technologies.

- Utility-implemented energy efficiency programs increase electricity rates. Whether or not customer bills are reduced is debatable. However, it is not debatable that the increase in rates reduces the funds available to nonparticipating customers for investing in other energy efficiency projects that may provide greater energy and industrial efficiency.

- Finally, utilities are not better bankers than bankers – even in the current economic climate.

OTHER RELATED ISSUES:

I raise four other related issues often discussed in the context of achieving greater energy efficiency.

Energy Efficiency Resource Standard (EERS)

First is the Energy Efficiency Resource Standard (EERS), proposed by several Members of Congress. An EERS could be enacted jointly with a Renewable Energy Standard or as a stand-alone measure.

ELCON has not taken any formal position on EERSs. We certainly support measures that result in the implementation of cost-effective energy efficiency. However, there are several very basic questions that any EERS raises such as: How is the baseline established? Are factors such as an economic recession or a cool summer, each of which reduces electricity demand, appropriately accounted for? Are factors such as "free riders" and the "rebound effect," taken into account? Different consumers have different energy efficiency potentials. Are each of these differences appropriately considered?

If an EERS is actually implemented, we strongly urge that industrial facilities be exempt. As I have mentioned earlier, industrial facilities must make cost-effective energy efficiency improvements – the competitive markets requires it. Making these manufacturers subject to artificial mandates will only diminish their ability to increase efficiency.

Revenue Decoupling

The second issue, Revenue Decoupling, is one which the full Committee considered just a few weeks ago in the context of the Economic Stimulus bill. This debate demonstrated the great opposition for federally-mandated Revenue Decoupling from small and large consumers alike.

The argument for Revenue Decoupling is rather straight forward. Electric utilities make more as their sales of electricity increase. Thus, these utilities have a disincentive to implement energy efficiency that would reduce their sales – and hence revenues. There are those who believe that by separating a utility's earnings from its sales, you remove the utility's disincentive to promote energy efficiency. We disagree for several reasons.

First, we certainly agree that electric utilities that are required to implement energy efficiency face a potential internal conflict. By far, their main motivation is to increase sales. The energy efficiency portion of their business will be rather small, but significant. However, we believe that revenue decoupling disrupts and distorts the utility's core business functions – to produce and deliver electricity in an efficient manner – and is not a particularly effective way of promoting energy efficiency. Moreover, there are better ways to deliver cost-effective energy efficiency. As an example, Vermont has one of the most effective energy efficiency programs in the Nation. But Vermont's method involves the creation of an independent entity, Efficiency Vermont, whose core business is to implement energy efficiency. Thus, there is no basic conflict between the implementation of energy efficiency and the loss of revenues for the utility.

Second, several states have found decoupling to be a failure once policymakers recognize that a cool summer, or a warm winter, or an economic downturn triggers increased revenues to the utility even if no (or limited) energy efficiency gains are realized. We wonder if the current interest in decoupling is driven by a desire for a utility to be made whole during this horrible recession rather than by any altruistic urge to promote energy security.

Third, we question why a regulated public utility that has been given a monopoly service territory by the state should be rewarded for implementing an efficiency program that is required by either federal or state mandate. We believe they have an obligation to serve, and should be

given the opportunity to recover prudently incurred costs and earn a return that reflects the risk they incur – but no more.

Finally, I am often amused when I read about Decoupling's supposed successes. Many proponents of Decoupling hold California up as the poster child for energy efficiency – at least partially because per capita consumption of kilowatt hours is relatively low. But California's relatively mild climate and thus the lack of air conditioning in many homes may be a far greater cause of lower consumption. Additionally, California has implemented an inverted rate structure that may have in and of itself brought about more energy efficiency than Decoupling. Further, accompanying California's implementation of their energy efficiency programs is a state deficit of nearly $42 billion, an unemployment rate that has skyrocketed to nearly 10 percent, one of the very highest foreclosure rates in the nation, and a greater loss of manufacturers than any state in recent years. I am well aware that California's problems are caused by far more problems than just their energy efficiency programs, but the very high electricity rates at least in part contributed to their problems. It is all related – it is not hard to reduce electricity consumption if you take away your manufacturing base and put people out of work.

Demand Response

Just to emphasize that I am not totally negative, the third issue I raise is Demand Response. Quite simply, this is the ability of a home or business to reduce or curtail its use of electric power during periods of peak demand. The sound bite is that the most efficient unit of electrical generation is the one that is never built.

Demand Response can be very successful in reducing the need for new generation and thus reducing green house gases. In fact, we already are seeing some of the benefits of Demand Response. A FERC representative recently said that with only today's very minimum incentives, Demand Response reduced peak load by 5.8 percent in 2007. Similarly, a representative from the Electric Power Research Institute recently stated that Demand Response and energy efficiency could cut projected peak growth in half by 2030.

Demand Response has been moderately successful to date, with industrial, commercial and residential customers participating. But greater success in achieving Demand Response has been stymied and thwarted, primarily by parties on the supply side that view Demand Response as a threat to their generation revenue. I give two examples. In PJM, the regional wholesale market that now operates in all or parts of thirteen states, a program that many customers found supportive of Demand Response was not renewed, primarily due to utility efforts. And more recently, the North American Energy Standards Board (NAESB) adopted a Demand Response standard that will result in different procedures in each area of the country. This means that those who wish to participate must learn and comply with different standards and regulations for each individual market – a burden that will surely diminish rather increase the amount of Demand Response achieved.

Demand Response is a resource that should be considered along with energy efficiency measures. We simply believe that each kilowatt and kilowatt-hour of avoided consumption is

equivalent to – and much more efficient than – a kilowatt or kilowatt-hour of additional generation. And we believe it should be compensated accordingly.

Combined Heat and Power (CHP)

The fourth issue is that of increased utilization of combined heat and power (CHP) technologies, including the capture of additional waste heat as provided for in the Energy Independence and Security Act of 2005. The manufacturing industries, particularly but not exclusively companies in the pulp, paper, petroleum and chemical sectors, have been leaders in this effort. But I must report that companies planning to increase their CHP production have been disappointed by a recent rulemaking process at the Federal Energy Regulatory Commission (FERC). Specifically, as part of the Energy Policy Act of 2005 (EPAct), ELCON worked with Members of Subcommittee, led by Representatives Barton, Boucher and others, in drafting compromise language, the intent of which was to continue certain incentives for combined heat and power, as provided for under PURPA, until truly competitive markets were established.

Unfortunately, things simply have not worked out as we expected. FERC's rule in essence discontinued those incentives for any facility operating in one of the FERC-approved RTOs or ISOs. This rule will clearly hinder CHP growth. We believe that Congress intended a more rigorous test to determine if a market is competitive, and we know that several Members wrote FERC noting their disagreement with FERC's rule. We strongly urge Congress to maximize the potential of CHP by either reconsidering the language in EPAct 2005 to more accurately reflect congressional intent or addressing this issue in oversight hearings on FERC implementation of EPAct 2005.

CONCLUSIONS

So, in conclusion, I return to where I started. Basic manufacturing in the U.S. is in terrible shape. Despite the well intentioned Stimulus Package, I have seen no projections that manufacturing output will increase in the near future.

Yet, many in Congress and elsewhere seem intent on implementing several new and substantial energy initiatives. All have noble goals. But many will work to the detriment of industrial companies and their employees.

I applaud this Subcommittee for seeking to make our energy market more efficient. But I ask that this Subcommittee, when considering energy legislation, to examine the total impact of its proposals, including its impact on the manufacturing sector. Specifically, I urge you to consider the following:

1. Government policies to promote energy efficiency investments of large industrials should take the form of tax credits or loan subsidies that reduce the capital costs of such investments. Policies should not promote mandatory utility financing that increase capital costs.

2. Government policies and mandates that intend to promote ratepayer-funded energy efficiency investments should recognize and give credit to energy efficiency improvements that large industrial customers have already implemented at their own expense.

3. Large industrial customers should be allowed to demonstrate that they have self-directed energy efficiency programs, and be eligible to opt-out from any obligation to pay tariff based surcharges used to fund utility programs, or alternatively, receive dollar-for-dollar credit to offset or bank revenues collected in any applicable tariff or tariff rider used to fund utility energy efficiency program costs.

4. Large industrial customers that invest in energy efficiency improvements at their own expense are entitled to any energy efficiency certificates (e.g., White Tags™) imputed from such investments.

5. Government policies and mandates that target electric power use reductions should recognize that often the most cost-effective measures to improve energy efficiency require net increases in electricity consumption to offset greater reductions (in terms of BTUs) in the use of natural gas or other fossil fuels.

6. Large industrial customers should not be forced to "borrow" money from a utility to fund energy efficiency improvements at an effective cost of capital that exceeds a participating customer's own cost of capital.

7. Large industrial customers should not be required to pay for the so-called system benefits alleged from energy efficiency improvements of other ratepayers unless large industrial customers receive credits for comparable system benefits resulting from all energy efficiency investments they made or make at their own expense.

8. Energy policies that force large industrial customers to become "free riders" of utility energy efficiency programs are counter-productive and wasteful.

9. Utilities should not be given special riders or single-issue cost recovery methods to increase rates absent a showing that current procedures for establishing base rates have disadvantaged utilities in any way.

10. Large industrial customers strongly support the development of advanced tariffs and business practices that increase their opportunities to provide demand response for price mitigation and improved reliability.

11. An overarching principle of government policies and mandates to promote energy efficiency in the industrial sector should be to "first, do no harm."

Mr. INSLEE. Thank you.

And our last witness is Mr. Bryan Reichel, who is president and CEO of PureChoice, Incorporated. PureChoice provides building performance reporting software and helps organizations with their energy efficiency.

Thank you, Mr. Reichel.

STATEMENT OF BRYAN REICHEL, PRESIDENT AND CEO, PURECHOICE, INC.

Mr. REICHEL. Thank you, sir.

I would like to thank Chairman Markey and Ranking Member Upton and the members of the subcommittee for inviting me here today. My name is Bryan Reichel. And I am president of PureChoice, Burnsville, Minnesota. We are an ENERGY STAR partner.

I will summarize my testimony, but I ask that it be included in the record as submitted. But what I am going to do is tell you a little bit different story today. Instead of telling you what I think we can do, I am going to tell what you we are doing today as a small company in Minnesota. There has been talk about looking for shovel-ready projects, and we are about as shovel-ready as they go.

The main reason for energy use in commercial buildings is to condition the space for human occupancy. There are approximately 5 million existing commercial buildings in the U.S. today, totaling well over 70 billion square feet. Consider then that, according to the Department of Energy, about 33 percent of the energy used in those buildings is used specifically for heating, ventilation, and air conditioning. The average cost of that is about $1.23 a square foot, or about $86 billion annually.

There has been talk of increasing the energy-efficient goals up to 10, 20, 30, now I hear up to 50 percent. But I ask the question, without first measuring the building for the performance of the building, how do you know that that building can even attain better energy efficiency? We need to somehow measure the performance of the building. I can achieve 100 percent energy efficiency in this particular building. If somebody would show me to the breaker panel, I will shut all the switches off. However, we screw up the interior environment of this building. So there has to be a balance somehow between energy-efficiency goals and our indoor air quality goals, which is the reason a lot of these codes were put into place in the first place.

PureChoice takes a bit of a different approach. We actually measure the interior performance of the building. We measure temperature and humidity and carbon dioxide and carbon monoxide and VOCs, which are basically odors and gases.

I brought with me today one of our mechanical pieces; it is called ″The Nose.″ The Nose houses all these particular sensors on a single platform, and it is delivered every 20 seconds back to our server in Minnesota that is on a secure site. We then put it out with our building performance software, which is called PureTrac. PureTrac is a Web-based data collection software that functions very much like a continuous energy audit. Essentially, we are continuously commissioning the building all the time.

Every building has an operating strategy. On a continuous basis, the software checks the overall performance of the building against that particular operating strategy. And, at the end of the month, we generate a report, and we tell you how efficient your building is to that particular operating strategy.

I can tell you we have no customers that are 100 percent. We have some customers in the 15 to 20 percent range, and they had no idea. And, on a simple basis, if you are spending $10,000 a month on energy, and you are 50 percent efficient, that is $5,000 that you have room to find.

I will give you an example of what we have done. We recently partnered with the Federal Government at the Bishop Henry Whipple Building in Minneapolis. It is located at Fort Snelling. The GSA, the Department of Energy, and the Minnesota Department of Commerce were our partners on the project. We monitored the building for 1 year. The partners identified opportunities for energy savings, and we modified the operation strategy. We realized a savings in excess of 20 percent in 1 year without compromising indoor air quality and without purchasing any additional HVAC equipment. The energy saving opportunity was in excess of $144,000. The payback was less than 2.2 years, fully funded.

Now, the GSA was so pleased with that study that—you may have seen this before—they have included it in their ″Sustainability Matters″ document. I have submitted some of those for the subcommittee, and I have just an excerpt to show you. On page 94 to 99, it is the center of their bible going forward on how they achieve green and high-performance buildings.

The President has placed a priority on this. Congress recently passed $4.5 billion in the stimulus for energy conservation. We can achieve that in a very simplistic format. And I will tell you, if the GSA just wanted to do all their Federal buildings, they would spend less than $40 million and save approximately $60 million a year. And that is the bottom line, just to give you how much of this is available.

I will give you another example. We recently partnered with a big-box retailer in the city of Chicago. Chicago has got some of the strictest building codes in the country, as far as ventilation is required. The major retailer couldn't meet their energy-efficiency goals and achieve their indoor air quality goals at the same time. They used our PureTrac data, and the city gave them a variance on the ventilation rate, and they were able to cut ventilation by over 54 percent. But because they were able to electronically prove that they matched the indoor air quality guidelines of the code, that 54 percent averaged into $2,500 a month per store in realtime savings. They didn't disqualify the indoor air quality of the building, and they met all the requirements of the code.

Currently, the technology is being used by Tulsa University. It is being taught in the engineering program at Stout University. We have partnered with Secretary Chu's old company, Lawrence Berkeley Labs. We have done three school studies with them. Dr. Michael Aptee has been our project partner out there. The study that we did in the schools found that the worse the air quality was in schools, the higher the absenteeism. For every thousand parts

per million of carbon dioxide, absenteeism went up 10 to 20 percent.

Minnesota Power and the Minnesota Department of Commerce had us do another program called SAMPLE2, School Air Monitoring Program for Learning and Energy Efficiency. We did three schools in Minnesota, and the findings averaged that we could save an average of 14 percent of energy conservation, which was approximately $30,000 per school. If we take that across what Senator Boxer has proposed, we would save in excess of $580 million annually, using 2003 energy numbers, on all the public schools in this country.

This technology works. We are here today talking about how do we do energy efficiency. You need to measure the performance of the building, and we can turn everything else around. We have some suggestions. I look forward to your questions. Thank you for your time.

[The prepared statement of Mr. Reichel follows:]

Testimony of Bryan Reichel

President and CEO,

PureChoice Inc.

House Subcommittee on Energy and Environment

"Energy Efficiency: Complementary Policies for Climate Legislation"

February 24, 2009

Thank you to Chairman Markey, Ranking Member Upton, and to the members of the Subcommittee for the opportunity to testify this morning. My name is Bryan Reichel, I am President and CEO of PureChoice. We are a small privately held company based in Burnsville, MN. Our business is the design, manufacture and implementation of the PureTrac® Building Performance Software and also The Nose® - an environmental data collection device. It is an honor to be asked to appear on this panel.

In my testimony this morning I will describe for you how companies like ours can contribute to our nation's energy future by implementing innovative technologies for use in both the private and public sector. There are actions we can take *today* which would save energy, create jobs, and save money. I hope to point out a few of those opportunities for the Committee's consideration. The term "shovel-ready" has been used often lately, and I would like to bring to your attention some options that are even more than "shovel-ready". Energy Efficiency and the policies to direct it can encompass such a wide variety of activities, and it is my hope our expertise can add to the dialogue and result in effective practices.

Identifying Conservation Opportunities

Simply put, our PureTrac Building Performance Software independently verifies that energy is not being wasted by overheating, overcooling, or the over-ventilating of buildings. It is a simple concept, but in our experience it is an often-overlooked facet of energy conservation and one that can provide immediate and dramatic energy-saving benefits. Consider that there are approximately 5 million existing commercial buildings in this country and that 33% of the energy used in those buildings is for heating, ventilation, and air conditioning, (U.S. Department of Energy, 2007). It's then easy to see that simple improvements in building performance can make a big impact in nationwide energy use.

It's important to remember that energy savings goals in buildings must be achieved while maintaining an indoor environment conducive to living and working. Otherwise, you have met one purpose while undermining another. The goal is simple – we work together with building managers to ensure an optimal work environment is maintained while using the least amount of energy.

From my visits to Congressional offices, I often see space heaters running during the summer months when the air conditioning is on. Or windows left open during the winter, because the buildings are overheated. Those are obvious, visible signs of a problem. But what if the issues were less obvious? Our technology finds those types of problems that can't be seen with the naked eye and uncovers them to reveal energy-saving opportunities.

To accurately collect environmental information, PureChoice has developed the Nose® Monitor – a multi sensor platform that resides in the occupied space of the building. Once the Noses are installed, our team at PureChoice works with the building management to identify the optimal operating strategy. The Nose® tracks the building's performance using our PureTrac Building Performance Software to see how close the building is to its budgeted performance. The Nose takes readings every 20 seconds on a variety of highly accurate environmental sensors key to an indoor environment – Temperature, Relative Humidity, Carbon Dioxide, Carbon Monoxide, and Odors and Gasses (VOCs). Once collected, the Nose then averages the readings every 5 minutes in its onboard microprocessor. The data are then sent via the internet to a secure server where the readings are stored and constantly compared to the operating strategy set forth by the building manager. Authorized personnel can log into the PureTrac website from anywhere in the world and review actual building performance.

The overall performance of a building is checked continuously against its operating strategy and at the end of a month – a report is generated showing exactly how efficient the building is running compared to its operating strategy. To go one step further, we can take a grouping of buildings, rank them by efficiency, then empower managers to make investment decisions based on the data. This is important in a business setting, because having this simple data can help buildings be treated as performing assets. The CEO of every company has immediate access to all the financial information about the health of the company, but very rarely are buildings treated in the same manner. This approach takes building performance out of the boiler room and places it squarely on the CEO's desk.

Federal Government Partnership

While most of our current partnerships are with private-sector businesses using our technology to reduce energy use, meet environmental strategy goals, and also improve the bottom line, we have had also had significant success working with the federal government.

From 2003 to 2007, PureChoice partnered with the General Services Administration (GSA), the U.S. Department of Energy, and the State of Minnesota to improve energy efficiency and building performance of the Bishop Henry Whipple Federal Building, at Fort Snelling in Minneapolis. Using PureTrac, the partners identified opportunities for energy savings, modified the operations strategy, and achieved energy savings in excess of 20% per year without compromising the indoor air quality or purchasing any additional equipment. The sustainable energy savings opportunity of the project is in excess of $144,000 per year. The estimated the payback of this project is less than 2.2 years.

The GSA considered the project such a significant success that it highlighted the Henry Bishop Whipple Building project in its recent publication, "Sustainability Matters" - which focused on efforts the GSA is currently making to improve energy efficiency in federal properties. Given that the President has identified energy efficiency in federal buildings as a high priority, and that Congress provided $4.5 billion in the Stimulus bill to fulfill this task, it is clear energy efficiency in federal buildings is an area of great interest. We are prepared to deploy PureTrac on a more widespread basis and help the federal government save energy and money by first working with what they already have before investing those billions.

Air Quality

Another valuable use of our product has been to verify air quality data. One major retailer was interested in implementing an energy efficiency program in its stores, but found that in some cities, local building and ventilation codes were at odds with the company's energy efficiency goals. As an example, the local ventilation codes in Chicago are some of the most restrictive in the country. Our client was tasked with the goal of reducing energy usage in its large Chicago-area stores, but was also faced with high ventilation requirements that increased the energy costs. This is a concern in the cold Chicago winter months, since when more air than necessary to maintain air quality is brought in through the ventilation system, it must be first heated to the desired temperature -- which means wasted energy. We worked with the retailer and the city to ensure the indoor air quality standards are met, and now furnish a monthly report to both parties showing continuously updated indoor air quality measurements. Because the stores could use our technology to prove all requirements were met, a variance was granted and the stores were able to operate at an effective reduction of almost ½ of the prescribed ventilation rate. The resulting energy savings on a per store basis was in excess of $2500 per month.

Again, I would like to thank the committee for the opportunity to share our approach with you today. Our approach is simple, but effective, and can help save a great deal of energy starting now. I hope the examples I have provided this morning will help as you form the policies that guide our country's energy future.

Mr. INSLEE. Thank you very much.

We would like to go to Mr. Upton first, in recognition of his great work on lighting last year.

Mr. UPTON. Thank you. Thank you, Mr. Vice Chairman.

I would like to make a couple points.

First of all, when we dealt with the energy title as part of the stimulus bill, that moved through this committee, and those provisions actually passed by voice. I don't think there was any opposition to having incentives for improving on our energy efficiency in, really, any sector of our economy.

However, there was one rather contentious item that we debated—and, Mr. Anderson, you touched on it—and that was the decoupling issue. And I want to just pass a chart out to my colleagues and members of the panel on both sides here. This was printed by the Department of Energy, and it appeared in CQ Today back last month, and it talked a little bit about decoupling.

And, Mr. Wells, I have Western Michigan University in my district, and I want to think that every one of our rooms in the 50-some buildings on campus now have a Johnson Controls sensor, and it works. It savings the university hundreds of thousands of dollars every year in heating costs that we are able to see. We have schools in my district that have now achieved the ENERGY STAR rating. It is terrific, in terms of what we have.

And, as you look at the strides that we have made on appliance standards, building standards, lightbulbs—one of the issues that this subcommittee worked on and was able to pass in the Congress—wind turbines—last week, in my district, again, we looked at both residential and some of the giant, 80-meter types that are there—we can save great amounts of energy.

But if you impose this decoupling on States—and this chart illustrates that, again, from the Department of Energy—you don't actually, at least my reading of it, you don't actually see the savings, the incentives to purchase that additional equipment. At the end of the day, the utilities are able to add increases in that rate, and you don't see the same savings. I mean, it would be like buying a hybrid automobile, and instead of paying the normal gas price, you just say, well, you drive a hybrid, so we are going to charge you another 25 cents a gallon at the pump to make up for what you are not giving the Exxon or BP or somebody else.

And I would like each of you maybe to just comment. It is a fairly simple chart here that was printed by the Department of Energy. But, as you can see, it has the original billing for residents, office buildings, and industrial buildings. And then it has the decoupled buildings, where the high users pay a little bit less but the low users pay considerably more. And I just think that it takes away the incentive for folks, businesses or homeowners, to actually install the devices that are going to save energy and make us less energy-reliant on other sources.

Mr. Reichel, if you would like to just start and make your comment based on this chart, and we will just go down the line in the time that I have remaining.

Mr. REICHEL. Thank you, sir, but I don't have any position on the decoupling. In fact, the last time I heard the word ″decoupling″ was at my dog breeder's. So I can't speak to that.

Mr. UPTON. OK. I am glad this isn't in the big house downstairs, live on C-SPAN.

Mr. Anderson?

Mr. ANDERSON. Thank you, Mr. Upton. I have not seen this chart before, so I can't really respond to it.

Let me say a couple things about decoupling that I said a little more in my written statement. And we actually have a publication on it that I would like to ask if it can be inserted into this record.

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

Mr. ANDERSON. Decoupling, as you said, it does increase rates. That is what it does. Now, the increased rates may bring about reduced consumption. And for some customers, there could be a reduced bill. But for other customers, there won't be a reduced bill.

Mr. UPTON. That is right. It rewards the folks that don't do as much as the folks that may invest in energy conservation.

Mr. ANDERSON. Precisely. Precisely. And that, to me, boils it down to——

Mr. UPTON. That is a good answer.

Mr. Campbell?

Mr. CAMPBELL. I am not sure I can comment deeply around the decoupling provisions. But what I can say is that, for energy efficiency to work, there has to be alignment of incentives so that when energy efficiency is being driven and achieved there has to be incentives appropriate to that.

Mr. UPTON. I am running out of time, so we have to go fast. Mr. Wells?

Mr. WELLS. I will echo what Mr. Campbell says. A lot of us have talked about the energy-efficiency improvements we have done at our companies. The question is, why hasn't that happened in the public sector? It is because we have split incentives. We have to find a way to break that.

Mr. UPTON. Mr. King?

Mr. KING. Thank you. There are numerous issues associated with rate design. I think the incentive component is critical, as well as there is an ability, through the rate design, to mitigate some of the low-income, low-user impacts. That can be dealt with State by State as we deal with decoupling.

Mr. UPTON. Mr. Giudice?

Mr. GUIDICE. Yes, from my perspective, decoupling is neither the panacea or the cause of what ails us. It is just one of the tools that can be useful, done right, to help make sure we move forward.

And the stimulus bill does not require decoupling, in my read. It requires Governors to assert that they are going to work towards minimizing disincentives for efficiency as well as move to better building codes.

Mr. MARKEY [presiding]. Great. The gentleman's time has expired.

That is an important point that you made, Mr. Guidice, that it is not mandated. Just elaborate upon that for another 30 seconds, please.

Mr. GUIDICE. Sure. The national State energy officials actually worked with committee members when looking at this issue, because decoupling is a third-rail, hot issue across the country. Lots of different States look at decoupling in different ways. Massachu-

setts has recently, last year, chosen to move forward with decoupling, and we are going to be looking at our first utility rate cases in a long time.

And the parameters of looking at those rate cases and how that decoupling is going to be done in Massachusetts, it is going to have all of the normal sort of processes to assure that extraordinary returns are not being generated by utilities. There are protections to make sure that rates are set appropriately.

The stimulus bill recognizes all of the various ways that different States are dealing with this issue and allows for Governors to simply assert that they are going to work towards building codes and towards disincentives—take away disincentives to maximize efficiency. And there are lots of ways that we can make that happen across the country.

Mr. MARKEY. Thank you.

Mr. King, Mr. Anderson has raised some criticisms of utility-based efficiency programs, such as those used in Massachusetts, arguing that they are bad for industrial consumers. Could you respond briefly to those criticisms?

Mr. KING. We have had great success with our industrial energy-efficiency programs. And a critical component is that we have the consistency and the targets that we set with our State, and then we execute accordingly within the various energy-efficiency programs. So it has proven to be an effective tool for us to achieve our energy-efficiency goals.

Mr. MARKEY. OK. Thank you.

Mr. Campbell, you testified that an energy-efficiency resource standard could create 260,000 new jobs. Can you talk about some of those job opportunities, how they would be created?

Mr. CAMPBELL. We believe those job opportunities get created very quickly, as energy-efficiency projects and energy-efficiency activity starts to increase. Some of the numbers that we see is just for every million dollars' worth of projects, we are probably looking at five to seven direct jobs associated with that activity.

And these are well-paid jobs. I mean, these are things like energy engineers, controls engineers, software engineers, project managers, construction managers, construction crews, technicians, mechanics. These are good, solid, domestic jobs that get created with energy efficiency.

Mr. MARKEY. OK.

Mr. King, what is the average rate of return on each dollar you invest in energy-efficiency projects?

Mr. KING. Our overall energy-efficiency projects are not the utility investment. It is programs that are funded through our various State programs. And it is the most efficient low-cost investment with other alternatives, because we do view it as a resource. So as you deal with energy efficiency, demand reductions, et cetera, those are the most effective investments from an overall return standpoint.

Mr. MARKEY. OK. Thank you.

Mr. Anderson, under my EERS bill, electric and natural gas distribution companies are required to meet certain energy savings targets each year. Under that bill, utilities could satisfy those targets in part by buying from members of your organization the en-

ergy savings that your members achieve at their own facilities, for example, through combined heat and power, waste heat recovery, or other efficiency measures.

In other words, this is a major opportunity for your members to profit through energy-saving projects. Isn't that something that you could actively support?

Mr. ANDERSON. Mr. Chairman, your bill has quite a few very good things in it. I mean, I compliment you. It goes beyond utilities into building codes. It uses cost-effectiveness throughout the bill. It talks about the need for measurement and verification. It talks about, you know, taking into account weather and the economy and oversight and CHP, as you mentioned.

But the way we look at the bill is, it mandates energy efficiencies across the board. This is probably going to put a layer of cost across the board. Yes, there are some opportunities involved for some manufacturers who might be able to sell through a bilateral contract, which your bill does allow, but it also is going to affect other industrials in a different way.

We think, at least, that industrials, through their competitive forces, have had to implement energy efficiency in a great amount. And we just think they ought to be exempt from the——

Mr. MARKEY. All right. Let me let Mr. Wells respond to that.

What do you think about that?

Mr. WELLS. Could you repeat the question, please?

Mr. MARKEY. Just respond to Mr.——

Mr. WELLS. About the EERS?

Mr. MARKEY. Yes, please.

Mr. WELLS. We have reviewed the bill. We support the bill. When you look at the energy-efficiency opportunity, we look at our own company. It is in line with the performance that I talked about, and it is in line with the opportunities that we see going forward.

Mr. MARKEY. OK.

And I will give you the final word, Mr. Guidice.

Mr. GUIDICE. I think that the bill will actually unleash all kinds of opportunities, in industrial facilities and commercial and governmental facilities. And I am quite excited about it. I think many folks across the country will be able to——

Mr. MARKEY. Do you agree with that, Mr. King?

Mr. KING. Yes. Again, if you go back to some of my comments, our view is this is the foundation of a strong energy policy. And if we can build energy policy on the foundation of energy efficiency as one of the top resources, I think it is the right way to go.

Mr. MARKEY. Thank you, Mr. King.

The Chair recognizes the gentleman from Illinois, Mr. Shimkus.

Mr. SHIMKUS. Thank you, Mr. Chairman.

Let me follow up on this. Would anyone who supports the EERS support it without decoupling?

Mr. GUIDICE. Yes, I would support EERS——

Mr. SHIMKUS. Without decoupling?

Mr. GUIDICE [continuing]. Without decoupling as a specified requirement, absolutely. But, to be clear, we would require different States dealing with the utility-by-utility issues for that one.

Mr. SHIMKUS. Mr. King?

Mr. KING. We are operating in States that are moving on a progressive path towards sound energy policy, and decoupling is an issue that they are willing to tackle. So we are going forward without it being a part of the——

Mr. SHIMKUS. So you don't need decoupling to support EERS?

Mr. KING. Within the States we are operating in, the States are supportive of moving in the direction——

Mr. SHIMKUS. Anyone else want to add on to this debate?

Let me follow up on this decoupling debate, because this is pretty telling. Major users were thrown out, but this chart by the Department of Energy that my colleague, Mr. Upton, brought out talks about the additional cost to low users.

Now, I represent parts of 30 counties in southern Illinois. We wish we had more manufacturing. We wish we had big users. We are producers of electricity through coal and through coal-fired operations. I have talked about that last hearing, where a thousand jobs in my district were lost through the Clean Air Act. I can point to the specific mine, and I showed pictures of that mine in the last hearing. But this is talking about the effect to low users and residential small businesses of decoupling. So I would hope we didn't just disregard this.

And I would want to ask Mr. Guidice and Mr. King, The Boston Globe in an article, January 18, 2008—and this is the second paragraph: ″Massachusetts manufacturers pay the highest electricity prices in the continental United States, and the gap between their costs and those of competitors in other States is widening, according to the Energy Department. In 2006, the most recent annual data available, industrial users in Massachusetts paid more than double the average U.S. rate, compared to 60 percent more in 2005. Only Hawaii has higher industrial rates.″

And you are telling us that that is a standard that we should have? Higher industrial rates?

Mr. GUIDICE. No.

Mr. SHIMKUS. The Massachusetts model?

Mr. GUIDICE. I am not saying that our rates are the model for the country. I would actually love to bring our rates down, and we are working hard to do that—and our spending down on energy. And I suspect that the efficiency initiatives that we are taking are the ones that are going to drive that down most dramatically. And, to be clear——

Mr. SHIMKUS. Let me add to this debate the international scope, because this is really an international debate, and we are competing internationally with countries around the world.

If China and India do not fall into some climate change regime on cap and trade, can we ever compete with them in the manufacturing sector again?

Mr. GUIDICE. In my view, the world needs to get involved in the carbon issues.

Mr. SHIMKUS. No, that is not the question. The question is, if China and India does not—which I believe they will not, based upon discussions I have had with senior Chinese officials—if they do not, will we ever be competitive in major manufacturing in this country again?

Mr. GUIDICE. We will have gigantic problems if China and India do not get involved in carbon issues.

Mr. SHIMKUS. Thank you.

Let me follow up with—and I don't believe they will, obviously.

Let me go—Mr. Campbell, this is a great—in your testimony—and this is, again, on this decoupling. And you could have been stronger based upon your written testimony, because you say this: ″Improving efficiency is good for everyone. Efficiency improvements not only reduce emissions but also save consumers and businesses money. Energy prices are escalating and would continue to rise with a price on carbon.″ This is what we say all the time: Energy prices are escalating and would continue to rise with a price on carbon. That is climate change—putting a price on carbon.

″Energy efficiency will reduce that impact of climate policies on consumers' energy bills. It would lower energy spending for American business large and small, enabling them to better compete in the global economy. Smarter, more efficient buildings not only have lower utility bills″—and that is the one I want to highlight—″but also improve health, safety, and comfort.″

If consumers do not see lower utility bills by efficiencies, will they move to a new efficiency world?

Mr. CAMPBELL. I would say that for consumers and businesses to take on those energy-efficiency improvement measures, they have to see the incentive. There has to be an incentive for that.

Mr. SHIMKUS. And just for my Massachusetts friends at the panel, we debated decoupling here in the hearing. And you are correct that the stimulus bill strongly implies for the Governors to move their PUCs to a decoupling regime. And if you followed the debate here, there was no confusion that decoupling is a major issue. And, as we see, it is going to cost individual consumers, and it is not going to provide the incentives for the individual consumers.

And I yield back.

Mr. MARKEY. The gentleman's time has expired. The Chair recognizes the gentleman from Washington, Mr. Inslee.

Mr. INSLEE. Thank you.

Could the staff put up—we have a chart with California rates, or California usage. If you could put it up on the screen, please. I just want to make reference to that.

It is a little difficult to see, but I think it does help visually to look at how stunningly different the per-capita usage is in California, which is the lower blue line, and the average per-capita usage of the American, the upper red line, and how they have diverged. And they have diverged in no small part because of some efforts in California to inspire efficiency.

And I just want to note that the numbers are pretty stunning. As a result of that difference, together with the rate structures in California, that has saved Californians somewhere between—$4.1 billion between 1997 and 2004. And basically it is the difference between a flat per-capita usage in California and about a 40 percent increase per capita in the United States.

Now, as I understand what has happened in California, they have followed sort of a commonsense provision. Their measures they have adopted basically say that if a consumer's energy needs

can be met with a 3-cent-per-kilowatt investment in energy efficiency, essentially California has required utilities to go in that direction, where, instead, a 10-cent-per-kilowatt investment in a new power plant would be an alternative way to go about that.

Now, our efforts in the stimulus bill would essentially, in one way or another, ask utilities to adopt that same type of strategy, which, to me, seems a relatively commonsense provision. If you can achieve your consumers' goals, which is a warm house, with a less expensive investment in efficiency rather than a more expensive investment in power generation, then we want you to go in that direction.

Now, I think the language of the stimulus bill, in fact, meets that sort of goal. And that is why the president of the National Association of Regulatory Utility Commissioners just last week basically expressed acceptance of the language that we put in the stimulus bill.

So I just want to ask Mr. Guidice, if I pronounced your name right, to comment. Is that a fair assessment of what we are doing in that bill?

Mr. GUIDICE. Yes, that is a fair assessment. And I think it is a good case example of what is possible here for the whole country to move forward with.

Mr. INSLEE. Do any of the panel disagree with that assessment?

Mr. ANDERSON. I would like to add a couple of things to it. I happen to have been looking at the same chart that you have put up there, and just add a couple of things to it.

The vertical line right there—it is hard to see—it was 1976. My understanding is that California decoupled in 1982. They got rid of decoupling in 1996. They instituted recoupling again in 2004. They implemented inversed rates—in other words, the more you consumed, the higher the cost per kilowatt hour—that I think, at least, went farther than anything else in bringing this about. And I conclude from this, if you have high rates, you are going to have lower consumption.

Now, climate helps too. You know, when you are on the coast of California, you have a wonderful climate. It is truly God's country, and you don't need air conditioning a lot of the time, or heating. So there is a lot of other factors here besides it.

But what my main point is is that business flight out of California has exceeded, I believe, just about any other State for a considerable length of time. And if we, as a society, like that as a model—high prices, flights of businesses away—then I think we can get into this.

I don't think this chart, though, tells us that decoupling is good or bad or whatever because it just is far more complicated than that.

Mr. INSLEE. So do you have any assessment of—are you familiar with any studies that have tried to parse out the relative contributions to the California experience?

Mr. ANDERSON. I don't know of any particular ones, no.

Mr. INSLEE. Very well.

Let me ask in general, regarding Mr. Markey's bill, do any of you have any suggestions on changes to the bill, other than what you

have already articulated? I just want to give you an opportunity if you have any suggestions for us in that regard.

Mr. Markey, of course, thinks that this is a perfect Mona Lisa, which we would normally start with a presumption in that regard. But I just wanted to give anybody an opportunity.

Mr. GUIDICE. I would look at even more aggressive targets in the EERS, both on the gas side and on the electric side. I think those are understandable as to those why those are the sets that we are starting with. But I think, as we think about the climate challenges that we are facing and the economic opportunities that we will unleash, that we could ramp those targets up more significantly and quicker.

Mr. INSLEE. Anyone else?

Mr. ANDERSON. We would like very much to see the bill have the ability for industrials to opt into it. Clearly, there are cases where there could be real advantages if an industrial was involved to sell some energy-efficiency savings. But we also think that one size does not fit all, and we think it would be very difficult. So we would prefer to see them excluded otherwise.

Mr. INSLEE. Thank you.

Mr. MARKEY. Great. The gentleman's time has expired. The Chair recognizes the gentleman from Texas, Mr. Barton.

Mr. BARTON. Thank you. Thank you, Mr. Chairman. We have go a hearing going on downstairs, too, so I have been running back and forth.

I want to ask Mr. Inslee a question, although he is not on the panel. What is the retail cost of your constituents for electricity in Washington?

Mr. INSLEE. Well, that violates the rule against embarrassing any of your colleagues. So I will decline to answer, both because it violates that rule and, secondly, I don't know.

Mr. BARTON. Oh. Well, I am not trying to embarrass you. I think it is around 7 cents a kilowatt hour.

Mr. INSLEE. I honestly do not know the answer to that question.

Mr. BARTON. OK. It is very low. You have some of the lowest utility——

Mr. INSLEE. That is correct. That is correct.

Mr. BARTON. What is the average retail rate in California, Mr. Anderson or Mr. Reichel? They have some of the highest rates.

Mr. ANDERSON. I am sorry, Mr. Barton, I don't know the numbers. I know that it is very, very, substantially——

Mr. BARTON. Well, I know in San Francisco their highest rate is 37 cents a kilowatt hour.

Now, spare me the California model—you know, brownouts, haven't built any new power plants in probably decades; this decoupling, which I am going to ask Mr. Anderson about. I want the Jay Inslee-Washington State model, Bonneville Power Administration generating clean hydropower because God blessed his region of the country with great hydro resources, and the Federal Government, during the New Deal, built some of the most efficient hydroelectric power dams in the world. So his constituents get power at probably the lowest rate in the country. That is a plus for them; it is not a negative. And I am not trying to embarrass Mr. Inslee at all, because that is just the way it is.

But, you know, this hearing on energy efficiency is a good hearing. I am for what Mr. Markey is trying to do. But don't gag me by saying that we need to emulate the great State of California, who is almost single-handedly doing everything they can to destroy their economy on almost a daily basis and which has the largest State budget deficit in the history of the Nation, $42 billion this year alone. To put that in perspective, the entire budget of the State of Texas, on an annual basis, which is the second most populous State, is, I think, $75 billion.

So, anyway, Mr. Anderson, what is your opinion of decoupling?

I asked Mr. Anderson, but I will let Mr. Reichel answer it if he wants to.

Mr. REICHEL. I yield to Mr. Anderson.

Mr. ANDERSON. As I said very briefly in my oral remarks, and I have much more detail——

Mr. BARTON. Oh, I got the nametags wrong. I am sorry. Go ahead, Mr. Anderson.

Mr. ANDERSON. We are very much opposed to revenue decoupling for a variety of reasons.

First of all, we agree that there needs to be incentives for cost-effective energy efficiency; there is no doubt about that. But trying to pay extra amounts to utilities to have them implemented just doesn't make sense. The dollar that you give to a utility for energy efficiency—and, remember, utilities don't spend their money; they spend customers' money. So you give a dollar to a utility to implement energy efficiency, they take a sizable portion of that in overhead and whatever else, and then they give what is left back to some customers. This is an income redistribution. It probably doesn't really reduce the disincentive of a utility anyway. Eighty, 90 percent of the utility's revenues are still going to come from generation, no matter what you do.

So we have a whole variety of reasons why we are strongly opposed to revenue decoupling.

I would also like to say that I was surprised to hear someone say that NARUC, the Natural Association of Regulatory Utility Commissioners, supported the provision in the stimulus bill. I was working very closely with NARUC throughout that debate, and I thought that they were opposed. I cannot speak for them, but I think we ought to find out where they stood on the final——

Mr. BARTON. Is there a better way to incent a utility to do these energy-efficiency programs than decoupling?

Mr. ANDERSON. I think a far better way—if you are going to have a utility involved at all, I think a far better way is to have the utility be basically a tax collector; they collect money from customers however you specify that they are going to do it. And they turn the money over to a third party, whose sole objective is to implement energy efficiency. Their business model is to implement energy efficiency.

I believe Vermont has one, North Carolina has one, New York has one. There is a variety of examples. And we think, at least, that they work a whole lot better than trying to have an interim conflict within a utility. One side wants to sell more power; another side wants to sell less power. And it is an internal conflict inside. Have a business model of a utility to produce and sell and dis-

tribute energy efficiently, and have a third party whose sole business it is to implement energy efficiency.

Mr. BARTON. My time has expired. Thank you, Mr. Chairman.

Mr. MARKEY. Great. The gentleman's time has expired.

Mr. INSLEE. Mr. Chair?

Mr. MARKEY. The gentleman from Washington.

Mr. INSLEE. Thank you.

Mr. Anderson brought up an issue about the Chair of the National Association of Regulatory Utility Commissioners, and I had made a reference to, essentially, that they had said that they are comfortable with the final product. With your permission, I will put his statement in the record, and I think it will clarify that. They basically had concerns about the original product. He expressed comfort with the final product.

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

Mr. MARKEY. If I may, I am going to ask the gentleman from Texas if he would mind having this clarification be part of a 1-minute extension that is granted to the gentleman from Texas.

Mr. BARTON. Sure. Sure.

Mr. MARKEY. Thank you.

Mr. Anderson, if you want to respond?

Mr. ANDERSON. Yes, I was at the meetings where they did this, and I didn't understand the final, so I may be incorrect with it. But I know that there was tremendous concern that a public utility commission is supposed to be an independent body. And the way I read the language, the way they were reading the language was the Governor is supposed to be, in essence, trying to tell the independent commission what to do. And they thought this caused tremendous amounts of internal conflict, maybe ex parte kinds of concerns and that sort of thing.

But if I am incorrect, I need to stand corrected. I apologize if I am.

Mr. INSLEE. We will just put this in the record and let people draw their own conclusions. Thank you.

Mr. MARKEY. I thank the gentleman.

The Chair recognizes the gentleman from Vermont, Mr. Welch.

Mr. WELCH. Thank you, Mr. Chairman.

Mr. Anderson, I am from Vermont. We do have decoupling, and we do have a separate energy efficiency utility. And they both seem to be successful. The decoupling was a process that was widely debated with our utilities and worked out. And I want to get back to what we can do and not get just bogged down in whether this question of decoupling should get in the way of an aggressive frontal assault on efficiency.

Mr. Guidice, as a State official, you obviously have some sense of the importance of State autonomy. And some are arguing that setting a Federal floor for building energy efficiency imposes a one-size-fits-all approach that interferes with autonomy at the State level. Yet you are arguing very aggressively for strong Federal building standards. And I want you to elaborate on that.

Mr. GUIDICE. Thank you.

Yes, it is clear that the market alone is not working on our efficiency around the country. There are market failures. There are market barriers. And so we need to stimulate the right decisions.

But it isn't one size fits all. And what does work in the Southeast in terms of windows, as Mr. Upton was speaking of earlier, is different than what works in the Northeast. But that doesn't mean that all of us don't have an opportunity to go much, much more significantly towards energy efficiency. And I do think that this kind of approach, as laid out in the proposed act, will enable us to do that.

Mr. WELCH. OK, thank you.

Mr. Campbell, it is tremendous to hear about the success that you have had at Johnson Controls. And one of the big dilemmas that we face, and it is being argued here, I think, largely around this question of decoupling is, what is the dislocation that occurs when you go from one energy policy to a new one?

And you have been successful, as I understand it, in achieving efficiency and also creating jobs. And I want you to elaborate on that, in your point of view about how aggressive we should be, using efficiency as a tool to create jobs.

Mr. CAMPBELL. I mean, our view is that energy efficiency is the number-one opportunity for managing emissions, for managing some of the capacity issues that we have on the generation side. And, clearly, energy efficiency creates significant jobs. There is a significant industry behind that. But there are a mismatch of incentives that are out there today.

So, as we look at this, we really do see significant value coming from a whole series of complementary measures that need to be introduced, both around building codes, equipment standards, and also the energy-efficiency resource standards that have been introduced. But, in addition to that, we believe that there does need to be a very clear alignment of incentives for people that are making energy-efficiency improvements on their buildings.

Mr. WELCH. All right. What would you say would be the, say, two or three incentive alignments that would be the most helpful?

Mr. CAMPBELL. Well, the first one has to be to save money. I mean, that is ultimately what you want to see with any efficiency improvement measures, that you have to have a return for undertaking that activity. And depending on the set scale of the return, which can be complemented with specific incentives, depends how deep you can go with an energy-efficiency project.

So you can see energy-efficiency projects without incentives, especially in the private sector, that go very shallow, maybe look at lighting, maybe look at recommissioning, constant commissioning of a building. But to do the deep energy-efficiency improvement measures that go 30, 40 percent energy-efficiency improvement in a building, people have to either have a very long-term perspective on that building or there have to be incentives attached to taking those measures.

Mr. WELCH. OK, thank you.

You know, in Vermont, we spend about a billion dollars a year, which for our small State is a lot of money, on energy that is money that goes straight out of the State. A lot of interest in doing combined heat and power or other means of local generation of electricity, in order to keep that energy dollar recirculating as much as possible in Vermont.

Mr. Wells, what specific things could we do, as you see it, to encourage local generation of power, to keep those dollars at home?

Mr. WELLS. When you talk specifically to combined heat and power or cogeneration, it is finding a means to utilize the waste heat that comes off power generation. Today's power generation, pulverized coal efficiencies are in the high 30s, and some of the cogeneration units that we run are in the high 70s, if not approaching 80, because of our ability to capture that heat. We have a ready heatsink right there to use it. So, distributive heating, finding a way to take the heat off of a power plant and using it to heat homes in a neighborhood or in some sort of way, or finding an industry that needs that heat and coupling that up with a power plant. When electricity is sold on the grid, the heat is used.

The problem is, heat can't be transported like electricity can. So it has to be something local, it has to be something distributed right nearby.

Mr. WELCH. And then, how do you deal with the impact that it has on the local utilities that would potentially lose customer base or lose revenues? And anybody on the panel can answer that.

Mr. KING. Just to put a couple of things in perspective, first of all, when you look at the total energy bill, both the transmission and distribution costs and other key important programs are basically at inflation or below. The bigger problem is the energy costs. And what we need to do is focus on how can we most efficiently reduce consumption and help reduce those overall energy costs. That is the fundamental driver on why bills are the way they are.

Mr. WELCH. Thank you. I think my time has expired.

Thank you, Mr. Chairman.

Mr. MARKEY. The gentleman's time has expired. The Chair recognizes the gentleman from Oregon, Mr. Walden.

Mr. WALDEN. Thank you very much, Mr. Chairman.

Mr. Campbell, as you know, in my opening remarks I cited the comments in your testimony. And I apologize for having to leave to go to the Communications Subcommittee, so you may have addressed this. But it appears to me that you are arguing against decoupling in those comments, because you are saying that ″energy prices are escalating and would continue to rise with a price on carbon. Energy efficiency will reduce the impact of climate policies on consumers' energy bills. It will lower energy spending for American business.″

You talk about doing all these controls to lower energy bills on consumers as a good thing, as an incentive, I would assume, to do energy conservation. I mean, you know, I think the average person in my district says, ″Gee, I want to cut my costs. My budget is constrained right now. I am afraid of losing my job.″ They are not going to be really excited if the State moves forward on decoupling and says, ″Yeah, you do all that stuff. But, oh, by the way, you are going to pay the same amount.″

Isn't that really what happens under decoupling?

Mr. CAMPBELL. Yeah, I mean, I am not arguing against decoupling, but I am arguing for energy efficiency and ensuring that there is aligned incentives associated with those energy-efficiency measures to drive energy efficiency so we bring true economics to the consumer or the business so they can make smart decisions.

Mr. WALDEN. All right.

Mr. Anderson, let me go to you, because it seems to me, from your testimony, you would be arguing against decoupling. And I don't know what the—it seems to me it is a really perverse incentive to tell businesses—and I was a small-business owner for 21 years—that you use less, pay the same. I don't know how that is going to help our economy.

Tell me the stimulative effect on a small business by having them pay the same utility rates because they conserve their energy consumption.

Mr. ANDERSON. As I have said earlier today also, I agree with you completely, and it is a disincentive. We also look at it for, why are the utilities guaranteed anything? I mean, my members right now would love to be decoupled from their customers. I assure you, my auto companies today would love to be making the same amount of money that they used to make.

Mr. WALDEN. You know, I was in the radio business for 21 years, small-market radio stations. And I always thought it would be great for every time we didn't sell an ad and had time to run it that, you know, maybe we should have gotten paid. That would be the ultimate form of decoupling. My sales people would have loved that, too, I suppose. But it is not the way it works.

Mr. ANDERSON. Correct.

Mr. WALDEN. It is not the way it works.

Mr. King, I noticed in your testimony that you congratulated the Congress for passing the stimulus with $3.1 billion in State matching grants for energy efficiency and assistance for low-income consumers to weatherize their homes.

Won't low-income consumers be hurt, as well, if they do all this weatherization and the utility company comes back and gets to charge them the same amount?

Mr. KING. The intent behind the low-income consumer program will be to ensure that we are doing what we can to reduce their overall energy bill. And all that goes into how overall rates are——

Mr. WALDEN. And who pays for that subsidy to the low-income energy consumers who have reduced their consumption because they have taken advantage of weatherization, of which I am a big advocate of, who subsidizes them? Where does that money come from?

Mr. KING. All of those types of decisions are rolled into the overall rate design. And our customers, as a whole, as a community, support those kinds of programs.

Mr. WALDEN. Now, ″community″ is a wonderful term to use. But, at the end of the day, it is everybody paying their power bill, right?

Mr. KING. That is absolutely——

Mr. WALDEN. Do higher power rates affect the economy?

Mr. KING. No, they don't. That is a cost of living and doing business.

Mr. WALDEN. Have you ever been in small business?

Mr. KING. No, I have not.

Mr. WALDEN. I have. And I have to tell you, in the radio business I did everything I could, as I could afford to, to replace old tube-type transmitters with solid-state ones so I could cut my energy

bill, be more efficient. That savings amounted to something in my bottom line.

Mr. KING. I can understand that. And we have spent a tremendous amount of time with our customers trying to find ways to help them reduce it.

Mr. WALDEN. But how can you say that the higher energy costs don't affect the economy? I am struggling here.

Mr. KING. I don't think I said that. I think I said, yes, I understand how it impacts the economy. And it is part of living within a certain area and trying to help manage overall energy bills on a day-in, day-out basis.

Mr. WALDEN. But don't you think the best incentive is the good old marketplace that says, if I can cut the use of my power, I can save myself a little money and put it towards something else?

Mr. KING. That is exactly what energy efficiency and demand reduction is about.

Mr. WALDEN. It is, except when you add the decoupling to it that says the utility gets to charge me the same amount regardless of how much I save.

Mr. KING. Decoupling doesn't necessarily equate to that sentence.

Mr. WALDEN. What does it equate to then?

Mr. KING. The overall issue that we are trying to deal with from decoupling is to make sure that we understand the cost to deliver the energy and that we have the ability to recover those costs. That is it.

Mr. WALDEN. Which is why the utilities love decoupling.

Mr. KING. The overall issue with why we support decoupling is to make sure that, again, as you heard from the panel today, is the incentives are aligned and we are making sure that we are doing what we can to support the policy to reduce energy demand.

Mr. WALDEN. I wish we would have had a single hearing on this issue as it was related to the language in the bill that everybody voted on and very few got a chance to read in advance. I am trying to figure out now what this language that is now law means in terms of assuring that the governors get assurance from their PUCs to implement it.

I know my time has expired. Thank you.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from Texas, Mr. Gonzalez.

Mr. GONZALEZ. Thank you very much, Mr. Chairman.

I guess I should start off with my own observation of Texas government and Texas budget as compared to California. I am not here to defend California, but, by the same token, I know how State governments can save a lot of money.

Texas has been able to do it by simply not investing in infrastructure, on maintaining what they have and making no real investment in health care and education. You can save a lot of money that way. There is a greater price down the road, and I believe that my analysis would be supported by any study of what Texas has done in the past few years.

As we go through this debate today, you would think that we have made some real progress. Because you think in terms of the first year of the Bush administration in 2001—and I know it is getting into the partisan, but let's figure that we made some progress.

Because, in 2001, it was Vice President Cheney who commented on efficiency and conservation that conservation may be a sign of personal virtual, but it is not a sufficient basis for a sound, comprehensive energy policy.

I think we all acknowledge today—even my colleagues on the other side of the aisle—that conservation efficiency does in fact have a place in the overall energy policy of this country. At least that is what I am hearing. I have heard it referred to as not necessarily the fifth fuel but the first fuel. I have heard it as being one of the legs of the three-legged stool and so on. But what I am really hearing here is that we acknowledge it is out there, its value, but it can't be done, whether we say it is about decoupling or are talking about exemption for the industrial sector and so on.

So, on one hand, I think we recognize certain things like, well, we recognize that global warming is real, but I am not real sure that we can do anything about it. But at least we have the acknowledgment. So I feel hopeful that we have finally acknowledged a fundamental fact, and we move forward.

The question to the panel, and I am going to ask Mr. Anderson, during your testimony, I wasn't real sure if I heard you correctly about an industrial sector exemption. Is that what you stated?

Mr. ANDERSON. In Mr. Markey's bill, that is what we were suggesting, yes.

Mr. GONZALEZ. All right. And do you wish to elaborate at all? Because I am going to ask the other witnesses to comment on that proposal and what they believe might be the impact.

Mr. ANDERSON. Our companies operate in worldwide competitive markets; and the tremendous competition requires them, we believe, to implement cost-effective energy efficiency already. And we are concerned that if another layer gets put on top of that, it adds another layer of cost while doing more on the energy efficiency is quite difficult. So we are asking that industrials have the option of opting in if they want to be but otherwise being left out of the Federal mandates.

Mr. GONZALEZ. I think our industrial base does operate at a terrible disadvantage with other countries. India and China, of course, come to mind. The problem is we are not India and China, and much of our progress was based on some pretty bad experiences, and it doesn't mean that we continue or revert back to practices that should have been unacceptable under any circumstances.

I do not want to go too far back, but let's go back to child labor and working conditions and such. That will give us a tremendous advantage. Maybe we will be able to compete with practices in other countries. I don't think we do that.

When it comes to global warming and practices, I think there is a certain responsibility not to sink our economy but to do the responsible thing. I am not you are sure if you say it is a moral imperative and all that. Look, this is the real world. My constituents want jobs and a quality of life, also. So it does not fall on deaf ears.

But I am not sure if you are advancing an argument that simply says we just can't do it under the present economic circumstances and we never will be able to do it. But let's just talk about the exemption. Is that a viable choice? Is that something Mr. Markey should be considering?

And I will ask the other witnesses to make their remarks and to address that particular statement by Mr. Anderson.

Mr. WELLS. I think when you look at competitive that is a very good point; and in my case the competition is not labor cost, it is energy cost. So we are competing with places like the Middle East, where they can get natural gas out of the wellhead for a dollar BTU. And as recently as last summer we were paying $14 for that same.

For this reason, we have done sort of the efficiency improvements that I talked about, 1,600 trillion BTUs that Dow Chemical saved since 1994. And for this reason the opt-out may make some sense. Because we have done a lot of things that are out there, and for us to go the next step gets us out of what would be defined as cost effective and into much more costly.

However, having said that, having looked at the bill and looked at the numbers, at least for our particular company, we feel the bill as introduced is something we can live with.

Mr. CAMPBELL. Let me just add to that. With the targets within the bill I would concur. Personally, on behalf of the company, I believe we need to get serious about energy efficiency; and having exemptions is not getting serious about energy efficiency. I think the numbers are very attainable from all businesses, and I think that it really is a significant opportunity to drive competitiveness of our industrial base, to get more competitive in relation to energy efficiency and energy consumed.

Mr. GIUDICE. I strongly support no opt-out for anyone. We are all in this together, and there is opportunities for all of us to do so much more.

In Texas, the PUC there in the State energy offices recently looked at the efficiency potential in Texas and determined there is upwards of 20 plus percent of reduction of energy consumption possible and the economy would grow without any shrinkage. It would grow jobs in Texas by reducing energy consumption by upwards of 20 percent.

Mr. KING. Our industrial base is very interested in finding every way they could to reduce their energy consumption. We spend a great deal of time with them. We have had great success in reducing the overall energy consumption; and if we set goals and objectives in this bill, we need to find every way we can to achieve those goals and objectives. I would highly recommend that we stay with as large of a market impact that we can to ensure that we are achieving the efficiency goals.

Mr. GONZALEZ. Mr. Reichel—is that correct? The pronunciation?

Mr. REICHEL. Yes, sir.

As my expertise here today is pretty much with energy, once it is inside the building I would support anything that we can do from the energy efficiency side on the outside of the building.

Mr. GONZALEZ. Thank you very much.

Yield back, Mr. Chairman.

Mr. MARKEY. The Chair recognizes the gentleman from Louisiana, Mr. Scalise.

Mr. SCALISE. Thank you, Mr. Chairman.

Mr. King, in your testimony that you submitted, I think on the first page, you talked about the various strategies that you em-

brace; and I think your comment was we need law. And I agree with that. I know a lot of us last year in the big energy debate we were having in Congress proposed an all-of-the-above strategy, which encompasses efficiency conservation but also production and natural resources as well as renewables.

One of the things—and we had this debate on the stimulus bill—that we consider a renewable option is nuclear power; and there was an attempt to include nuclear power, which has no carbon emissions, in that renewable definition. Unfortunately, that was an unsuccessful attempt.

Do you support including nuclear power in that we-need-it-all strategy that you envision in your testimony?

Mr. KING. I think it is important that we look at all the alternatives.

Mr. SCALISE. And consider that as one of the alternatives.

Mr. KING. So it is important that we look at all the alternatives and make sure that we understand and have a comprehensive view of the national energy policy.

Mr. SCALISE. Clearly, many other countries are already pursuing that in a very aggressive way; and our country seems to be lagging behind. Hopefully, that changes as the technologies advance. It is clearly working well for many who are using it. So I appreciate that.

Mr. Wells, in some of your testimony as you talk about natural gas prices and the effects—and, obviously, we have some large facilities with your company and others in south Louisiana—as gas prices increased, it had a stifling affect on growth in the industry. As companies are trying to be more efficient—and, of course, the biggest incentive is the profit incentive, and there is a profit incentive to be more efficient.

But as you squeeze efficiencies out and then you get to a point where decoupling and other things would potentially increase rates for those who have done all they can—in terms of job losses, every time you have a 1 percent increase in natural gas prices, for example, what does that mean in terms of your ability to continue keeping the people employed that you have employed, looking at moving more operations overseas? How many jobs are lost for every 1 percent increase in natural gas prices?

Mr. WELLS. I don't have the number for the 1 percent, but the chemical industry in the last 8 years we have lost over 100,000 jobs in this country in large part due to what has happened in natural gas pricing, where we were in an area where we paid a pretty constant price in this country and we built a large chemical infrastructure around that and became an export base for much of the world. When natural gas did what it did in the late '90s and the early part of this decade, then we started looking for other, cheaper sources and found them. My own company, we are looking at building plants in Saudi Arabia, places like Libya, Egypt, because we can get that very cheap feedstock.

It is important to know for the chemical industry natural gas is not just a source of energy. We don't just burn it in a turbine and just combust it to make steam. We also use it to make our feedstocks.

I talked about in our company alone the bill last year was over $27 billion for our energy costs. Not only do they rise because of increasing demand and supply that is starting to fall off—we have seen some new discovery that has helped, but we think that just at best will delay the inevitable. But we also when we think about the climate change and what could happen with climate change and climate legislation, which we support, the easy answer is to go to natural gas for power generation and to combust natural gas over coal and lead to this dash to gas which could even further exasperate the situation.

Mr. SCALISE. I just hope as we go forward we—a lot of us have concerns about exporting jobs overseas and job losses. You talk about 100,000 jobs lost, in a way, because of a failed energy policy. I just hope we are very cautious in how we proceed, that some of the things we do, where we all agree that efficiency is important, where we don't have penalties on the other side that actually cost us more jobs. And your industry is a good example of there is a point of, if you exceed that level, your ability to continue employing the people you have is going to diminish.

So, hopefully, we keep all of that in mind as we entertain legislation to address the concerns that I think a lot of us have. But how we get there, we have to be cautious that we don't have those consequences which I don't think would be unintended, because we are well aware, as you point out, that those have direct impacts on businesses' ability to continue operating profitably here or looking at other options in other countries which have definitely been taken by companies over years and hopefully won't in the future. And, hopefully, we won't do anything in this Congress that encourages people to move those jobs overseas.

Thank you.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from Texas, Mr. Green.

Mr. GREEN. Thank you, Mr. Chairman.

And it is interesting I follow our new colleague from Louisiana, because I have a district in Houston that—I have the petrochemical complexes there. When you talk about losing jobs because of the high price of natural gas, we have seen that in our district, and particularly in the recent with our own economy with what is happening. Because a lot of the things our chemical industry does actually goes into home buildings for weatherization and things like that. That is why this last bill was a success, I think, to try to do some of the things that we want to do.

I want to follow up on that line of questioning, Mr. Wells. I know Dow Chemical is a member of the U.S. Climate Action Partnership. Like I said, your biggest plant in my area is in Freeport. It is not in our district. But I have Channelview, Houston and Pasadena, so I have a number of your facilities.

In your testimony, you mentioned that one of the likeliest ways to meet short-term carbon emission reduction targets called for in climate changes that fuel switching from nat coal to natural gas. And, again, with my accent, you would think I would love natural gas. And that is not a problem. It is just that in the chemical industry it is not only a fuel but it is a feedstock, and that is what caused us to lose those jobs.

I can tell you 3 years ago Shell Chemical moved jobs from Deer Park, Texas, in my district to the Netherlands for two reasons. The price of natural gas in the North Sea was cheaper, but also the price of health care for the Netherlands was cheaper per employee than their plan in Deer Park. So our committee has jurisdiction over both of those; and, hopefully, we will make it a little more competitive.

But the so-called dash to gas could be ruinous for the industries that are dependent on it, like the chemical industry. So I have significant concerns about any impact the climate change would have on affordable and reliable supplies of clean natural gas.

I have to admit even in Washington we see Boone Pickens ads. If we all did what Boone Pickens wanted us to do, not only with wind and solar but natural gas, we might not be having this concern.

Since I represent a great deal of the manufacturing facilities, Mr. Wells, do you believe that enacting energy efficiency measures would be enough to offset the job losses in particularly your manufacturing sector due to the increased demand for natural gas from the fuel switching?

Mr. WELLS. No, there would not be enough. They are an important step. They are an important easy step, an important economical step, but we have to go further, and we have to look at increased supply, what we can do to get more supply in a situation.

We have to manage both sides of the supply and demand equation. We have to manage demand by the efficiency measures and other complementary measures we talked about today. We also have to manage the demand side and make sure the country—we can get at the source of natural gas and oil that we have available. We are the only country in the world that is not allowed to look for our own resources right off our shores.

Mr. GREEN. The last Congress made exceptions, and we took off the moratorium on Outer Continental Shelf drilling. There may be some adjustments to that, and we don't want to drill in national parks and sanctuaries and things like that, but there are areas that we can get natural gas.

Natural gas is site based. Dow put in an LNG facility in Freeport, but that is not the way to solve the problem. We really need to have it much closer. You can pipeline it closer, because the cost gets so extravagant.

Mr. WELLS. We didn't put it in. It is another company that put it next to ours, and we are a user to clear that up.

Mr. GREEN. You probably wouldn't be there without Dow in Freeport. In fact, in the 2005 energy bill, Congressman Terry and I both championed that we would import natural gas when possible. But that is not our solution, either.

What design elements for a cap and trade program where there is reduction of targets and timetables or cost containment mechanisms or complementary policies would be most effective and lessen the impact of fuel switching? Does Dow have——

Mr. WELLS. Absolutely. As a member of U.S. CAP, they recently came out with their blueprint for legislative action. In there it talks about complementary measures for coal, complementary measures for transportation, things we would like to see. Certainly carbon

capture and storage. The ability to continue to use coal in a responsible way will would go long way to keeping the dash for gas.

What will happen if we don't do something like that, natural gas becomes the bridge as we invent the carbon free energy infrastructure. That will take time, and to bridge that time the easy choice is to go to natural gas. It creates half the amount of CO_2 as coal does in a power generation situation, and our industry cannot afford for that to happen because of what I talked about.

Mr. GREEN. Also, when you happen—and carbon capture and sequestration, that will help, particularly with coal. I know from your response to the earlier question about nuclear power, again, that is 15 years away, if we are lucky, maybe 12.

Mr. WELLS. We certainly think nuclear is part of it, both the traditional light water reactors and next generation, the high temperature reactor. We see lots of potential—although technology has a long way to go, lots of potential for that also to come to bear.

Mr. GREEN. Last year, the natural-gas-council produced a model that predicted demand for natural gas to increase by as much as 10 trillion cubic feet per year under climate change legislation.

The first question is, even with measures to increase energy efficiency, do you believe it is still necessary to increase environmentally responsible reduction of natural gas, domestic natural gas supplies in order to meet short-term carbon reduction targets called for in the climate change legislation and to keep those good-paying manufacturing jobs in the United States?

Mr. WELLS. Yes, absolutely.

Mr. GREEN. Could congressional efforts to hinder the domestic production of clean natural gas inhibit the U.S. from achieving the short-term carbon reduction targets while protecting our manufacturing base?

Mr. WELLS. Yes.

Mr. GREEN. So it is compatible as a member of both U.S. CAP to be a supporter of efforts to reduce carbon emissions as well as the increased domestic supplies of clean natural gas?

Mr. WELLS. Yes.

Mr. GREEN. Thank you.

Dr. Anderson, you mentioned the importance of utilizing combined heat and power technologies and petroleum chemical industries expressed disappointment with FERC's recent rulemaking regarding incentives for CHP as called for under the Energy Act of 2005. Can you further elaborate on why you believe that rulemaking would discontinue CHP incentives in certain FERC-approved regional transmission organizations?

Mr. ANDERSON. The FERC order rule that came out basically said that the PRPA incentives granted in 1978 for combined heat and power for cogeneration would go away in those markets that FERC has approved as being an RTO or an ISO. That is an independent system operator or a regional transmission system. So in those areas, which covers a significant portion of the country, the incentives that have been there since 1978 are going away. A utility can simply file with FERC and ask that they go away, and they are beginning to do that.

We did not think that was the intent of the Act in 2005. In fact, we worked with Representatives Barton and Boucher and others

when that language went through. And so what we are asking is that you all take another look at that and see if this really was the intent. We at least believe, as manufacturers that do a lot of cogeneration, that it is a big detriment.

Mr. GREEN. Thank you, Mr. Chairman. I know my time has expired.

I appreciate that. I know that wasn't the intent in 2005.

Mr. ANDERSON. Thank you very much.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes Ms. Baldwin.

Ms. BALDWIN. Thank you.

Mr. Green's questioning dovetails well with the direction I want to go in.

In my opening remarks, I cited the December Oak Ridge Natural Laboratory report stating the manufacturing facilities and commercial buildings are sources of waste energy that can be captured and converted into useful electricity and steam productions.

Further, it said that waste energy recovery is one of the most promising options in the U.S. energy efficiency portfolio and that if the U.S. adopted a high deployment strategy, combined heat and power development could generate $234 billion in new investments and create nearly 1 million new high-skilled technical jobs throughout the country.

The report goes on to say that the U.S. could avoid 60 percent of potential growth in greenhouse gas emissions between now and the year 2030 if we increase the amount of electricity produced from distributed energy sources from 9 percent today to 20 percent by the year 2030. We have had some questioning about this, but I would like to, with this potential out there, sort of have a little bit more of a discussion about the various incentives and barriers, the regulatory environment, as we just talked about, the technological hurdles and cost.

I guess I want to start in with cost. There was some testimony suggesting that this isn't cost effective but cost prohibitive. I have certainly heard from many industrial waste experts, waste energy experts, who say that much of the technology is readily available without further R&D. Required heat exchangers, turbines, piping are all off the shelf, not requiring additional R&D. And that there are other things that create hesitation in making investments in the industry sector.

I guess, to Mr. Wells and Mr. Anderson, if you might comment first on the cost barriers and additional incentives that we could be looking at.

Mr. WELLS. I can only speak for the industrial sector and for our own, and we don't see any cost barriers for the Dow Chemical Company. A vast majority of the power that we use is self generated, well over 70 percent; and of this power well over 90 percent comes from cogeneration. So in our application it makes a lot of sense, an awful lot of sense for us. We make maximum use of it.

Mr. ANDERSON. First, I am not familiar with the studies. I apologize for that. But one of the big barriers to cogeneration is the ability to get backup maintenance and standby power. If your generator does go down, you have to buy in a non-discriminatory way. We are concerned that when the incentives of PRPA were taken

away that has taken those things away, and that is why we are asking that you look at those things again.

I agree that there is a tremendous potential for combined heat and power. I am not as familiar with distributed generation. It is much smaller and applies to commercial and residential entities. But I understand that there is a potential there, also.

Ms. BALDWIN. Let me follow up on that answer.

In designing the Energy Independence and Security Act, I know that I worked with energy efficiency experts in my own district to craft the waste energy incentive grant program really to incentivize owners and operators of industry facilities to successfully produce electricity from recovered waste energy. Specifically, it provides a financial incentive of $10 per megawatt hour; and it is authorized at the $200 million level, although not yet appropriated. Is this in your mind sufficient financial incentive from manufacturers to invest in capturing waste energy and converting it to useful energy?

Mr. ANDERSON. We are strong supporters of the program. I can't say whether that is sufficient or not, but it is definitely a significant step in the right direction, and I hope the money does get appropriated. As you said, it has not been appropriated yet. We have been working with the Department of Energy as they are trying to implement this, and we think it is a great idea.

Ms. BALDWIN. I recognize there is controversy over whether manufacturers should be able to convert waste heat to energy and then sell any excess back onto the grid. How essential is the ability to sell excess energy to the success of harnessing waste energy—industrial waste energy?

Mr. ANDERSON. I think it varies significantly by application, by industry, even down to the individual plant.

Mr. Wells just mentioned they consume most of the power that they consume, and that certainly is a model that many others use, but others have the opportunity to produce more power than they can consume. And you have to be able to sell it at a price that makes sense.

Once again, it gets into the review of it, but that is an important area for many applications.

Ms. BALDWIN. Mr. Wells.

Mr. WELLS. When you look at how we use cogeneration, that is a very important thing for us. Because we balance on steam. We make all the steam we need; and then whatever power that comes along through the cogeneration process, if it is more than we need at a location, being able to sell on the grid is very helpful to us. If we don't make enough, being able to buy off the grid is helpful to us.

Mr. MARKEY. The gentlelady's time has expired.

The Chair recognizes the gentleman from Utah, Mr. Matheson.

Mr. MATHESON. Thank you, Mr. Chairman.

One observation before I ask questions.

As I listened to the discussion on decoupling that was taking place, whether people think they are for it or against it, I detected a lack of understanding about it during this discussion. I heard people comparing decoupling issues relative to regulated utilities with how it applied to private-sector competitive businesses. I sense the discussion, quite frankly, diverted into a lot of extraneous

issues that weren't relevant; and so it may be helpful for members of this committee to get a primer on decoupling and what it means and what it doesn't mean. Because, as I said, as I listened to that discussion I think there was a lot of confusion, a lot of apples and oranges comparison that were not necessarily appropriate or productive to the conversation.

Mr. MARKEY. I think that is a good idea. Thank you.

Mr. MATHESON. I want to address the issue briefly of appliance standards in the Act that was developed between the House and the Senate. The House version in 2007 had some provisions that allowed multiple efficiency standards for a single appliance. During the conference negotiation in the Senate, some of the provisions were dropped. Anyone on the panel, I would like to ask what room you think there is for further improvement in energy efficient appliances regulations.

Mr. GIUDICE. Gigantic room for improvement. We are consuming electricity in devices that are not producing any useful product for us. Our set top boxes, TVs that are on standby, plug power, vampire power in our homes is consuming 10 or 15 percent of the electricity that our residence is consuming for no useful output. There is technologies off the shelf that once we put them in place can go back down to 1 watt standbys on all those devices and still come alive at 4:00 in the morning when you want to record a show if need be. We just haven't spent enough time on those matters across the board.

As we look at it in Massachusetts, and we have seen similar studies across the country, just taking energy efficient devices off the shelf that exist today, ENERGY STAR and better, and putting them in across the Nation would save on the order of 20 or 25 percent in our residential electricity consumption. So tremendous opportunities. We haven't unleashed all the potential from design and marketplace to really drive that. And I would call for very high standards.

Mr. MATHESON. All right.

Mr. KING. The other element I would add is we need to also think about the future as we deal with intelligence on the grid, smart meters, et cetera. If we could start developing the standards for appliances where we could automate demand reduction, energy efficiency, et cetera, it will have a significant impact when you have a broad-scale deployment of energy efficiency in those appliances.

Mr. MATHESON. I think being forward looking makes some sense.

Currently, the law does not allow for use of multiple standards for appliances like if you have a dual electric gas furnace. Are those changes Congress ought to be looking at try to create some of those multiple standards?

Mr. GIUDICE. Yes. I think we have to look at all the standard setting very differently than we have to date. SEER rating standards on air conditioners are seasonal electricity consumption, not peak electricity consumption. Some of the air conditioners actually have a small compressor that when it gets really hot it is very inefficiently producing that cooling to kind of boost it. It looks like a good SEER rating, but it actually hits us the hardest on those peak days when we are trying to meet the electric load. So looking at

the standard setting and doing it on a very accelerated time path I think is very appropriate for national attention.

Mr. MATHESON. The committee learned in 2007 the DOE process for appliance standards takes a long time. And other countries such as Japan use a top runner program where the standard is updated every 3 years based on the top technology at the time. That technology becomes a standard for the next 3-year period. My question is, is this type of model realistic for the United States and how do we address concerns that manufacturers may express about making that a challenging time frame for them to adopt new standards? Any thoughts on that?

Mr. GIUDICE. I am a little familiar with the program in Japan, and I think it is a very interesting model. I think it stimulates innovation and creativity in their design, and I think it would do the same here. I think that we have been so comfortable in our absence of attention on this and our manufacturing folks have not spent sufficient attention to these matters that any kind of a change to a new regime is really hard, and so the initial reaction is to resist it. But I think working collaboratively, under very clear deadlines and very clear outcomes, that we could get to very similar models; and it would be beneficial to all of us.

Mr. KING. Just to quickly add to that, the opportunity that the bill provides us is a Federal standard. So once we have absolutely set that target, then you'll get a lot of expertise to jump in and help move to help not only from a State standpoint but over from a Federal policy. So that is a big opportunity you have as you debate the bill and support it.

Mr. MATHESON. Thank you, Mr. Chairman.

Mr. CAMPBELL. I would add a comment. I think aggressive standards drive innovation; and they also ultimately help with manufacturing scale, which gives us more cost-effective appliances going into the market.

Mr. MATHESON. Thank you. I yield back.

Mr. MARKEY. The gentleman's time has expired.

Here's what we're going to do. We will give each one of you one minute to tell us when you want us to remember from your testimony. What is your highlight? What is your takeaway message? What is it that you want us to be factoring into the development of energy and client change legislation this year in terms of efficiency?

We will begin with you, Mr. Reichel.

Mr. REICHEL. Thank you, Mr. Chairman.

I don't want you to remember me for my expertise on decoupling.

Mr. MARKEY. It is the joke of the day. Though. Well done.

Mr. REICHEL. Our technology that we have brought before the panel today and the committee works with every control system and every HVAC system in the country. I would encourage this committee to set up a performance efficiency standard. For every building has different controls and different HVAC systems, but they all have an operating strategy. Building performance software can help these buildings calibrate the buildings to actually achieve that energy efficiency goal. This was probably one of the last bastions of energy efficiency available in operation and maintenance. The Federal buildings I would encourage as strongly. We are work-

ing with the GSA, but I would encourage them, because private practice will follow what the Federal buildings do.

I would also look at setting this for schools. There is $13 to 15 billion of savings if we did this across the country. I think it is very important, and I commend you for your work here.

Thank you.

Mr. MARKEY. Thank you very much.

Mr. Anderson.

Mr. ANDERSON. I just hope that you will look very carefully at what the impacts of whatever you do will be on the manufacturing community. Nearly every one of these proposals will raise rates that we see. Some will bring about lowering consumption; and if the two offset, then that is great. But have a very realistic look at what it is going to do to the manufacturing community. Because many are right on the edge, and they are going to close the plant here. And they are not going to reopen it here but somewhere else.

Mr. MARKEY. Mr. Campbell.

Mr. CAMPBELL. We do believe that energy efficiency should be considered the first fuel, because it does save consumers and businesses money. And we do have the technology available, widely available today to deliver energy efficiency. We don't believe there is a silver bullet to energy efficiency. We believe there is silver buckshot. There will be complementary measures like the ones we have been discussing this morning, and they are going to give us the opportunity to drive energy efficiency to the level that I think as a Nation we need to drive it.

I think that energy efficiency is the most important thing that we can focus on when it comes to climate change. We need to make sure that there is alignment of incentives from the utilities to the users of energy. And I don't think it has ever been more important. We have to focus on it now.

Mr. MARKEY. Mr. Wells.

Mr. WELLS. When we think about the triad of economic success and environment performance and energy security, energy efficiency hits the sweet spot of those three things. It is a win-win-win. So why aren't we doing more of it?

We talked about the barriers today. It is clear we need a nudge or a push of some sort. So the complementary policies that we talked about today can form this nudge, give us the push we need to do the right thing with respect to energy efficiency and to help our economy.

Mr. MARKEY. Thank you.

Mr. King.

Mr. KING. I would start with energy efficiency is a resource, and it is a critical resource to meet America's overall energy needs. Secondly, that it is one of the least expensive investments that we have as an alternative to us. So we should be aggressive both on the targets to achieve as well as the time lines to achieve them, and we stand ready to help deploy and deepen its impact.

Mr. MARKEY. Mr. Giudice.

Mr. GIUDICE. I encourage the committee and Congress and the administration to be very, very bold at this time. I cannot imagine but I suspect that decades in the future we will be looking back

and wishing we were bolder about what we will be accomplishing right now. And I thank you for your leadership on these matters.

Mr. MARKEY. Thank you, Mr. Giudice; and we thank all of you. Just an excellent panel today.

I just want to, in closing, say that there has been a lot of talk this morning about the stimulus bill and decoupling; and it was raised by Mr. Matheson as well. So I just thought I would read the language from the stimulus bill so that people can hear it and it is on the record.

What it says is that, as enacted, the language requires the Governor of a State, as a condition for receiving the allocation for State energy program funds, to notify the Secretary of Energy, ″in writing that the Governor has obtained necessary assurances that the applicable State regulatory authority will seek to implement in appropriate proceedings for each electric and gas utility with respect to which the State regulatory authority has rate making authority, a general policy that ensures that utility financial incentives are aligned with helping their customers use energy more efficiently and that provide timely cost recovery and a timely earnings opportunity for utilities associatedwith cost-effective, measurable and verifiable efficiency savings in a way that sustains or enhances utility consumers' incentives to use energy more efficiently.″

The language does not mandate decoupling. It simply asks States to pursue policies to align utilities' initiatives with the pursuit of efficiency while insuring that consumers have incentives to pursue efficiency as well. NARUK does support the final language, and there are many ways to satisfy this requirement. It does not require decoupling and allows States to innovate in order to protect their own consumers.

So I thank the panel very much for being here today. It is incredibly helpful.

Unfortunately, historically, this subject and its discussion is only exceeded by watching grass grow in terms of the level of enthusiasm that it brings to a room. But, as you are all saying, it is the sweet spot. It is the first fuel. It is the whole key to how we can put a dent in climate change and energy industry issues and economic growth simultaneously. It is important for us to ensure that this year we put the laws on the books that telescope the time frame it will take for us to reach that day.

We thank each of you for being here today.

This hearing is adjourned.

[Whereupon, at 12:16 p.m., the committee was adjourned.]

[Material submitted for inclusion in the record follows:]

PILKINGTON

February 24, 2009

Alan R. Graham
Country Manager, North America
General Counsel & Secretary

The Hon. Fred Upton
Ranking Republican Member
House Committee on Energy & Commerce
Subcommittee on Energy & Environment
Washington, DC 20515

Subject: February 24, 2009, Subcommittee Hearing - Energy Efficiency: Complementary Policies for Climate Legislation

Dear Congressman Upton:

We applaud the Subcommittee on Energy & Environment for holding this hearing on energy efficiency. As this subcommittee has discussed previously, energy efficiency can and must play a critical role in climate policies directed at reducing carbon emissions. To that end, we are pleased to provide input and assist you in your efforts to pursue complementary policies which increase energy efficiency throughout the country. We are uniquely positioned to provide insight into the residential glass and glazing industry and strive, as we believe you do, to ensure policies directed toward energy efficiency capture the energy savings which exist in the fenestration arena.

Pilkington North America, Inc. ("PNA") is a leading U.S. manufacturer of flat glass for residential windows. Glass and windows have historically been overlooked as having any effect on energy efficiency; however, advances in glass and window technology in recent years have changed the landscape. This now is an area which can yield efficiencies resulting in significant energy savings. It is important to note that not all windows perform the same in all climate regions. For example, in the southern region of the country it is important to limit the amount of solar energy that enters the home through the windows in order to reduce the cooling costs resulting from the use of air conditioners. In the northern region of the country, however, it is critical to permit solar energy to enter through the windows in order to reduce heating costs and conserve energy. In order to maximize energy efficiency, the correct window glass must be matched to the appropriate climate region.

When energy efficiency is the primary motivating factor, it is critical to recognize the differing climate regions of the country and that energy efficient glass designed for Miami, FL will consume more energy when used in Boston, MA. The application of sound scientific principles and years of research supports this fact. In the northern region of the country, low solar gain products increase annual energy consumption by blocking the sun's heat, and forcing

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consumers to compensate for that loss through the use of additional electricity, fuel oil or gas to heat their homes. Installing the wrong window glass not only leaves significant energy savings unrealized, but also costs consumers more in home heating costs.

There are two basic measures for assessing the energy performance of windows. One measure is U-factor. U-factor measures the ability of a window to resist thermal transfer, or the flow of heat into, or out of, a building through the window. The lower the U-factor, the more resistant the window is to thermal transfer. The other measure of a window's energy efficiency is its Solar Heat Gain Coefficient (SHGC). This is a measure of the amount of solar energy that a window admits into a building. The higher the SHGC, the more solar energy the window admits.

There are two basic technologies available to alter the U-factor and SHGC of a window. Both involve coating one side of the glass in the window with a low emissivity coating (low-e). Pyrolytic technology applies the low-e coating early in the manufacturing process before the glass hardens from its molten form. When a low-e coating is applied in this way, it forms a permanent bond and actually becomes a part of the glass. This is also referred to as "hard coat" low-e glass. The other technology, referred to as "sputter coating" applies the low-e coating to the glass in a vacuum chamber after it has been manufactured. This type of coating never becomes a part of the glass and can easily be removed after it is applied. This is commonly called a "soft coat" low-e.

Hard coat low-e glass typically has a high SHGC and admits a large amount of solar energy into the home. Soft coat low-e glass can be manufactured with a high or a low SHGC.

After years of study and scientific analysis it has been unequivocally verified that in the northern region of the country high solar gain windows reduce annual, aggregate energy consumption by using the free and renewable energy of the sun to reduce residential heating loads. In many cases, consumers in heating dominated regions may even save more energy using clear glass (ie., glass without no low-e coating at all) in northern climates than they would using low SHGC glass.

Prescriptive energy codes have historically required low SHGC glass in southern, cooling dominated regions. The 2006 International Energy Conservation Code (IECC) prohibits the use of glass with an SHGC higher than 0.40 in southern climate regions. In the two code development cycles since 2006, the IECC Committee voted to reduce the maximum allowable SHGC in these southern zones by a full 25%, first to 0.37, and then to 0.30. A glass with a 0.30 SHGC will block 70% of the solar energy that strikes the glass from entering the home.

In contrast to the prescriptive control exercised over SHGC in the southern region of the country the IECC, and, to date, the Energy Star Windows program administered by the Department of Energy, have left SHGC criteria alone. This is significant because it permits very low SHGC products, manufactured to comply with low SHGC requirements imposed in the south to proliferate in the north, resulting in a lost opportunity for significant energy savings. This deficiency is made worse by a provision in HR 1 - the American Recovery and Reinvestment Act - which bars high SHGC products from qualifying for the energy efficiency

tax credits, further compounding the lost opportunity for energy savings. If a 0.30 SHGC glass manufactured to comply with requirements in the south is used in the north, it will result in northern homes using glass that blocks 70% of the sun's free and renewable solar energy from entering the home. This will, in turn, result in the unnecessary burning of additional fossil fuels to heat those homes. Correcting this deficiency will result in significant, additional energy savings and is very easy to accomplish -- Congress should amend HR 1 as soon as possible to remove restrictive tax credit qualifications that limit energy efficiency and disadvantage consumers economically.

Historically, for manufacturing and marketing convenience, some glass and window manufacturers have favored little or no regulation of SHGC in the northern region of the country in order to foster a "one size fits all" inventory of products from Miami to Minnesota, over the energy efficiencies of using high SHGC products in the north and low SHGC products in the south.

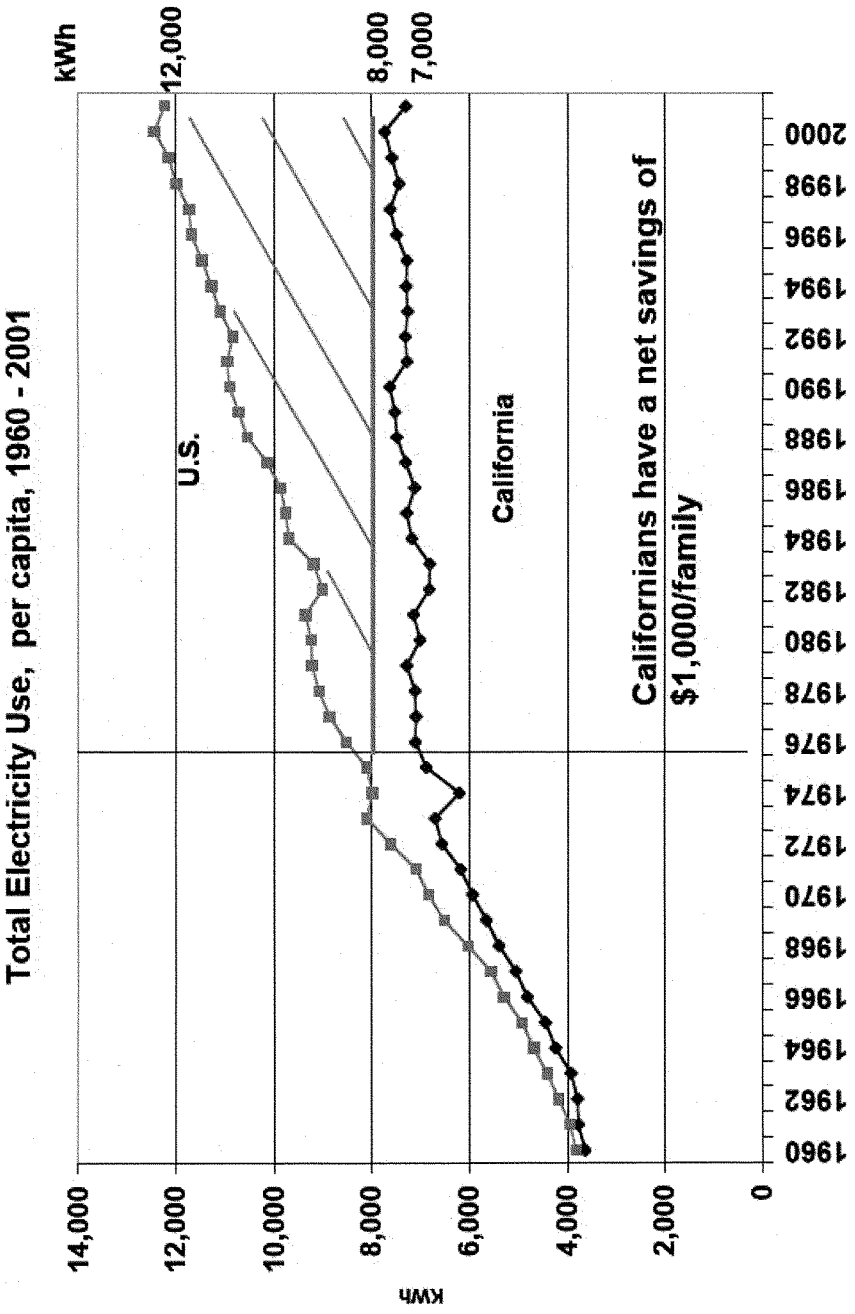
Once windows are installed, they will affect a home's energy use for thirty or forty years. If high SHGC windows are installed, homeowners can reap the benefits of free solar heating while controlling SHGC to desired levels by simply opening windows, using curtains, screens or blinds or any one of an infinite variety of external shading devices. If, on the other hand, low SHGC windows are installed, northern homeowners will <u>never</u> realize the benefits of free solar heating since, once installed, low SHGC windows act as a permanent barrier to the use of solar gain to reduce wintertime heating loads.

Pilkington North America has led the glass industry in research, development and commercialization of glass products to improve energy efficiency in homes. We offer a broad range of products because we believe that window glass should provide the greatest energy efficiency possible. We encourage members of this subcommittee to join us in this effort by ensuring regional climate differences are accounted for and insisting that consumers in northern climates of the country benefit from the free, renewable energy of the sun. High solar gain windows will improve energy efficiency, yield considerable aggregate energy savings and enable consumers to cut their heating costs dramatically.

Thank you for the opportunity to submit our input on these important issues. Pilkington North America welcomes the opportunity to meet with members of the subcommittee and/or staff to discuss this issue further.

Sincerely,

Alan R. Graham


Total Electricity Use, per capita, 1960 - 2001
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ELECTRICITY:

NARUC's Butler discusses transmission siting, rate decoupling *(OnPoint, 02/23/2009)*

About this video

After strong lobbying by state utility regulators, how does the final stimulus package address rate decoupling? What will the impact be on consumers and utilities? During today's OnPoint, Frederick Butler, president of the National Association of Regulatory Utility Commissioners and a New Jersey Board of Public Utilities commissioner, gives his take on how the stimulus addresses ratemaking procedures and energy efficiency for utilities. He gives an update on the federal electric transmission-siting issue and discusses how a federal renewable electricity standard will affect utilities.

Transcript

Monica Trauzzi: Welcome to the show. I'm Monica Trauzzi. With us today is Fred Butler, president of the National Association of Regulatory Utility Commissioners and a commissioner of the New Jersey Board of Public Utilities. Fred, it's nice to have you on the show.

Frederick Butler: Good morning, Monica, and thank you for having me.

Monica Trauzzi: Fred, the president recently signed the economic stimulus package into law. It was pretty controversial on the utility ratemaking and what's your take on how the final bill addresses ratemaking procedures and energy efficiency from utilities?

Frederick Butler: Well, we're very pleased that the bill has in it the kind of funding that it does for the states and for a number of the energy efficiency and Smart Grid kinds of projects. And we're also pleased that the language so was proposed to be in there that actually made it into the final bill is fairly general in terms of this ratemaking provision, almost a condition of accessing a portion of the money, a small portion of the money. It addresses kinds of ratemaking approaches that the states need to consider and governors have to certify to the Department of Energy that the commissions are looking into seeking to put in provisions for cost recovery by the utilities. But it wasn't as strict as the original language was, and that's something we worked very hard to see happen.

Monica Trauzzi: So, you feel like you got what you want or got partially ...

Frederick Butler: We got partially what we wanted, at least the original requirements, which were very strict, were changed substantially.

Monica Trauzzi: So, who benefits from a policy like the one that we saw included in the stimulus?

Frederick Butler: Well, the utilities benefit from something like that because it improves their ability to recover in a timely manner the costs that they incur. The ratepayers, of course, end-use customers have to pay for that, but if we all believe they're achieving some benefits from what's going on, it's their responsibility to pay for some of it, as it is for the utility company's shareholders to pay for some of it. So it is a balanced cost and benefit here.

Monica Trauzzi: So, is this a good compromise or is there a better way to be approaching this overall? I mean utilities, frankly, at this point, make money when people use energy. So how do you promote energy efficiency?

Frederick Butler: Right and there is a contradiction here. If you're asking utilities to sell less and to help us in the effort to sell less and for people to use less, it's obviously affecting their bottom line, the revenues that they bring in. So there has to be some consideration for the effect on the financial health of the utilities. At the same time, we can't ask end-use customers to also use less and then have to pay a higher rate per unit on the less that they're using. That's really not fair to them. So I think the provision in the final act allows for a whole variety of ways in which states can address this problem, this conflict between the interests of the utilities and the interests of the end-use customers and we're comfortable with that. We think states are creative. We think states are approaching this in a number of very creative ways and that's what we wanted to see, not a prescriptive, it must be this kind of way, and that's what was originally in the bill.

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April 21, 2009

The Honorable Henry Waxman
Chairman
House Committee on Energy and Commerce
2125 Rayburn House Office Building
Washington, D.C. 20515-6115

Dear Chairman Waxman,

Thank you again for the opportunity to testify before the Subcommittee on Energy and Environment on February 24th regarding "Energy Efficiency: Complementary Policies for Climate Legislation."

In response to your letter of March 30th, attached are my responses to questions sent by members of the Committee.

I look forward to continuing to work with you and your Committee to deliver a greener energy future for our state and nation.

Sincerely,

Philip Giudice
Commissioner

The Honorable Joe Barton – Five questions, with sub-questions

1. **Massachusetts has the 4th highest electricity rates in the country, almost 7 cents per kilowatt hour more expensive than the national average, and cheaper only than New York, New Jersey, Connecticut, and Hawaii. In these economic times, why should we be following the Massachusetts model?**

   Global fuel markets are the fundamental driver of energy prices. Massachusetts and the other states you mention do not have conventional fossil fuel resources of their own, and are at the end of the pipe, so to speak, for oil, natural gas, and coal. For this reason we look more and more to local options to meet our energy needs. Fortunately, these local options – energy efficiency, wind, solar, biomass and hydro power – are cleaner than the alternatives, and often are much better for local economies and job creation.

   While I am not bold enough to call it a Massachusetts model, I did and do recommend that states and the federal government prioritize energy efficiency and clean, local sources of power. Because of the steps we have taken, our state economy is one of the most energy efficient in the US. We create more gross state product per unit of energy than all but three or four other states (depending on the year, New York, Connecticut, and one or two other states join us at the top of the list). According to 2006 U.S. Energy Information Administration and Census data, Massachusetts created more than $225 of Gross State Product per MMBtu of energy input. For reference, the US produced about $132 GSP/MMBtu, and Texas produced about $90 GSP/MMBtu.

   I would also encourage you to look less at *rates*, and more at the *bills* people end up paying. Our best tool for helping people to manage their energy costs is to help them to eliminate wasteful usage – and therefore lower their energy bills.

2. **A Northeastern University study of Massachusetts manufacturing stated that in 1970, 25% of workers in Massachusetts were employed in manufacturing, while less than 10% are today. The study indicated that the third most important thing Massachusetts could do to help manufacturers was to "ensure availability of lower cost energy." The Boston Globe reported that only Hawaii has higher industrial energy rates than Massachusetts, and that electricity costs have contributed to the shutdown of several plants and an estimated 2,000 jobs lost in the last few years. How will your decoupling program and Regional Greenhouse Gas Initiative "ensure the availability of lower cost energy"?**

   I think you are referring to the study, "Staying Power: The Future of Manufacturing in Massachusetts," prepared by the Center for Urban and Regional Policy at Northeastern

University (http://www.bostonfoundation.org/UtilityNavigation/MultimediaLibrary/ReportsDetail.aspx?id=8242&parentId=354). Among other things this study finds that:
-manufacturing is the fourth largest employer in the Commonwealth;
-Massachusetts sees new manufacturing firms entering the sector every year, and even during the recession years of 2000 – 2001 there was an average of 500 new establishments created each year;
-manufacturing *output* has actually been on the rise in Massachusetts in the last decade; and
-55% of firms expect to expand their operations in the next five years.

The indication on energy costs you mention comes not from the report authors, but from survey respondents. It is worth noting that survey respondents also put learning about energy conservation at the top of their list of subjects on which they would like more information or training.

We expect that decoupling and the Regional Greenhouse Gas Initiative, in combination with the other energy policies covered in my testimony, will unleash a new era of economic growth that puts Massachusetts at the hub of a 21st century clean energy economy. I do hope that the federal government adopts similar policies in order to allow our nation take advantage of similar growth opportunities.

3. **Massachusetts Renewable Energy Credits are the most expensive in the region. Despite your efficiency efforts – and even as you increase your efficiency efforts – there were [sic] still be high costs burdening consumers for failure to meet RPS objectives. One major renewable project that would produce renewable credits and either contain or lower the cost of renewable energy credits in your state is the Cape Wind project off the coast of Cape Cod. This project has been under development for quite some time. Do you support the project? To what do you attribute the delays?**

Massachusetts in 2008 met its entire RPS compliance obligation with Renewable Energy Credits generated by renewable energy facilities. We expect this to be the case in future years as well. We look forward to the continued growth of a robust and economically efficient renewable energy market that supports the development of clean, local electricity sources, and expect to derive significant job and economic development benefits from these local investments.

Governor Deval Patrick supports the Cape Wind project proposal. Massachusetts regulatory agencies completed the state environmental review of the project in March 2007. State and local permits are now pending before the state Energy Facilities Siting Board and action is expected to be complete there in the next month. We now await final decisions from federal agencies with jurisdiction.

4. **Would you agree with this statement: "a requirement mandating that between 20 and 25 percent of national electric consumption come from Renewables will require investment of hundreds of billions of dollars in generating facilities, as well as several hundred billion dollars of investment in the transmission systems needed to take the renewable energy to market." If no, please explain.**

   The statement is provided without context or attribution, so I will decline to either agree or disagree. Generally speaking, Massachusetts is strongly supportive of developing renewable energy resources both within and outside our borders. Our state RPS – and those of other states in our region – has been successful in driving strong expansion of renewable power generation in our region at reasonable cost and under strong competitive market rules. And as Secretary Bowles noted in a recent op-ed piece in the New York Times, "Renewable energy resources are found across the country; they don't need to be harnessed from just one place." Developing offshore wind farms harnessing the strong winds that blow off the Northeast coast is likely to be cheaper than relying on an extensive, costly and controversial new transmission system that would carry power from remote areas. The cost of transmission ought to be incorporated into the cost of bringing clean energy to market.

5. **I'm curious about your assertion that the average existing home in Massachusetts uses about 20-50% more energy than current codes allow. You stated in your testimony that the State of Massachusetts is "designing programs that will achieve deep energy use reductions in all of these older homes." Commissioner, will the State of Massachusetts – which is currently running a $1.1 billion deficit – be paying for all of these retrofits on these homes? If not, will you be forcing the average citizen to pay for all of the improvements? If the average citizen will be forced to make these changes to their homes, will they be the ones saving on energy costs? How is that possible under a decoupling scheme?**

   The energy performance of the average home in Massachusetts is largely a function of the age of our housing stock. A significant portion of our energy efficiency progress in coming decades will come from progressive updating of our building energy codes, which will improve the energy performance of new construction and major retrofit projects. In order to make existing homes that are not undergoing major retrofits more efficient, we offer incentives and technical assistance to homeowners and businesses. These voluntary efficiency programs are funded by a combination of sources – our 2008 energy legislation provides for an expansion of energy efficiency funding from electric rate changes, but only to the degree that they are cost effective and serve to reduce overall energy costs. As I covered in my testimony, they are very cost-effective, returning major energy savings and bill reductions – not to mention pollution reductions – for every dollar spent.

   A new "decoupled" rate structure will do nothing to prevent billpayers from seeing savings on their energy bills; in fact it will increase the savings they see. Our utility regulatory agency, after a public review process lasting more than a year, directed our major investor-owned utilities to

make proposals that "decouple" their revenue from volume of sales, in order to remove fundamental disincentives to the pursuit of energy efficiency. Each company will be filing comprehensive rate cases which are expected to last months and include a full vetting of each company's cost of doing business as well as their decoupling proposals. The regulatory processes have been and will be informed by robust participation from all sectors of the Commonwealth.

Johnson Controls

A Follow Up to House Subcommittee on Energy and Environment Hearing on Energy Efficiency: Complementary Policies for Climate Legislation

Response to Questions from the Honorable Joe Barton

April 20, 2009

To the Honorable Joe Barton, and

Members of the House Subcommittee on Energy and Environment:

On behalf of our company, I appreciate the opportunity to participate in the ongoing conversation and deliberations about the best approach to drive greater efficiency and address climate change. In the following few pages I include the text of your questions, and our responses. I hope you will find these helpful.

Question 1. Building control systems help a building's heating and cooling system operate at the optimum level. However, my understanding is that with today's sophisticated Building Control Systems, system components often fail or deterioriate over time, and the deterioriation is often hidden or unnoticed because the controls have "learned" or "adapted" to the changing conditions of the building and/or the HVAC equipment. How can you achieve

energy efficiency savings when the deterioration occurs unnoticed? What is the loss measured in dollars and kilowatts for control system that doesn't function properly? Couldn't this lead to operating cost increases of as much as 50 cents per square foot?

Building control systems are designed with the objective to continuously "solve" a single question: how to deliver a pre-set level of comfort (temperature, humidity, lighting levels) in the most energy-efficient manner possible. This means calling on centralized and distributed mechanical and other equipment to do work at varying levels at different times.

As you point out, both the mechanical equipment and the controls systems themselves inevitably degrade and fail over time. We have a very high degree of understanding of this performance curve for both families of products – and how to postpone it – given that we are one of the worlds' leading manufacturers of both building automation systems and heating, ventilation, air-conditioning and refrigeration equipment.

Johnson Controls was one of the early leaders in developing adaptive controls algorithms that intelligently adjust to lower performance in degrading equipment by calling on other equipment to work harder to maintain the overall comfort requirements. Because the overall comfort conditions remain stable, the deterioration of individual units may go unnoticed to the occupant and building owners, and can result in reduced system energy efficiency and higher operating cost. These losses can be quite significant -- The Department of Energy (DOE) has estimated savings potentials in the report: "Energy Impact of Commercial Building Controls and Performance Diagnostics: Market Characterization, Energy Impact of Building Faults and Energy Savings Potential (2005)". The energy savings from repairing aging equipment is

estimated to be as high as 26% of the energy consumed by the heating and cooling systems, which could approximate or exceed 50 cents per square foot depending on the cost of energy. From the Johnson Controls perspective, understanding, postponing and avoiding the degradation of the mechanical and building automation systems is both a critical component of any effective energy efficiency strategy, and also creates significant economic benefits for communities across the United States in two different ways.

First, in order to achieve and maintain significantly improved energy efficiency performance in buildings, we need skilled engineers to find the opportunities, efficient equipment to do the work, intelligent control systems to deliver comfort, and a trained and skilled workforce operating, maintaining, repairing and replacing these systems and equipment on an ongoing basis. These jobs are local, can't easily be off-shored, require skills and training, and are a critical component of making and keeping buildings operating at their highest efficiency. In other words, we can achieve and maintain energy efficiency by employing people to keep a total building running as it should, for as long as it should.

As we described in our testimony, we provide this full solution to our public sector clients in the form of "performance contracting." In these contracts we deploy engineers to identify savings opportunities, provide the equipment and building automation systems necessary to do the work, and assign personnel to measure and maintain the results. As part of this program we guarantee that we will achieve the expected energy savings. This guarantee provides confidence to borrowers and lenders that the investment will be recouped.

Second, we are making significant investments in advanced information applications that detect and diagnose faults that lead to energy waste. These technologies use decision-based rules to inspect a wide variety of equipment on a continuous basis, and then isolate the events and

equipment most likely to contribute to energy waste and cost. This work again requires people: engineers and information specialists to provide on-site and remote diagnostics, as well as highly-trained individuals on the ground to do the work of repairing and tuning equipment. We view this opportunity as especially promising in existing buildings where clients don't have the ability to make capital investments in new equipment, but would be willing to fund operational improvements enabled through technology. By implementing information technologies that identify equipment deterioration, we can help our clients save money, improve system reliability, and extend the life of existing equipment.

Question 2. Your testimony states that energy efficiency is the fastest, cheapest, and cleanest energy source. Why isn't profit motive sufficient to get corporations to implement these fast, cheap, and clean energy solutions? You state in your testimony that businesses can and should incorporate climate change responses into their corporate strategies. Does your business need a federal mandate to incorporate something that is fast, cheap, and clean?

When it comes to individual corporations considering energy efficiency investments, there is a well-documented array of barriers to unlocking the potential for energy efficiency within the private sector. In our testimony we attempted to describe some of the mismatches we see most often as individual companies consider energy efficiency investments. These include:

- Incentive mismatches between an owner who may want low lifecycle costs for their building versus a developer/builder who selects equipment based on lowest first-cost;

- Timing horizon mismatches between an owner/tenant making decisions without certainty about how long they will stay in a building versus making decisions from the perspective of the lowest lifecycle cost for the building itself (regardless of tenant);
- Pricing mismatches between the cost an owner sees for conventional and renewable energy sources versus the full societal cost associated with that energy in terms of greenhouse gas emissions and other environmental impacts; and
- Priority mismatches between private sector companies investing their limited capital in growth opportunities versus cost-reduction opportunities.

Although in our discussions with clients we point out the speed, ease and cleanliness of efficiency projects, the mismatches listed above often prevent individual firms from undertaking efficiency projects.

It is our view that we need both a price on carbon and a set of complementary policies to overcome these mismatches at the individual consumer level. At the macro-economic level, we think these policies will help make the broader and equally important argument: that energy efficiency is fast, cheap and clean – especially relative to conventional fossil fuels used in new generation plants.

Question 3. I'm curious about your building performance software. How does your software function in a building without a control system? What is your energy efficiency strategy for buildings with fewer than 3 stories or other buildings with traditionally no control systems?

Building control systems are a combination of hardware (devices and sensors) and software (algorithms that drive actions and call on equipment). In more complex buildings

(multi-floor, typically with some kind of central system that chills and pumps water throughout the building), building controls are a stand-alone system much like an I/T network. These controls can connect to all kinds of different building equipment, including heating and cooling systems, lights, fire & security systems and others.

In simpler buildings (large or small), control systems can be added in the form of time clocks that turn equipment on and off based on a simple schedule. More sophisticated control systems can also come pre-installed on the heating and cooling equipment itself, and can then autoconfigure themselves into smaller networks serving specific zones within these buildings.

As a leading manufacturer of heating and cooling equipment, we do sell controls and heating/cooling products to serve this market segment. Like most manufacturers, we have a broad product line that includes products with average energy efficiency, and products that are very high efficiency. Given the mismatches described in answer to question 2, however, we see buyers often default to the product lines with lowest first-cost and average efficiency or low efficiency. We have a view that the combination of complementary policies, such as high efficiency standards on equipment, a price on carbon, and a growing consumer interest in reducing their environmental impacts will all contribute to a shift from lower efficiency to higher efficiency products – both ours and our competitors. We are factoring this thinking into our research & development efforts.

Question 4. Is putting a price on carbon through a cap and trade or through a carbon tax a requirement to making your energy efficiency technology price competitive?

Our energy efficiency products and technologies are market-competitive today. By bringing together both a price on carbon to capture the full cost of energy and a range of complementary policies around equipment standards, labeling and others, we believe that consumers at all levels of the economy would have a clearer and better understanding of the tradeoffs between energy efficiency and first cost. With this information, they would elect to purchase our most efficient products (as well as those of our competitors). This shift in demand and supply at a market level is needed to unlock the vast potential for energy efficiency, to provide meaningful and important work to Americans across the country, to substantially reduce our dependence on foreign oil, and to put a significant dent in our carbon emissions as a nation.

Thank you once again for the opportunity to respond to these questions. I hope that you will find these answers instructive. As I closed in my original testimony, Johnson Controls strongly believes in the need to increase the nation's focus and investment in energy efficiency. Energy efficiency should be the first priority in addressing climate change as a way of containing the cost of climate protection policies and creating new jobs.

Sincerely,

Iain Campbell, Vice President and General Manager

North American Service & Global WorkPlace Solutions

Building Efficiency

Johnson Controls Inc.

RESPONSE OF JOHN ANDERSON TO THE QUESTIONS ASKED BY REP. JOE BARTON SUBSEQUENT TO THE FEBRUARY 24, 2009, HEARING ON ENERGY EFFICIENCY

1. *Two weeks ago, Congress passed a "stimulus" bill which included a provision requiring states to implement policies like decoupling in order to receive energy efficiency funds. I opposed this provision, because I believe it could raise customers' electric rates. Could you please tell us what this decoupling means for energy consumers?*

As I stated in my testimony, ELCON opposes a Federal mandate requiring States to implement decoupling. Decoupling places the administration of energy efficiency programs in the hands of the utility, thus to a large degree removing the incentive for an energy consumer to undertake investments for energy efficiency. In addition, since a specific level of earnings for each utility is guaranteed, it reduces the incentive for the utility to strive to be efficient. Finally, since a premise of decoupling is for a utility to retain its earnings level if its volumetric sales decrease, a customer will certainly have higher rates and might well have a higher electric bill even if it used less electricity.

2. *Why would we want to raise energy prices in these tough economic times? What would higher energy prices do to the manufacturing sector?*

The manufacturing sector has suffered – and continues to suffer – tremendous job losses, some of which are directly attributable to electricity prices which have increased tremendously in the past few years. I am aware of at least three facilities – an aluminum plant in Maryland, a chemical plant in Delaware, and a steel mill in New Jersey – which have closed and in each case high electricity prices were cited as a primary cause. As I stated in my testimony, increased electricity prices can result in making America's manufacturers less competitive in international markets, leading to more closures and more job losses.

And, during these difficult economic times, small businesses and homeowners will also suffer from increased energy prices.

3. *Why do you think the proponents of decoupling are so eager to have it enshrined into federal law? Who benefits from decoupling?*

Proponents of decoupling fall primarily into two categories, environmental advocates and investor owned utilities.

Utilities have traditionally opposed energy efficiency mandates because they fear that increased energy efficiency will result in reduced electricity consumption leading to lower sales and reduced earnings. Well meaning environmentalists seeking legislation to promote energy efficiency often find themselves thwarted by investor owned utilities. While decoupling may remove the disincentive for utilities to oppose energy efficiency, it does not provide incentives for them to support it.

As for why utilities advocate decoupling, at the risk of sounding flippant, I quote a friend in the utility industry who explained why he supported such legislation, stating "if I sell more electricity, I make more money, and if I sell less electricity, I make more money."

4. *I've seen this McKinsey study chart about the benefits of energy efficiency many times now. According to McKinsey, much of this energy efficiency is effectively free money. You'd be saving money by implementing more efficiency. Do you believe your member companies are leaving free money on the table, or is the issue more complicated than the McKinsey chart makes it appear?*

I too have seen the McKinsey chart. Speaking from the perspective of manufacturers who consume large quantities of electricity, I know that each and every company is forced by world-wide competition to constantly study and evaluate ways to increase the energy efficiency of their facilities, which in turn reduces the production cost of their product and, hopefully, increases their ability to compete in domestic and international markets. Manufacturers also realize that our energy supplies are not unlimited, and there is no reason to consume a fuel today that will be needed tomorrow.

For the most part, manufacturing facilities long ago implemented such energy efficiency devices as new light bulbs and more insulation. For manufacturers, energy efficiency now entails longer term projects with significant capital investments and lead time – for example, new motors, retrofitted boilers, and increased combined heat and power or the capture of waste heat. If the capital and technology are available, I do not believe any manufacturers are eschewing energy efficiency improvements or leaving "free money on the table."

5. *Are utilities better at implementing the best energy efficiency programs than their customers? It seems that folks who work at your members' factories would have a much better idea of where they could save energy than the local utility company would? Don't you also bring in your own experts to help you manage your energy usage?*

The simple answer is that we believe manufacturers are better than utilities at determining how to implement energy efficiency at their own industrial facilities.

In addition, as I mentioned in my testimony and in my response to question four, manufacturers are constantly looking for ways to improve the energy efficiency of their facilities. And we believe that the engineers and energy managers within each company possess far greater expertise at how to achieve such efficiency improvements than do utilities.

6. *You talk about how important energy prices are to manufacturing. Does restricting domestic oil and gas development raise or lower energy prices? Would lower domestic oil and gas prices help preserve manufacturing jobs?*

My association deals solely with electricity consumption so I don't have the expertise to respond to your query about oil and gas development. I can state, generally, that lower energy prices – for electricity, oil, and natural gas – will help to preserve manufacturing jobs in the United States.

7. *Does mandating efficiency raise or lower energy prices?*

In most cases, utility-administered energy efficiency programs raise energy prices by taking dollars from all customers, using a sizable portion of these dollars for administrative costs, and returning what is left to some customers.

In some cases these programs may not even result in net efficiency gains, due to factors such as the "free-rider effect" (paying consumers for energy efficiency efforts that would have otherwise done on their own) and the "rebound effect" (an anticipated reduction in energy expenditures encourages action that then uses more energy in other ways, e.g., getting a rebate check for a programmable thermostat and then buying a flat screen television).

We believe that a mandate should be avoided and that more efficiency and lower prices result when consumers decide on their own the amount and type of energy efficiency that makes sense to them based on many factors, including the ability to lower their energy bills.

Revenue Decoupling

A Policy Brief of the Electricity Consumers Resource Council

Every complex problem has a simple solution too good to be true, and it usually is.

Attributed to H.L. Mencken

Introduction

For over two decades advocates of ratepayer-funded energy efficiency and load reduction programs have recommended that the 'link' between utility's revenues and its sales be 'decoupled' to eliminate a utility's disincentive to sponsor such programs. The argument is that the combination of the utility management's fiduciary duty to shareholders and the use of rates based on a revenue requirement, that includes sales in its calculation, discourages utilities from being competent vendors of energy efficiency and load reduction services.

Revenue decoupling (RD) is generally defined as a ratemaking mechanism designed to eliminate or reduce the dependence of a utility's revenues on sales. It is adopted with the intent of removing the disincentive a utility has to administer and promote customer efforts to reduce energy consumption and demand or to install distributed generation to displace electricity delivered by the utility's T&D system. In regulatory parlance, RD takes the form of a tracker or attrition allowance in which authorized per customer margins are subject to a true-up mechanism to maintain or cap a given level of revenues or revenues per customer. Variations from the targeted sales or revenues are subsequently recaptured from ratepayers through a surcharge or credit.

In a significant departure from traditional cost-of-service principles, which historically provides utilities with only the opportunity to earn a fair return, RD guarantees actual earnings at the level of authorized earnings. Under RD, a utility is indifferent to the impact of sales levels or when the sales occur because of changing economic conditions, weather, or new technologies.

ELCON members are strong supporters of energy efficiency and are world-class practitioners of innovative technologies that reduce their energy costs to improve their competitiveness. But ELCON strongly opposes decoupling because it disrupts and distorts the utility core business functions and is not a particularly effective way of promoting energy efficiency or anything of benefit to customers. Time and time again decoupling has been tried in several states, only to be suspended because it unduly interferes with the overall regulatory process. ELCON believes that there are other ways to promote energy efficiency and load reduction services that have proven to be more effective. This paper describes the simple mechanics of decoupling, why decoupling has historically failed and is not likely to be any more effective in future applications, and proposes alternative regulatory policies that more effectively focus on market transformation and the effective delivery of demand-side services.

The Mechanics of Revenue Decoupling
An Illustrated Example of An Annualized RD Mechanism[1]

Base Year Assumptions

	Year One	Year Two
Utility's Operating Costs (A)	$4 billion	$4 billion
Utility's Rate Base (B)	$5 billion	$5 billion
Authorized Return to Equity Owners (ROE)	10%	10%
Authorized Earnings to Equity Owners (C) (10% of $5 billion)	$500 million	$500 million
Utility's Authorized Revenue (A + C)	$4.5 billion	$4.5 billion
RD Balance Account (D)	0	$45 million
Baseline Sales (E)	45,000 GWh	45,000 GWh
Base Rate per KWh (A + C)/E	$0.10	$0.10
Effective Rate per KWh (F) (A + C + D)/E	$0.10	$0.101

Actual Sales Year

Actual Sales (G) (1% diviation from baseline forecast)	44,550 GWh 1% Below Baseline	45,450 GWh 1% Above Baseline
Actual Revenues Collected (H) (F × G)	$4,455 million	$4,590 million
Unadjusted Earnings to Equity Owners (I) (H minus A)	$455 million	$590 million
Reported ('Authorized') Earnings (C)	$500 million	$500 million
Actual ROE (I/B)	9.1% Reduction of 90 basis points	11.8% Increase of 180 basis points
Reported ('Authorized') ROE	10%	10%
End-of-Year Balance Account (D) (A + C) minus H	$45 million	($90 million)

[1] This is a simplified example of revenue decoupling that assumes no variable T&D costs or change in the number of customers. Also, tax implications and accounting for price elasticity are ignored.

How Decoupling Works

RD mechanisms can take several forms but all accomplish the same thing: customer rates are automatically adjusted to immunize utility earnings from sales fluctuations.

The first example is illustrated on the spreadsheet on page 2. It provides a simplified form of mechanism in which true-ups are done on an annual or multi-year basis. The process usually starts with a baseline determination of a utility's revenues that may include the anticipated consequences of a DSM program. This is the 'base case' in the illustration.

The illustration holds this baseline constant over a two-year period. In the first year, actual sales are 1% below the baseline amount; in the second year actual sales are 1% above the baseline. The result is a revenue shortfall in the first year of $45 million. Absent any other offsetting revenue recovery mechanism, this shortfall reduces earnings to equity owners and the expected ROE. This illustrates a main argument of proponents of RD that any small reduction in sales can produce a significant reduction in the utility's allowed earnings. In the example, the actual ROE is 9.1%, a reduction of 90 basis points from the allowed ROE of 10%.

Applying the RD mechanism in the second year, revenues are adjusted by increasing the customer rate upwards to ensure that sufficient revenues are collected to achieve the allowed ROE. However, actual sales are 1% above the baseline amount and the utility over collects $90 million. The actual ROE is 11.8% or 180 basis points above the allowed ROE. This simple example highlights the potential year-to-year volatility of the RD mechanism.

With compounding economic events (e.g., recessions), the accrual account can grow quite large unless more frequent rate cases or true-ups are ordered. RD mechanisms tried in the past tended to generate substantial accruals that quickly became a dilemma for regulators and a burden for ratepayers.

The second example (on page 4) illustrates decoupling on a revenue-per-customer (RPC) basis. The base year revenue collected per customer (RPC) on an average customer class basis is fixed, and the annual charge is then typically allocated on a monthly, normalized basis over a reference year. Each month the actual revenues collected per ratepayer are compared to the allowed monthly RPC and the difference is either credited or debited to a balancing account. Customers would still be billed on a per-unit consumption basis, but the rate would be trued-up based on actual revenues collected per customer. This prevents the utility from earning additional profit from unexpected sales but also ensures that the utility recovers its costs resulting from unexpected customer growth. For unexpected declines in sales per customer and/or declines in the number of customers, the mechanism works the same way. Under- or over-recoveries in any month are automatically trued-up the following month or at the end of the year.

The RPC mechanism highlights the 'blunt instrument' nature of decoupling. The utility is made whole for earnings losses that go beyond the limited losses caused solely by energy efficiency and load reduction programs. The net effect of the true-up mechanism is to put the utility's revenue stream on autopilot. This isolates utility management and equity owners from the normal business risk inherent to the utility industry, notwithstanding that the existence of a ROE is to reward equity owners with a return on their investment that includes a sizeable risk premium commensurate with the business risk. In short, an RD mechanism makes retail electric distribution service virtually risk free for utilities.

The Mechanics of Revenue Decoupling

An Illustrated Example of Revenue-Per-Customer (RPC) Mechanism With Monthly True-Ups [2]

Base Year Allowed RPC
For a Base Year Month

Base Year Rate per kWh (A)	$0.10
Base Year (Month) Sales in kWh (B)	1 billion
Base Year (Month) Revenue (A x B)	$100 million
Base Year Number of Customers (C)	1,000,000
Allowed RPC (A x B)/C	$100

Calculation of Revenue Adjustment
For A Single Month

Base Year Rate per kWh (A)	$0.10
Actual Sales for the Month (D) 5% Reduction from Baseline (B)	0.95 billion
Actual Revenues for the Month (E) (A x D)	$ 95 million
Actual Number of Customers (F)	1,010,000
Allowed RPC	$100
Allowed Revenues (G) (F x E)	$101 million
Revenue Adjustment (H) (G - E)	$6 million
Forecasted Next Month Sales (I)	1.0 billion
Rate Adjustment (True-Up) (H/I)	$0.006

This adjustment is added to rates for sales the following month, or at the end the year.

[2] This example assumes that sales per customer decline but the number of customers grows.

ELCON Position & Recommendations

A. *Decoupling Promotes Mediocrity In The Management Of A Utility.*

The primary function of a regulated electric utility is and will always be to efficiently sell and deliver electric energy to customers. For investor-owned utilities, the profit-motive is a legitimate and practical means to incent utility managers to operate their business in a competent and efficient manner. There also need not be any conflict with 'unselling' the business' primary product by offering energy efficiency and load reduction services.

Firms in many industries meet the competition by selling a range of products competing for different segments of the market share. But in regulated industries, such as electric utilities, rate structures and regulatory policies may have to be aligned to make this work. The attractiveness of revenue decoupling to many utility executives is that it will immunize the company's earnings or revenues from sales fluctuations. This can only promote mediocrity and indifference to the utility's core business, a situation that should not be in the best interests of either advocates of selling or unselling the energy product.

B. *Decoupling Shifts Significant Business Risk From Shareholders To Consumers With Only Dubious Opportunities For Net Increases In Consumer Benefits.*

Decoupling does not create an economic incentive promoting greater energy efficiency or load reduction. It establishes, at best, utility indifference to these objectives. At the same time, it undermines customer efficiency efforts and muddles price signals to consumers. For example, conservation efforts are rewarded with higher future rates, while excessive consumption paradoxically produces bill credits. This is a cynical way to induce energy conservation that is not likely to be effective. Decoupling only removes an alleged disincentive while at the same time creating real disincentives for competent management of the business. The Maine Public Utilities Commission stated in 2004:

> Revenue decoupling does not ... provide any positive incentive for utilities to promote or support energy efficiency or conservation programs; it only makes them financially neutral to such activities.

There is growing national concern that utilities are under-investing in infrastructure and not adequately planning for the future needs of their customers. Why this situation has been allowed to happen is troublesome given that for many utilities their allowed return is already above their actual cost of capital. Regulatory policies need to refocus utility management on its core responsibilities to efficiently sell and deliver electric energy and to make prudent long-term investments. Regulators must not bargain with their utilities from a weak position that assumes that financial incentives in excess of a reasonable return is necessary for ordinary business behavior. For all practical purposes RD mechanisms put utility management on autopilot and this will only further encourage them to ignore their core business, the value of economic development in their franchise area, and the broader needs of the utility's customers. These objectives are at least as important as any attempt to only eliminate a disincentive to energy efficiency.

An important feature of the financial structure of investor-owned utilities is that the utility's shareholders assume normal business risk. This is the risk-reward model that pervades private businesses in the US and global economies. Shareholders are best able to diversify business risk and market-based economies strive on this basis. Utility ratepayers are least able to do so; yet it is the expressed intent of RD mechanisms to shift risk from shareholders to consumers, a radical

departure from standard regulatory policy intended to balance the interests of equity owners and ratepayers.

Proponents of RD mechanisms almost always support preserving the utility's allowed return on equity at a level that assumes the shareholders retain such risk. Getting utility management to buy into the scheme would be difficult otherwise. Hence RD mechanisms are an attempt to force energy efficiency and load reduction programs at any cost and with no regard for the economic welfare of the impacted ratepayers.

Using RD mechanisms in conjunction with general rate cases also can have a ratchet effect on revenues and rates to the extent the RD adjustments in between rate cases are memorialized in the next rate case. For these and other reasons there is ample justification for dismissing the alleged value of RD mechanisms in ratemaking.

c. ***Decoupling Eliminates A Utility's Financial Incentive To Support Economic Development Within Its Franchise Area. This Includes The Incentive To Support The Well Being of Manufacturers And Their Workforce.***

Promoting growth in sales through the addition and expansion of business enterprises is a key area where utility financial incentives and local public interests are precisely aligned. Revenue decoupling breaks that alignment. While its sole purpose is the elimination of the alleged disincentive to a utility's active support for energy efficiency and load reduction programs, it also eliminates the financial incentive to actively promote the economic development of the utility's franchise area. More specifically, it neutralizes the financial incentive to attract new commercial and industrial businesses—and new job opportunities—to the utility's franchise area, and to support the well being of its existing commercial and industrial customers, unless those customer classes are specifically exempt from the RD mechanism. ELCON believes that regulatory policies should promote greater customer focus, not less.

d. ***Revenue Decoupling Mechanisms Tend To Address 'Lost Revenues' And Not The Real Issue, Which Is Lost Profits.***

To the extent that rates based on sales create a disincentive for utility efforts to promote energy efficiency and load reduction, the problem is in the rate design and the failure to abide by long-standing cost-of-service ratemaking principles. RD mechanisms have the effect of shifting the recovery of the utility's fixed costs into the customer (or demand) charge of base rates where they belonged in the first place. Thus, from one perspective, RD can be viewed as a stopgap ratemaking mechanism to overcome rate designs that have been used and abused for other misguided policy objectives such as the imposition of cross-class subsidies and stranded cost recovery. The complexity of RD mechanisms also makes them very expensive to administer and regulate. This greatly reduces the transparency of the ratemaking process and, even more so in the public mind, reduces the logic of cost causation.

The ability of a utility to have the opportunity to earn a fair return on assets that are prudently incurred and that remain used and useful is a grand compromise of regulation that has withstood the test of over a hundred years of practice. Any increased opportunity for a utility to earn its authorized rate of return must be commensurate with an increase in business risk, not the reverse!

There is no inherent inconsistency that a utility would both sell and 'unsell' electric energy if rates are appropriately designed for the different services. Selling competing products and services is a common business choice and need not be a moral dilemma only for utility executives. There are examples of state ratemaking practices such as shareholder performance incentives that create

more explicit economic inducements for promoting energy efficiency and load reduction. These practices avoid the collateral damage created by the 'blunt instrument' nature of RD mechanisms.

E. The First And Most Important Step Regulators Can Take To Promote Energy Efficiency Is To Send The Proper Price Signals To Each Customer Class.

In the short term, seasonal weather variations are the predominant cause of variations from sales forecasts. For example, unseasonably mild winters can lead to below forecast sales. In the longer term, economic growth in the form of increased customer accounts and usage drive electric sales and revenue growth. Ratepayer investments in energy efficiency gradually moderate energy sales growth. Load shifting efforts from peak to off-peak periods may not reduce overall kWh sales, but should lower the cost of supplying that energy.

Thus the first and most important step regulators can take to ensure that ratepayers themselves are induced to make energy efficient investments and behavioral changes is to implement retail rates that send the proper price signals to each customer class. This includes allocation of fixed costs to customer (or 'demand') charges and time-variant energy charges. The Energy Policy Act of 2005 directs the states to consider expanded deployment of time-based pricing and advanced metering, and ELCON strongly encourages states to pursue this path to more efficient pricing rather than the futile pursuit of decoupling mechanisms.

Large industrial customers are almost always on some form of time-of-use rate, with a demand charge, and this rate structure is extremely valuable to the customer for evaluating the cost-effectiveness of energy efficiency improvements in their manufacturing facilities. Large industrial customers do not look for guidance from utilities on how to co-optimize their energy consumption and manufacturing activities, and 'decoupling' does not make utilities experts in these matters. By further blunting price signals to ratepayers, RD mechanisms actually undermine incentives for customers to invest in more efficient appliances and equipment because the reward for reducing consumption is higher rates in the future. ELCON members believe that a utility's fundamental responsibility is to efficiently sell and deliver energy at the lowest possible cost, and appropriate price signals are an essential component of that objective.

F. Several States Have Successfully Used Alternative Entities—Including Government Agencies—For Unselling Energy. This Creates An Entity Whose Sole Mission Is To Promote Energy Efficiency, And Retains A Separate Entity Whose Responsibility Is To Efficiently Sell And Deliver Energy.

Some states believe that simultaneously selling and unselling electric energy is a real conflict of interest and have assigned the administration of the unselling function to an independent entity or agency whose mission is dedicated to promoting energy efficiency and load reduction. This policy recognizes that another entity—the utility—must be responsible for efficiently selling and delivering electric energy. States that have taken this path are Wisconsin, Maine, New Jersey, Ohio, Vermont, Oregon, New York, and Connecticut.

In New York, for example, the New York State Energy and Research Development Authority (NYSERDA) is charged with the responsibility for demand-side programs, and is funded by a systems benefit charge that is collected by the utilities. Wisconsin established *Focus On Energy* as a public-private partnership offering energy information and services to residential, business, and industrial customers throughout the state. There services are delivered by a group of firms contracted by the Wisconsin Department of Administration's Division of Energy.

January 2007

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PURECHOICE

April 17, 2009

Chairman Henry A. Waxman
Committee on Energy And Commerce
2125 Rayburn Office Building
Washington DC. 20515-6115

Chairman Waxman,

I wanted to start by thanking you and the members of the Energy And Commerce Committee for allowing me to come and testify before you on February 24th, 2009. It was an honor and privilege to be able to contribute information to your committee that could very well assist our country in achieving sustainable energy conservation through the use of Building Performance Software.

Pursuant to your request, my colleagues and I have taken time to review the questions put forth by Congressman Joe Barton. We hereby submit those answers to you in written form.

If I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Bryan S Reichel, President
PureChoice Inc.

Attachment

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energycommerce.house.gov

March 30, 2009

Mr. Bryan Reichel
President and CEO
Purechoice, Inc.
11481 Rupp Drive
Burnsville, MN 55337

Dear Mr. Reichel:

Thank you for appearing before the Subcommittee on Energy and Environment on February 24, 2009, at the hearing entitled "Energy Efficiency: Complementary Polices for Climate Legislation".

Pursuant to the Committee's Rules, attached are written questions for the record directed to you from certain Members of the Committee. In preparing your answers, please address your response to the Member who submitted the questions and include the text of the question with your response, using separate pages for responses to each Member.

Please provide your responses by April 20, 2009, to Earley Green, Chief Clerk, in Room 2125 of the Rayburn House Office Building and via e-mail to Earley.Green@mail.house.gov. Please contact Earley Green or Jennifer Berenholz at (202) 225-2927 if you have any questions.

Sincerely,

Henry A. Waxman
Chairman

Attachment

The Honorable Joe Barton

1. Can you please explain to me the difference between achieving energy efficiency through your technology and the energy efficiency that is assumed from retrofitting buildings with new windows or extra insulation? Is retrofitting with new "energy efficiency" products always the financially prudent decision?

Energy Savings through the use of Building Performance Software is complementary to, rather than "different" from, or in competition with traditional energy conservation retrofits. Proper operation of a building control system is no less important or desirable than proper, efficient operation of any energy consuming device. We have all been advised to make sure or personal vehicles are properly tuned, tires inflated and so forth so energy use, and associated emissions, are minimized. Exactly the same principles apply to building operations, except that energy use and related emissions are hundreds of times greater, perhaps thousands of times for larger facilities, than that of a vehicle. If new windows or insulation are installed, proper operation of the building control system will increase the net energy savings for that building even after the retrofits.

2. You've achieved double-digit efficiency gains in Minneapolis and Chicago without a single change to the physical condition of the building. Are you able to achieve these increases in energy efficiency no matter what the existing energy efficiency code in that particular state?

The physical attributes and equipment of a building are not what yields the significant savings achieved via the use of Building Performance Software. Rather, it is the subtle changes made in how you operate that building that yields those "behavioral" savings. Studies by Lawrence Berkley and the US Department of Energy show that "Behavioral Savings" or those savings generated by efficient operation of a building are consistently available in all buildings - new or existing. The savings derived from those behavioral changes are consistently in the range of 15-25%. Based on that data along with our own studies of some of the most strict energy efficiency codes in the country, leads us to believe that deploying Building Performance Software in all buildings, that these "behavioral energy savings" will be reproducible in virtually all geographic regions.

3. Why is it important to independently verify that energy is not being wasted by overheating, overcooling, or over-ventilating buildings? How immediate can energy efficiency savings be realized by calibrating or monitoring these heating and cooling systems? What types of energy efficiency gains can be achieved, and how soon can this happen?

It is important to verify that energy is not being wasted by overheating, overcooling or over-ventilating because these three comfort related actions are often the biggest energy wasters in HVAC management of buildings. The truest definition of achieving "energy efficiency" is to use only the amount of energy necessary to create 'human comfort" or rather to condition the environment to the precise level of comfort you desire. In achieving maximum HVAC energy efficiency – one would only heat or cool precisely to the desired temperature and one would only ventilate to either the minimum ventilation as required by code or to the precise desired comfort point set by the occupants. Over heating, over cooling and over ventilating past these desired goals is a very costly waste of energy – especially since HVAC energy accounts for 30% of all energy consumed in a commercial building and commercial buildings alone account for 30% or so of all energy consumed annually.

4. You speak about the need to maintain an indoor environment that is conducive to living and working while achieving any energy savings goals in buildings. What is the risk to the indoor environment if air-tight windows and certain insulation are installed in the name of energy efficiency in certain climates? Have you ever encountered the problem of indoor air problems created in the name of building efficiency codes?

We do not think that the installation of more energy efficient windows or adding certain insulation to buildings is a bad thing, however, we do believe that simply trying to achieve energy efficiency goals by installing more energy efficient windows or more insulation is failing to capture a significant – and immediate - financial benefit. Many situations might require both retrofits and building operational improvements, but in almost all cases, the operational, behavioral savings are more immediate. As operational improvements can be continuous – as long as conditions are monitored – the financial benefits are sustainable exactly like those achieved with additional insulation or low loss windows. To the question of "have we ever encountered the problem of indoor air problems created in the name of building efficiency codes" – we think California regulations provide a prime example of how the building codes require vast amounts of ventilation and are directly in conflict with the goals of energy conservation. It is hard to conserve energy when the code requires and promotes excessive ventilation. PureChoice successfully provided an alternative to that same situation in Chicago and we are working to address that issue in California as well.

5. In a recent Lawrence Berkeley National Laboratory study of 60 new buildings, 50 percent of the new buildings suffered controls problems, 40 percent suffered HVAC problems, and 15 percent had missing heating or cooling equipment. How does calibrating a building's performance detect and correct these issues to save energy efficiency in a way that simply retrofitting with new windows or insulation cannot?

We feel that this study itself provides an excellent answer to this question. The 60 buildings in this study were all new – and because of that we can reasonably assume that the windows and insulation installed in those 60 buildings were new also – providing the latest in window and insulation technology. However – because the building's performance was not being continuously measured – or calibrated, the buildings themselves were not functioning as they were intended to function. Building performance Software continuously calibrates the performance of a building – allowing the building operator easy access to the information showing the breakdown in building performance and highlighting exactly where corrections are needed to achieve maximum operating efficiency.

6. By listening to a building and calibrating the systems for optimal efficiency, what has been your experience in terms of what percentage of improvement do you get? What is the typical pay-off time for buildings?

The deployment of Building Performance Software has consistently provided our customers a 12% - 25% performance improvement. A study of our monitoring system done jointly with the GSA and the Department of Energy yielded a sustainable 20% energy conservation in one building yielding $144,000 savings annually. While building performance varies, studies have shown that most buildings perform at about a 65% efficiency, leaving considerable room for improvement, just by maximizing the performance of existing equipment. The typical payoff time for the investment in a building performance system in a building is well under a year – often in the 2-7 month range.

○