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HEARING ON ``RENEWABLE ENERGY: COMPLEMENTARY POLICIES FOR CLIMATE LEGISLATION''

THURSDAY, FEBRUARY 26, 2009

House of Representatives,

Subcommittee on Energy and Environment

Committee on Energy and Commerce

Washington, D.C.

The subcommittee met, pursuant to call, at 9:40 a.m., in Room 2322 of the Rayburn House Office Building, Hon. Edward Markey (chairman) presiding.

Members present: Representatives Markey, Doyle, Inslee, Butterfield, Melancon, Matsui, McNerney, Welch, Dingell, Pallone, Engel, Green, Gonzalez, Baldwin, Matheson, Barrow, Waxman (ex officio), Upton, Hall, Stearns, Whitfield, Shimkus, Blunt, Pitts, Sullivan, Scalise and Barton (ex officio).

Staff present: Matt Weiner, Clerk; Melissa Bez,

Professional Staff; John Jimison, Senior Energy Counsel; Jeff Baran, Counsel; Joel Beauvais, Counsel; Lindsay Vidal, Press Assistant; Andrea Spring, Minority Professional Staff; Amanda Mertens Campbell, Minority Counsel; and Garrett Golding, Minority Legislative Analyst.

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Mr. {Markey.} Welcome. Today the Subcommittee on Energy and Environment is going to have a very important hearing because the American people are calling for a clean energy revolution.

According to a December 2008 poll conducted by the Washington Post and ABC News, 84 percent of Americans support requiring utilities to increase their use of wind, solar and other renewable sources of power. In his address to Congress earlier this week, President Obama outlined his vision for a clean energy future that will not only help turn around our ailing economy but also drive new investment and job growth for decades to come. The President called upon Congress to enact cap and invest legislation to slash global warming pollution and spur renewable energy growth, and that is what this committee intends to do.

President Obama has called for 25 percent of our electricity to come from renewable resources by the year 2025. The American Renewable Energy Act, the renewable electricity standard bill that Congressman Platts and I introduced earlier this year, would achieve that goal. Such a standard would create hundreds of thousands of new jobs and can provide an essential pillar of strong energy and climate legislation.

Renewables are already growing fast. In 2008, we installed in the United States over 8,000 megawatts of new wind-generating capacity in the United States, over 40 percent of all new electricity-generating capacity additions in our country. The Department of Energy recently issued a report charting a course to generation of 20 percent of the county's electricity from wind alone by 2030. Study after study has demonstrated the massive potential for solar, biomass, geothermal and incremental hydropower as well. One of the key drivers of the recent surge in renewables has been the growth in State renewable electricity standards. Twenty-eight States and the District of Columbia now have mandatory standards. Those standards cover over half of the country's electrical load and will require the addition of more than 60,000 megawatts of new renewable power by 2025.

Renewables are an engine of job creation. With a single wind turbine containing between 200 and 400 tons of steel, a clean energy economy will reinvigorate our manufacturing sector. Those jobs are going to be done by the same blue-collar workers doing the same kind of work just with new technologies already in communities like Newton, Iowa, where wind blades are now produced by the same blue-collar workers left unemployed when Maytag left town. The manufacturers of renewable energy technologies are located all across the

country from LM Glassfiber's wind turbine blade factories in Arkansas, Michigan and North Dakota to First Solar's thin film solar plant in Toledo, Ohio. People are living the renewable energy revolution.

Just as the United States is blessed with great business and technology innovators, it has also been blessed with an abundance of renewable resources. A federal renewable electricity standard will allow us to harness potential from every region of the country from wind across middle America to biomass in the Southeast to solar in the Southwest. Every part of the country can benefit and contribute. A renewable electricity standard and a carbon cap are complementary policies. As a zero-carbon electricity source, renewables will of course contribute to our climate goals but a renewable standard will also spur technology development and job creation immediately, driving renewable energy costs down and domestic green jobs up. If we build a strong domestic renewable energy industry, that will drive economic growth over the coming decades and make it easier for America and the rest of the world to meet declining carbon caps over the long term. At the same time, by lowering demand for natural gas, a renewable standard will deliver major energy savings for consumers while enhancing our energy security and global competitiveness.

This is an important subject for our country. I look forward to our distinguished panel.

[The prepared statement of Mr. Markey follows:]

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Mr. {Markey.} I now turn and recognize the ranking member of the committee, the gentleman from Michigan, Mr. Upton.

Mr. {Upton.} Well, thank you, Mr. Chairman, and before I begin my statement, I would like to submit for the record an article by Professor Jay Apt, executive director of the Carnegie Mellon Electricity Industry Center. Sadly, Professor Apt was not permitted to testify today to make a couple of important points and observations on the topic. I would like to read two lines from his article that are very important for us to hear. ``Legislation that mandates specified electricity production from renewable sources paves the way to costly mistakes because it excludes other sources that can lead the country's goals. Rather than specifying a winning technology, Congress should specify the goals and provide incentives to reach them.'' I would ask that the hearing record be left open for the submission of additional statements including my friend, Mr. Burgess, who had to go to another hearing on the Senate side in terms of his opening statement.

Mr. {Markey.} Without objection.

[The information follows:]

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Mr. {Upton.} Today's hearing, ``Renewable Energy: Complementary Policies for Climate Legislation'', is indeed an important one. I am supportive of renewable energy for many reasons. Primarily it is domestically produced, it helps us achieve energy independence and it is clean, which helps obviously our environment. As policymakers, our goal should be to promote energy independence, keep energy affordable and foster a cleaner environment. It is not appropriate for us to be picking winners or losers. We should support all sources of energy that meet those goals and everything must be on the table, all of the above, as we week to expand the use of renewable energy.

This month my chairman, Mr. Markey, introduced a renewable electricity mandate. I do support using more renewable electricity but the bill, I think, provides too narrow an approach, only allowing for a few select renewable sources rather than all renewables, and most notably, his bill does not include other forms of emission-free power. Emission-free sources of energy should be at the forefront of any discussion of climate change. It is a glaring omission to not include all forms of emission-free electricity. A renewable-only electricity mandate would effectively be an added tax on electricity and this government mandate would

increase prices and hurt consumers by adding increased costs at a time of very dire economic times in our country.

U.S. residential electricity prices already are projected to increase in the coming years and this bill would undoubtedly increase those prices even more at a time when American working families and businesses can least afford it. The federal mandates ignores the standards already crafted by States to meet their specific regional needs. My State, Michigan, has already tailored a renewable plan to mesh with the renewable resources available in our region, and this bill ignores those different regional needs. A one-size-fits-all approach would not be the most effective means to harness the power of renewable sources of energy.

I thought we were trying to focus on reducing carbon dioxide emissions. If we add all clean electricity sources in the Markey bill, the impact on greenhouse gas emissions and energy security would be significant and our air quality and planet as a whole would be much better off. I would in fact support creating a national electricity standard and I would be happy to work with you in crafting a bill that creates a nationwide electricity standard that promotes any form of zero-emission power. That is what we ought to be focusing on, not a narrow renewable mandate that has somewhat minimal environmental impacts and does in fact increase

energy prices.

Energy legislation should be inclusive. Let us decide where we want to go and allow the market and all available technologies to get us there. If we are serious about reducing emissions, being energy independent and creating jobs, keeping nuclear off the table is a mistake. In addition to be a zero-emission-based low power source, each nuclear plant employs between 600 and 1,500 folks with an equivalent number of indirect jobs. There are thousands of jobs involved in the construction at these sites and obviously I think it improves our economy as each new plant adds more than $500 million a year to the economy. A renewed commitment to nuclear power and the construction of dozens of new plants on American soil will foster the rebirth of the manufacturing industry and the creation of tens of thousands of new high-paying jobs while at the same time reducing emissions.

In conclusion, I am supportive of finding policy options to address climate change but in today's economic and national security environment, we have to be mindful of the impact on our country. Thank you.

[The prepared statement of Mr. Upton follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the chairman emeritus of the Commerce Committee, the gentleman from Michigan, Mr. Dingell.

Mr. {Dingell.} Mr. Chairman, I thank you for your courtesy and I thank you for holding this important hearing. You are to be commended for building a strong record on this matter and for making a strong case for swift and well-thought-out action on climate change. The title of the hearing speaks for itself. Renewable energy can and should be a complementary policy for climate change, but as I have said for years, it must be well thought out and it must be a real renewable energy standard.

We in Michigan are saddled, as you know, with an extremely depressed economy, and I have to tell you, Mr. Chairman and my colleagues, that we have exactly the kind of workers who can benefit from the jobs created by a strong renewable energy sector. We have some of the best metal workers in the world, who would be delighted to have the opportunity to be in the forefront of these new technologies. I would also point out in Michigan, like in many other States, our State, we have our own renewable standard. Ours is 10 percent by 2015. As we move forward with a national standard, it is important that we take what the States have

already done into consideration and that we have a framework then within which they can work. It is also important, as my friend from Michigan has just said, that it is important that we should consider the differences and the peculiarities in the situation of each of the States.

Now, as always, Mr. Chairman, the devil is in the details. For example, it takes a great deal of sense to understand that we should not be putting waste in landfills if when we do so we are taking up space and in the long run we are spewing methane into the atmosphere. This is, as we all know, one of the very greenhouse gases which we need to rein in to effectively address the problem of climate change. So why add to the problem of landfill space and methane gas when we can utilize that waste for energy while still maintaining strong air quality standards.

Finally, I want to stress the importance of an inclusive approach as we move forward with climate change legislation. While we are talking specifically about renewables today, it is my strong belief that any comprehensive climate change legislation needs to include all renewables and indeed other non-greenhouse-gas-emitting technologies.

Mr. Chairman, I thank you for your courtesy. I look forward to hearing from our witnesses today and I yield back the balance of my time.

[The prepared statement of Mr. Dingell follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from Texas, Mr. Barton, the ranking member of the full committee.

Mr. {Barton.} Thank you, Mr. Chairman. I think it is important to have a good hearing schedule if we are going to begin to move on this issue of climate change. I commend you and the full committee chairman, Mr. Waxman, for scheduling and notifying that we are going to have a number of these hearings.

The question that I would have today before getting into the substance of the renewable debate is whether you want to have a series of hearings where you only hear one point of view. We have five witnesses today. There is one that has been offered by the Minority, the public utility commissioner from the State of Georgia. We had another witness, a professor from Carnegie Mellon that we did everything except smuggle him in under cover of darkness last night and disguise him as a chair or something in the hearing room to try to get him to testify. He wasn't allowed to because apparently you and/or your staff doesn't think that it is fair to have a broad range of views or more comprehensive range of views on this particular issue. We have had the same problem in every hearing that we have had so far in this

subcommittee on this issue, not renewable but just climate change. It is not fair to say you are going to have hearings and then not allow the Minority to have a full complement of alternative views so that we get a fair and balanced hearing record in which to determine what legislative approach, if any, needs to be taken. I know time is of the essence but I don't think one or two additional Minority witnesses is going to slow the process down that much and I am hopeful that in the near future we will come to some agreement so that we can have a full and balanced hearing.

Mr. {Markey.} Would the gentleman yield?

Mr. {Barton.} I will be happy to yield.

Mr. {Markey.} The standard which I am using is the standard honestly which was applied to me as the ranking member on the telecommunications committee. I was afforded one witness for each hearing for all those years, and that was deemed to be fair by the Majority at that time, and all I am doing is extending the same courtesy that the Majority, now in the Minority, that was extended to me because that was the precedent that was set and that was the determination that was made with regard to the number of witnesses--

Mr. {Barton.} Reclaiming my time.

Mr. {Markey.} --the Minority would have.

Mr. {Barton.} Reclaiming my opening statement time, Mr.

Chairman. We will go back and get the witness lists from my chairmanship. I am not going to disparage such a distinguished gentleman as yourself and a friend of mine as you are, but that is not my recollection at all. We had hearings in which there were more Minority witnesses than Majority witnesses, and it is just not acceptable to have a witness situation where the preponderance of the witnesses is so overwhelmingly at a philosophical and ideological point of view that it is just not--at a minimum, it is not balanced. Time will tell about where some of these issues stand up, so I am not going to belabor it but this issue isn't going to go away. I have talked to you about it privately. I have talked to Chairman Waxman about it. We will continue to discuss it as professionals. It is something that can be resolved and that should be resolved, and knowing your personal fairness as a human being, I think it will be resolved.

Mr. {Markey.} I appreciate that. But I think when you go back and you look at the history, you will see that my recollection of--

Mr. {Barton.} Well, we will see. The facts are the facts and we ought to be able to recreate the facts from the past. I mean, you can't predict the future but you can at least with some degree of accuracy recreate the past.

With the 1 minute I have left here in my opening statement, if Professor Apt had been allowed to testify, he would have told us than an RES is impractical, requires a lot of transmission construction and is not the most cost-effective way to reduce CO2. He would have also explained that the grid can't handle more than 20 percent of its power coming from an intermittent source such as wind and that the highly interconnected electricity grid is subject to cascading blackouts when there are disturbances, even in remote areas. Professor Apt is the executive directive of the Carnegie Mellon Electricity Industry Center, and he has conducted important work on the inefficiencies of RES. At some point in time I hope that his report will be included and I haven't given up hope that he may at some point in time yet be allowed to testify.

Let me also say that if we are going to have a renewable energy standard, I would change the terminology and make it a clean energy standard. I would include nuclear, I would include clean coal and then I would put some sort of a cap on cost increases so that as we go into this new world, we don't end up with cascading electricity retail and industrial price increases on our consumers and our industrial manufacturers that force many of them, in the case of industry, to go out of business and move their plants overseas, and in the case

of our retail constituency, force them into lifestyles that are less than they are today.

With that, Mr. Chairman, I yield back.

[The prepared statement of Mr. Barton follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from Pittsburgh, Mr. Doyle.

Mr. {Doyle.} Thank you, Mr. Chairman. Mr. Chairman, as we work on this committee to build a comprehensive national policy to address the very real threat of climate change, I think it is critical that we remember that different States and different regions of our Nation will face unique challenges as we all do our part to lower the emission of greenhouse gases into the air. A solution in one part of our country may not be workable in another due to the different resources each of our States possesses.

There is no doubt that our Nation's renewable energy portfolio must be expanded to meet the ever-growing energy needs of our citizens. Like most of you on this dais, I fully support increased investment and deployment of renewable sources such as wind, solar, hydro and geothermal power. We need to advance the efficiency of these technologies. We need to create incentives for investment in these sources of power and we need to ensure that the energy we generate can be transmitted to where the real need is. However, we also need to ensure that we don't shut off the lights or dramatically increase the cost of electricity in the parts of our Nation where these renewable resources

aren't as abundant. Many of our States have moved forward with their own renewable standards based on the resources available to them. In fact, in my State of Pennsylvania, we already have an 18 percent renewable standard and I would like to submit a summary of this policy for the record.

Mr. {Markey.} Without objection, it will be included.

[The information follows:]

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Mr. {Doyle.} This standard sets up a two-tiered system that not only includes the aforementioned technologies like wind and solar but also includes distributed generation, large-scale hydropower, energy efficiency and even waste coal clean-ups. It recognizes the resources available in our State and has brought significant environmental benefits to our citizens. I think it is critical that any standard we pass in this committee take a similar approach and allow States the necessary flexibility to meet the compliance requirements. Simply stated, there is no silver bullet to sole the climate crisis and there is no silver bullet standard that can be achieved everywhere in our Nation.

Mr. Chairman, I look forward to working with you and the members of this committee to establish a workable and flexible renewable standard that will drive investment in new technology while recognizing the real-world cost and compliance issues we face.

[The prepared statement of Mr. Doyle follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from Kentucky, Mr. Whitfield.

Mr. {Whitfield.} Mr. Chairman, thank you very much and we certainly look forward to this hearing on a particularly important subject matter, renewable electricity standard.

I might say that over 90 percent of the electricity generated in Kentucky and about eight other States comes from coal and 50 percent of the electricity generated in the entire country comes from coal. Coal is a reliable, available and affordable resource. Shifting even a small amount of our electricity generation from coal to renewable sources of electricity such as solar and wind would cause problems dealing with availability, affordability and reliability. Kentucky, for example, cannot meet a larger percentage of its growing needs for electricity. That means either drastically reducing demand or importing large quantities of expensive renewable power from the West and Southwest over an interstate power grid that is simply not up to the task today. Importing large quantities of power will require significant, lengthy and costly upgrades to the cross-country transmission system when we have the ability to do that at home today.

So the question is, we all understand we need renewable

power but how much will it cost, and I know that in one of the pieces of legislation that I have seen, there is an additional 5 cents per kilowatt-hour if States do not need their renewable mandatory sources. I had a local electricity company compute an electric bill or one industrial plant in my hometown with an additional 5 cents per additional kilowatt-hour, and it increased their rates by $18,750 per month. At a time when our economy is weak, we do not want to take an opportunity of forcing industries out of business, losing jobs and transporting those jobs to countries like China who are bringing on one new power plant with electricity every 2 weeks to produce electricity.

So as we move forward, I think we have to look at the total ramifications, the additional cost involved, and to make sure that we still have the opportunity to use our most abundant resource, and that is coal.

[The prepared statement of Mr. Whitfield follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentlelady from California, Ms. Matsui.

Ms. {Matsui.} Thank you, Mr. Chairman. I am very pleased to be here today and I also would like to thank all the witnesses for being here today too.

My State of California has a long history of support for renewable energy. While our initial renewable portfolio standard set a 20 percent goal by 2017, we have strengthened our commitment to 20 percent by 2010 and 33 percent by 2020. This commitment will lead to a cleaner plant and good-paying green job growth. The Sacramento region has been a laboratory on this issue and we have seen upwards of 100 clean energy companies emerging in our area from biofuels to solar to hydrogen fuel cells. These companies have brought good-paying jobs to a region in need. That is not to say that this has always been easy. While California has been a leader in this field, there are challenges to overcome. We will need to address a host of issues from transmission capacity to emerging technologies. I look forward to getting more insight on the challenges we must tackle and opportunities we will have from the witnesses we have here today.

Again, Mr. Chairman, thank you for highlighting this

important issue and I yield back the balance of my time.

[The prepared statement of Ms. Matsui follows:]

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Mr. {Markey.} The gentlelady's time has expired. The chair recognizes the gentleman from Pennsylvania, Mr. Pitts.

Mr. {Pitts.} Thank you, Mr. Chairman. I would like to thank you for convening this hearing today on such an important issue.

Like all of us, I believe that renewable and alternative sources of energy are important parts of the process in curbing greenhouse gas emissions and increasing energy independence. However, as Congress considers legislation dealing with the RES, the renewable electricity standard, it is imperative that we include all forms of viable alternatives in this standard. I would like to highlight one of those today mentioned by the former chairman.

In my district, the Lancaster County Solid Waste Management Authority operates a waste-to-energy facility that is literally turning trash into clean energy. During a visit last year I had the opportunity to see this incredible technology firsthand right there on the banks of the Susquehanna River. Trash that would have otherwise filled the local landfill is instead producing 198 million kilowatts of electricity a year. The plant is operated using just 10 percent of the electricity with the other 90 percent being sold to the local electric provider. There are six waste-to-

energy facilities in Pennsylvania, and the State depends on them to manage more than 8,700 tons per day of municipal solid waste. A baseload generation capacity of 268 megawatts powers many homes and businesses in the State.

The old-line opposition to waste-to-energy facilities claims that they pollute the air. However, with significant advances in technology in the last couple of decades and the sorting and removal of much of the waste before it is burned, the emissions from waste-to-energy facilities have become increasingly clean. In fact, the Environmental Protection Agency says that electricity from waste-to-energy facilities is some of the cleanest energy out there.

The Europeans and Japanese have been utilizing this process at far greater levels for decades. China plans to build 300 plants like the one in Lancaster. They can see the great potential that is present in this technology. Therefore, I believe that as this committee considers RES legislation, it is imperative to include waste-to-energy as a key part of this. To not include waste-to-energy sends a signal that we are not serious about the value of all alternative and clean energy sources, and I might add that this applies to nuclear power as well. It does send the signal though that we truly do not care about energy independency and viable options for decreasing greenhouse

gases. It makes no sense to haphazardly pick and choose what renewables and alternatives should be included and which should not.

So I hope this committee will recognize this value and efficiency of waste-to-energy as we move forward, and I yield back.

[The prepared statement of Mr. Pitts follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from California, Mr. McNerney.

Mr. {McNerney.} Thank you, Mr. Chairman, for holding this important hearing.

My perspective comes from two experiences. First, I spent 20 years as an engineer in the wind industry business and saw the technology transform from a fringe industry to a highly successful, competitive business. Second, I have been running around meeting entrepreneurs and looking at some incredible technology that is available from around the country, so from these two experiences, I am certain that the technology is out there. We can meet whatever standards we put up, especially if it is on such a good purpose for reducing greenhouse gases, improving our national security, creating jobs. We can do this. The real limiting factor, in my humble opinion, will be what the federal and State legislatures do in this issue.

Renewable energy standards is one strong tool we have to move forward and has been highly successful in application. As my colleague, Ms. Matsui, said, in California we have had a very good experience. The utility companies have not only met the standards but they have met them ahead of schedule and are very enthusiastic about proceeding with this issue,

and so when we get the utility companies to embrace the program, they turn on the local entrepreneurs, things start happening. So I think we need to move ahead and we need to be aggressive and we need to accept what we have to do and use this tool of renewable energy standards to make this happen.

With that, I yield back.

[The prepared statement of Mr. McNerney follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from Louisiana, Mr. Scalise.

Mr. {Scalise.} I would like to thank the chairman for calling the hearing and look forward to hearing from the panel as we talk about renewable energy.

These are all important issues in the broader context of developing a comprehensive energy policy which our country sorely lacks. When we talk about a comprehensive policy, clearly we are talking about renewable sources of energy but we are also talking about the importance of conservation, efficiency, as we had the hearing earlier just a few days ago on that issue, but also you have to talk about the importance of the role that domestic production of oil and gas plays in that comprehensive energy policy strategy and ultimately our goal is not only to reduce emissions but also reduce our dependence on Middle Eastern oil, which not only is an economic threat but is a threat to our country's security.

So when we talk about the broader comprehensive policy and then specifically talking about renewable sources of energy, I think it is very important to talk about the role that wind plays, the role that solar plays in that, but I think it is also important to talk about the role that other renewable sources play as well, and one renewable source of

energy that sometimes unfortunately gets left out of the discussion is the role that nuclear power plays and should play in this discussion, and I think right now it is not a part of that discussion and should be because it is a proven form of renewable energy, a form that many other countries have already figured out. Unfortunately, our country is behind in that and is going to continue to stay behind until we include nuclear power as a source of renewable energy, which it is, and unfortunately if it not going to be included in the legislation, we need to include it or otherwise we will have, I think, a failed renewable policy. So we are going to continue to show how the role nuclear plays in renewable energy is very important and very proven and is in fact adopted by many other countries.

With that, I will yield the balance of my time.

[The prepared statement of Mr. Scalise follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from New Jersey, Mr. Pallone.

Mr. {Pallone.} Thank you, Mr. Chairman. I want to thank all the panel for being here but I particularly want to point to my friend, Ralph Izzo, who is chairman and CEO of the Public Service Enterprise Group, which is a New Jersey-based energy company. Under Ralph's leadership, PSEG has been a leader in renewable investments. In February, PSEG's subsidiary announced their Solar for All program that will invest $800 million to bring solar energy to communities by placing solar panels at Brownfield sites, government buildings, low-income housing areas and on utility poles, and PSEG has also announced the development of an offshore wind project off the coast of Atlantic City.

I mention these because they are great examples of how a renewable electricity standard can spur private investment into renewable energy. New Jersey has one of the most aggressive renewable electricity standards in the country requiring that 20 percent of our electricity needs come from renewable energy by 2020. New Jersey is one of the 28 States that require a renewable electricity standard, and thanks to these laws, all of these 28 States are experiencing faster growth in renewable energy, and I can just imagine what we

would accomplish with a national RES.

I have long been a supporter of a renewable electricity standard. Last year I worked to help pass an amendment to the Energy Independence National Security and Consumer Protection Act that would have created an RES of 15 percent by 2020 nationally, and I am also a cosponsor of the chairman's bill that requires that 25 percent of our energy come from renewable energy by 2025.

Congress should be doing more to encourage investment in renewable energies. This should include tax incentives, low-interest loans and a renewable energy standard. By establishing a strong RES, we will be challenging energy companies and utilities to innovate and invest in renewable energy, and this will help us not only reduce greenhouse gases in this country but it also will create green jobs. PSEG's Solar for All program will create 400 to 500 direct annual jobs in my State, and I am happy that my State is on the frontline of renewable energy production and I am hopeful that Congress will pass legislation to establish a strong renewable electricity standard nationally.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Pallone follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from Missouri, Mr. Blunt.

Mr. {Blunt.} Thank you, Mr. Chairman. This is a topic that almost all of us agree on, on the goal of renewable energy and a lot of our discussion of course is how we get there.

In November of 2008, Missouri voters approved the Missouri Clean Energy Initiative at the ballot, which creates a renewable portfolio standard for investor-owned utilities to utilize 15 percent renewable energy sources in their total output by 2021 and so the States are moving forward sometimes with initiative efforts in the States. I have a statement for the record, and the only thing I would like to emphasize, Mr. Chairman, from that statement is just my belief that for renewable portfolio standards to make sense and work, we need to be sure that we are categorizing and counting the things that are renewable, that do matter. That has to include, in my view, hydro, it has to include clean coal, it has to include nuclear and certainly the other things like the good example that Mr. Pitts just gave of waste-to-energy from Pennsylvania.

Thank you for holding the hearing, Mr. Chairman.

[The prepared statement of Mr. Blunt follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the chairman of the full committee, the gentleman from California, Mr. Waxman.

The {Chairman.} Thank you very much, Mr. Chairman, especially for calling this important hearing today.

Renewable energy is going to be one of the key pillars of a clean energy economy. We are not going to be able to avoid catastrophic climate change without a dramatic increase in the amount of energy generated from renewable sources. Today only 2-1/2 percent of our electricity comes from all non-hydro renewables, but fortunately the United States has tremendous renewable energy resources that we have only just begun to tap.

In addition to the so-called Wind Belt that extends from the Dakotas down to Texas, there is substantial biomass potential in the Southeast as well as significant solar resources in the Southwest and throughout the United States. The Department of Energy recently issued a report showing that we could get 20 percent of our needed electricity from wind alone by 2030. Every region of the country has renewable resources that could be tapped to achieve our national goal of expanding renewable energy generation and reducing global warming pollution. More renewable energy

also means more good jobs right here in the United States. Over the last few years the wind industry has been an engine of job growth. Last year wind companies created 35,000 new jobs. Some climate solutions require big technological breakthroughs but renewable energy is something we can deploy today. We can ramp up wind, solar, biomass and geothermal electricity production now. As the deployment of clean energy increases, the cost for this technology will continue to decline.

A big driver for renewable energy development has been the willingness of States to forge ahead despite the absence of federal leadership. Twenty-eight States and the District of Columbia now have mandatory renewable electricity standards which require utilities to generate an increasing percentage of their electricity from renewable sources. These policies are working. More renewable energy is being generated with little or no effect on the electricity prices of American consumers.

One potential effect of a cap-and-trade system is a so-called dash to gas. Because burning natural gas for electricity produces less global warming pollution than burning coal, utilities may switch from coal to natural gas to reduce their emissions, and that could drive up the price of natural gas, increasing costs to consumers and companies

that use it. When paired with a cap-and-trade system, a renewable electricity standard could help stabilize natural gas prices and prevent the dash to gas. By providing long-term incentives for renewables, a federal renewable electricity standard would also give a big boost to those clean technologies while reducing the chances that utilities would have stranded investments in dirtier technologies. I don't believe that a federal renewable electricity standard and a federal cap-and-trade system are duplicative or mutually exclusive. On the contrary, they may complement each other in important ways.

I look forward to working these synergies with our witnesses today and with members of the committee. I yield back my time.

[The prepared statement of Mr. Waxman follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from Pennsylvania, Mr. Shimkus.

Mr. {Shimkus.} Pennsylvania has a lot of coal there too, Mr. Chairman.

Mr. {Markey.} The gentleman from Illinois.

Mr. {Shimkus.} I am honored to be considered from Pennsylvania, a fossil fuel state, which we are trying to protect their jobs too.

I have shown these posters before. A lot of the senior members of this committee were here during the Clean Air Act, and this is Peabody Mine #10, Kincaid, Illinois. When the Clean Air Act was passed, 1,000 mine jobs left. That mine is still closed. And we are moving hell bent to a cap-and-trade regime that for the fossil fuel industry will do the same thing, and whether that is coal and whether that is crude oil, whether that is oil shale, the day of reckoning is coming, and I just want to pose this as far as the last hearing on efficiency and the current hearing now on renewables, let us consider this: If we were to improve the efficiency of the existing coal power generation fleet by only one percentage point, that is to increase from 33 to 34 percent efficiency, which is doable with technology today, we

would save more energy than we would gain by expanding existing wind generation capacity 12 fold. This increase in efficiency would also result in 3 percent reduction of carbon dioxide release from coal power generation for the same amount of power delivered. Going further, if we aggressively improve efficiency by four or five percentage points, then emissions could fall by 250 metric tons, about 13 percent of last year's carbon dioxide emissions from coal power.

So Mr. Chairman, I think as we have talked before here in the committee and also on the Floor that I hope you will save fossil fuel use, low-cost power and coal in any movement on climate change, and I yield back my time.

[The prepared statement of Mr. Shimkus follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from Georgia, Mr. Barrow.

Mr. {Barrow.} I thank the chair, and I want to welcome Mr. Stan Wise today also, one of the members of the Georgia Public Service Commission, because he has an insight to share in this.

I just want to add to all the concerns that have been raised about such proposals that don't include making room for nuclear as a part of the portfolio and not including efficiency and not crediting those things. The unintended consequences that we will get from this, a lot of folks are making proposals and telling us in Georgia that we have enough biomass to cover our end of the deal but I don't think folks realize that folks are writing checks in Georgia that Georgia biomass cannot cash. I would hope we would have learned from the unintended results of our first tentative efforts to stimulate the growth in alternative fuels, that a small mandate that can only be met with existing technology without really forcing folks to really create new technologies had the unintended consequence of driving up the cost of other things as you take things that are spoken for in other marketplaces and try and direct them toward your new area of interest. We learned that with the price of food,

through corn and corn starch ethanol. I don't want us to learn that lesson again at the price of Georgia consumers for Georgia biomass. We simply don't have the biomass in Georgia to meet the projections some folks are calling for without deranging the market for pulp for paper, lumber for construction. You name it, we could pick the State clean and not be able to generate enough to meet the mandates that are being proposed by some.

What I also want to raise is the idea that if we don't have a mandate that is going to be met, we are going to have essentially an income transfer from one part of the country to the other, and the unintended consequence of this will be that some ratepayers in other parts of the country will benefit from an income transfer without generating any new net renewables in that part of the country to show for it. I am willing to vote for some pain but not if there is no gain. If we can't get the gain in our part of the country because the only thing we can do is buy our compliance and we don't get any gain in net renewables anyplace else because they have a surfeit because the mandate is set so low they already got renewables to burn, we are not going to get any new renewables anyplace else to show for the sacrifice being asked of some parts of the country. I can't support that, and I want to challenge those who are going to propose these

mandates that we make sure we get some net renewables someplace else to show for this. Otherwise we will have the irony of not supporting nuclear as an alternative in Georgia but providing money for other folks to support nuclear in other parts of the country as they get money to spend any way they want and they expand nuclear, even though is not supported by the proposed. So let us don't have that. Let us try and make sure that we got some new net renewables and we are all fed out of the same spoon.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Barrow follows:]

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Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentleman from Texas, Mr. Gonzalez.

Mr. {Gonzalez.} Waive opening, Mr. Chairman.

[The prepared statement of Mr. Gonzalez follows:]

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Mr. {Markey.} The chair recognizes the gentlelady from Wisconsin, Ms. Baldwin.

Ms. {Baldwin.} Thank you, Mr. Chairman.

As President Obama so clearly said on Tuesday night, to truly transform our economy, to protect our security and to save our planet from the ravages of climate change, we must ultimately make clean renewable energy the profitable kind of energy, and this not only means making investments in the development of new renewable energy technologies, but also taking policy steps to drive the production of more renewable energy in America. A federal renewable energy standard is one of the measures we need in place if we are to harness the power of clean renewable energy and be a leader in the 21st century global economy.

I am proud that my home State of Wisconsin has required electric providers to increase their use of renewables to generate electricity. Wisconsin's current RES requires utilities to produce 10 percent of their electricity from renewable energy sources by 2015, and last year the Governor's Task Force on Global Warming, comprised of members of a cross-section of Wisconsin's economy, recommended in its final report that the RES be increased to meet the 10 percent requirement 2 years earlier and reach 25 percent by 2025.

I do have some concerns and questions relating to the crafting of a federal RES that I hope we will discuss during this hearing today. Among them, what renewable energies should be allowed to qualify. For instance, Wisconsin has an abundance of woody biomass. Should that be included? What about energy derived from solar light pipe technology such as those made by a company in my home State? And what about some of the energy-efficient technologies that we discussed in our hearing just a couple of days ago including combined heat and power technologies and waste heat energy. I also have some questions about the constraints that we face in transmission as we generate more renewable energy.

But despite some of the challenges in defining and implementing a national RES, I believe it to be a key component, a key complementary measure to ending our dependence on foreign oil, tackling environmental degradation and addressing our economic recovery.

I look forward to our witness panel today, and I yield back the balance of my time.

[The prepared statement of Ms. Baldwin follows:]

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Mr. {Markey.} The gentlelady's time has expired. The chair recognizes the gentleman from Louisiana, Mr. Melancon.

Mr. {Melancon.} Thank you, Mr. Chairman. I appreciate the attention that you have shown to this issue and I would like to thank the witnesses for taking time to be here this morning.

As I have said before in hearings, meetings and anywhere else people will listen, I believe that we must take climate change seriously because I have a grandson that I want to be able to enjoy the same planet that I did, whether it is hunting or fishing or any other reason. I want Louisiana's coast to still exist for his and the other generations to come.

That being said, I encourage all my fellow committee members to be reasonable and responsible in how we approach climate change policies. There can be large costs associated with some strategies and it is important more now than ever to ensure that those costs do not simply get passed down to the consumers, who are our constituents.

We are here today to discuss complementary policies to climate change legislation and the crux of such legislation would be to reduce emissions of carbon dioxide and other greenhouse gases, an important and time-sensitive task.

Reducing emissions of carbon dioxide and other greenhouse gases is the right move to make but we should focus on that goal and not lose perspective. Wayne Leonard, who is the chief executive officer of Entergy, wrote an op-ed, which I would like to submit for the record, for the New York Times. In it he explains the realities of how a policy like RES would impact his company. He points out that having to invest in either development of renewable technology or the purchase of credits would drastically change their business model. It would create a drive towards cheaper and cheaper fuel sources to compensate for new costs, meaning that more expensive natural gas would be squeezed out of production to make room for more cheaper coal. This dynamic would have the precise opposite effect that we should be aiming for by countering some of the emission reductions achieved by development of renewable electricity.

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Mr. {Melancon.} I would like to conclude by reiterating my support for efforts to reduce harmful greenhouse gas emissions but also to emphasize the importance of taking a balanced approach that keeps in mind the impact this will have on our increasingly burdened constituents.

Thank you, Mr. Chairman. I appreciate the time.

[The prepared statement of Mr. Melancon follows:]

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Mr. {Markey.} The gentleman's time has expired, and all time for opening statements has been completed for the members. I will now turn to our very distinguished panel. Our first witness this morning is Dr. Howard Gruenspecht. He is the acting administrator for the Energy Information Agency. Dr. Gruenspecht worked with the Department of Energy's Office of Policy as director of economics, electricity and natural gas analysis. Thank you for joining us, Mr. Gruenspecht. Whenever you are ready, please begin.

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^STATEMENTS OF HOWARD K. GRUENSPECHT, ACTING ADMINISTRATOR, ENERGY INFORMATION ADMINISTRATION, DEPARTMENT OF ENERGY; RONALD BINZ, CHAIRMAN, COLORADO PUBLIC UTILITIES COMMISSION; STAN WISE, COMMISSIONER, GEORGIA PUBLIC UTILITIES COMMISSION; RALPH IZZO, PRESIDENT, CHAIRMAN AND CEO, PUBLIC SERVICE ENTERPRISE GROUP; AND EDWARD LOWE, GENERAL MANAGER, RENEWABLES MARKET DIVISION, GENERAL ELECTRIC

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^STATEMENT OF HOWARD K. GRUENSPECHT

} Mr. {Gruenspecht.} Thank you, Mr. Chairman and members of the committee. I appreciate the opportunity to appear before you today. The Energy Information Administration is the independent statistical and analytical agency within the Department of Energy that produces data projections and analyses to assist policymakers, help markets function efficiently and inform the public. We do not promote, formulate or take positions on policy issues, and our views should not be construed as representing those of the Department of Energy or the Administration. My testimony reviews the role of renewable electricity generation and recent EIA projections, provides an overview of the renewable resource base and discusses some key findings from some of

our earlier analyses of renewable electricity standards.

As discussed in many of the opening statements, spurred by State renewable incentives and mandates as well as federal tax incentives for renewables and projected prices for natural gas and other fuels, our Annual Energy Outlook 2009 reference case projects that renewable energy sources will play a growing role in electricity generation as shown in figures 1 and 2 of my written testimony. Overall, the projected growth in non-hydropower renewable generation in our reference case constitutes 52 percent of the overall projected growth in electricity sales through 2020 and 38 percent of the growth in electricity sales through 2030. These estimates do not include the very recent American Reinvestment and Recovery Act, which provides some additional incentives for renewable energy.

Let me now turn to some insights from recent EIA analyses of past proposals for a federal renewable electricity standard. First, because the levelized cost of renewable generation resources tends to be higher than that of equivalent conventional resources, there is a tendency for an RES to increase electricity prices and consumer expenditures on electricity though by relatively small amounts. For example, in our June 2007 study of a 15 percent RES, EIA found that residential consumers spent about four-

tenths of a percent more on electricity than in the reference case. However, these electricity price impacts can be partially offset if fuel consumption for electricity generation such as natural gas and coal is reduced enough to reduce the price of these fuels. It is important to note that impacts on individual consumers and electricity sellers can vary considerably in part for some of the reasons that were brought up in the opening statements.

The impact on carbon dioxide emissions, which are not currently regulated at the federal level, depends on the fuels being placed. Carbon dioxide benefits are significantly larger when coal is displaced than when natural gas is displaced. Certain renewables such as biomass cofiring at existing plants directly displace coal use. Other increases in renewable generation generally displace the most costly generation source that would otherwise be used to meet demand. Due to the effect of increasing concerns related to greenhouse gas emissions on investor behavior, our new projections include fewer additions of new coal-fired power plants than earlier projections and that tends to reduce the displacement of coal from levels projected in our previous RES analyses.

Regarding regional impacts of an RES also raised in many of the opening statements, different parts of the country

have access to different types of renewable energy with different cost and performance characteristics. Some parts of the country such as the Southeast would rely on a significant increase in the cofiring of biomass resources such as forestry residues in existing coal plants to move toward compliance with an RES. Other parts of the country such as the Great Plains or the Pacific Northwest are likely to focus on their abundant wind resources. The designs of all the federal RES proposals EIA has examined allow for renewable energy credit trading so electricity sellers in regions are not limited to locally available resources. However, in our June 2007 analysis of a 15 percent RES, EIA found that while some interregional trading credits occurred, most RES compliance occurred through growth in eligible generation within each region.

Looking at transmission issues, the need for expansion of the transmission system will depend on the stringency of an RES proposal and the desire to exploit some of the best renewable resources which are often located far from major population centers. The more stringent the RES proposal, the greater the likelihood that markets near the best renewable resources will not be able to absorb the potential increase in generation and additional transmission capacity would therefore be needed to move it to other markets.

Electricity demand and supply must balance continuously in the absence of cost-effective electricity storage technologies. As reliance on intermittent resources increase, the traditional electricity system paradigm of generation follows load becomes harder to sustain. Greater reliance on intermittent generation could be more easily accommodated with energy storage or if some portion of the load could be made to follow changes in generation, such as through smart grid technologies that allow for automatic or economically driven time shifting of non-critical loads.

In conclusion, as is the case with many energy issues, the devils or angels associated with the design of an RES or other types of energy policies are in the details. EIA is prepared to provide the committee with whatever assistance we can as you develop and design possible legislation.

Mr. Chairman and member of the committee, this concludes my testimony. I would be happy to answer any questions you may have.

[The prepared statement of Mr. Gruenspecht follows:]

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Mr. {Markey.} Thank you, Mr. Gruenspecht, very much.

Our second witness this morning is Mr. Ron Binz. He is the chairman of the Colorado Public Utilities Commission since 2007 where he has carried out Colorado's 20 percent state renewable electricity standard. Previously Mr. Binz was president of Public Policy Consulting specializing in energy and telecommunications policy. Welcome, Mr. Binz.

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^STATEMENT OF RONALD BINZ

} Mr. {Binz.} Good morning, Chairman Markey. It is nice to see you again after all these years.

My name is Ron Binz and I am the chairman of the Colorado Public Utilities Commission. It is my privilege and great honor to speak here today about the role that renewable energy will play in the Nation's attempt to address global cc. I congratulate the chairman on calling this hearing and I look forward to the opportunity to talk about a real success story, what we call the New Energy Economy in Colorado.

Colorado is moving forward aggressively to adopt renewable energy as a major portion of our generation resources in the State. The collection of all those efforts of new jobs, of companies relocating to Colorado, of rural economic development, we call the New Energy Economy, and it is easy to date the beginning of that. It was Election Day in 2004 when the State's voters passed the renewable energy standard. It had failed three times in the legislature. Citizens took it to the ballot. It passed in 2004. After initial opposition to it, the utilities have come back to support the process. In fact, the legislature 2 years later

doubled the standard in the State to 20 percent by 2020.

The New Energy Economy means more than just clean electrons. Colorado's Office of Economic Development traces 22,000 jobs, new jobs in Colorado, what we are calling green collar jobs. Now, to give you a sense of that scaled up to national numbers, that would be 1.25 million jobs nationally in this energy sector. Our investments in renewable energy are also helping the State make progress toward the Governor's Climate Action Plan. Significant wind and solar resources are reducing carbon emissions in the state. For that reason, Mr. Chairman, I would take slight exception to your notion of this being a complementary policy. We think of it as a foundational policy. Our belief is the reduction of CO2 and greenhouse gas emissions is going to require the development of renewable energies is not just an add-on to a carbon policy, it is going to be a foundation of it.

I dwelt in my testimony about solar energy. I put a map in there that was developed by the National Renewable Energy Laboratory in Colorado showing solar resources around the country. Everyone knows that solar costs more than electricity produced by coal or natural gas today. Everyone also knows that the cost of PV is falling and many predict that it will achieve grid parity some time in the future but the cost of solar and other renewable technologies doesn't

fall simply over time, it falls with the volume and deployment as that increases. Ramping up solar supply, just to again focus on solar, will thicken the supply chains and large manufacturing base, grow the commitment to R&D and generally increase competition in the design and installation of solar.

Much has been said about parts of the country who have relatively less wind power and I understand that Georgia, home of my soon to be former best friend, Stan Wise here, Georgia may not have the wind capacity that Colorado does but just to underscore, Mr. Pallone talked earlier about the efforts in New Jersey. New Jersey, maybe to your surprise, is the second largest State for solar deployment in the country, second only to California. The resources, the solar insulation levels in New Jersey are far poorer than they are in the southeastern part of the United States. I think the draft legislation wisely gives a there times credit for distributed solar generation. I think that is a very important step to boost the efficiency and economy of those kinds of resources.

I just want to conclude with two things. First, this salutary social effect of pushing renewable energy through an RES kind of standard is one of the main reasons that I as a regulator in Colorado hope that other States adopt RES

policies. That will begin to bring these break-even points on cost closer in time to today. Bringing down the level of carbon emissions and the cost of renewable technologies is in my view a shared responsibility shared by all citizens of this country, and as far as I am concerned, that is where the nexus for federal interest in this matter derives.

As chairman of the Public Utilities Commission of Colorado, I can unreservedly endorse the benefits of a renewable energy standard. Because of the action of 28 States with RES policies, the costs are falling today. RES will provide a needed boost to that continued development. In my experience, it enjoys strong consumer support and can be implemented with reasonable impacts on rates. Thank you.

[The prepared statement of Mr. Binz follows:]

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Mr. {Markey.} Thank you, Mr. Binz, very much.

Our next witness is Mr. Stan Wise, a commissioner on the Georgia Public Service Commission. He has previously served as Cobb County commissioner in Georgia and is a former president of the National Association of Regulatory Utility Commissioners. We welcome you, sir. Whenever you are ready, please begin.

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^STATEMENT OF STAN WISE

} Mr. {Wise.} Thank you, Mr. Chairman. Thank you to the committee for this opportunity to speak before you today as you wrestle with this very difficult issue.

I am a publicly elected commissioner on the Public Service Commission and as a regulator I am responsible for ensuring that retail electricity customers receive safe, reasonably priced, reliable electric service. I am concerned that a one-size-fits-all RPS mandate fails to recognize that there are significant differences between the States and regions in terms of available and cost-effective renewable energy resources and that having such a standard in energy legislation will ultimately increase consumers' electricity bills.

We should be discussing ways to promote clean energy of all types. We need to develop and deploy all energy sources that can ensure an adequate supply of energy in the future, that can power our economy and that moves us forward to improving our environment, especially in ways that reduce greenhouse gases. Major energy sources that can meet these needs include nuclear, coal, coal with carbon capture and sequestration, natural gas, energy efficiency as well as

wind, solar, biomass and geothermal. The distribution of these energy sources is different across the country. Some regions have more nuclear power than others, some coal, and others have wind and solar opportunities. We should be encouraging States and regions to take advantage of these sources that can best advance our energy and environmental goals with the understanding that the exact use of sources will be different in each State or region.

Establishing a uniform national RPS focused exclusively on a limited number of sources like wind, solar, biomass or geothermal without regard to crucial regional differences will unnecessarily drive up electricity costs, jeopardize reliability and divert capital that will be needed to achieve other objectives like meeting aggressive carbon targets. My State, for example, does not possess an abundance of what is described as renewable in many of the legislative proposals. The DOE data shows that Georgia does not have abundant solar energy that is available in other parts of the country, wind turbine generation available to States located in the Great Plains nor do we have abundant geothermal. My State and our region must seek to encourage the growth of research and development in the use of energy resources that are available and economically viable to provide our future needs. This will include the development of coal with carbon capture and

sequestration, nuclear power, natural gas and energy efficiency. There is renewable development occurring in our State and currently we are considering a biomass plant that would replace a small coal-fired plant, and even though it is one of the largest in the country, it will only equal 100 megawatts. Some regions of the country have access to wind resources. Wind can be a ready resource but has its limitations. Its availability is severely limited and cannot be dispatched by utility operators when the load demand peaks. A study by the Joint Coordinated System shows that several regional transmission planning organizations and the TVA in the Southeast does not and cannot meet anything greater than 30 percent all of the time. This gap demand would have to be recovered by building additional natural gas-fired generation. The report also shows that if the eastern United States were to meet the 20 percent of its energy requirements with wind, that 229,000 megawatts of wind capacity would have to be built. Some are discussing building transmission lines from areas with wind resources primarily in the West, to the eastern United States. These proposals raise concerns about cost, reliability and additionally transmission that doesn't solve the intermittent nature of wind resources.

Solar power has a capacity even lower than wind.

Humidity and cloud cover in the Southeast makes it very difficult to maintain a capacity of lower than 20 to 25 percent. That would also have to be backed up with fossil fuels, most likely natural gas.

Mr. Chairman, I would like to go ahead and skip ahead to my summary to make sure that I have the opportunity to get this in. Even with the challenges it is still the desire of the Congress to impose these federal mandates, then certain conditions should be taken into account, that States should be allowed to develop renewable or clean energy standards that take into account the resources available in the State or region. This will ensure State-to-State equity while maximizing the benefits of expanding clean energy. Targets and timetables should be practical and allow State or regional variations depending on the resources available. The definition of qualifying resources that would count toward compliance with a federal standard should be expanded from the list in the current proposals including existing hydro that should count towards compliance the same as existing wind and solar. Nuclear generation should be included due to the fact that it emits no carbon. The definition of biomass should be expanded to include all recoverable wood material. This would include whole trees which are currently excluded from credit towards compliance.

Energy efficiency should be included as a resource that would count towards compliance. This is a resource that is being expanded in Georgia and the Southeast and its use should not be limited in any federal standard. Utilizing municipal solid waste for energy production should be included toward compliance. This is a renewable resource that is available across the country and will reduce the use of other environmental impacts.

I thank the chairman for this opportunity.

[The prepared statement of Mr. Wise follows:]

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Mr. {Markey.} Thank you, Mr. Wise, very, very much.

Our next witness, Dr. Ralph Izzo, is the president, chairman and CEO of the Public Service Enterprise Group Incorporated. Mr. Pallone has already listed the distinguished history of Dr. Izzo. We welcome you, sir. Whenever you are ready, please begin.

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^STATEMENT OF RALPH IZZO

} Mr. {Izzo.} Thank you, Mr. Chairman, Congressman Upton and members of the committee. Our family of companies distributes electricity and natural gas to more than 2 million utility customers in New Jersey and we own and operate approximately 17,000 megawatts of electric generation in the Northeast, Mid-Atlantic and Texas. I appear before you this morning to express my strong desire to see this Congress adopt a national renewable electricity standard. I would like to recognize your leadership, Chairman Markey, on this issue as well as that of Congressman Pallone, who has championed renewable energy for as long as I have known is, which is probably a lot longer than either of us care to think about right now.

Global warming is the most important environmental challenge of our time, and to avoid catastrophic impacts from climate change, most scientists agree that we must achieve carbon emission reductions of 80 percent by 2050. To reach this target, we urgently need decisive federal action, not a patchwork of state and regional fixes but a strong, progressive national energy policy. A carbon cap-and-trade program will be a central part of such a policy but we need a

portfolio of solutions. To achieve necessary carbon reductions, we must do nothing less than electrify our transportation sector and decarbonize our electric sector. We need policies aimed directly at driving these transformations, and an RES will create demand for technologies that will transform the way we generate electricity. With this policy we will create jobs and we will develop new technologies that we can export all over the world. In other words, investment in renewable energy is a strategy for long-term sustainable growth.

As an investor and a businessman, I believe the adoption of a federal RES would create tremendous opportunities. PSEG, our company, our company, is already beginning to invest heavily in alternative energy. Two weeks our utility filed a proposal with New Jersey regulators to invest almost $800 million in solar generation over the next 5 years. This will include putting solar panels on Brownfields, low-income housing, government buildings and on roughly 200,000 utility poles. We are also planning a 350-megawatt offshore wind farm off the coast of southern New Jersey and we recently created a joint venture to develop compressed air storage facilities that can store energy and help make renewable generation more competitive.

A federal RES will send clear market signals to

companies like ours to increase their investment in renewable electric generation. In the long term, these investments will be a net benefit to customers. In the short term, however, renewable energy is more expensive than fossil fuel generation. We must be upfront with consumers about these costs, but the most effective way to minimize cost is through a national approach. A strong national program will create economies of scale and drive down production costs, and once developers can rely on a stable national market for renewable energy credits, it will reduce their cost of capital.

It is also worth nothing that certain emerging renewable technologies such as offshore wind and solar will need additional federal incentives, particularly through the tax code. Fostering these industries is important to our long-term climate change strategy.

In closing, Mr. Chairman, as you know, our country faces daunting challenges. We must dramatically reduce carbon emissions and transform our energy economy and we must do this while we face rising unemployment and an economic crisis. Implementing an RES will send a clear signal to investors that a true shift has occurred in our approach to a national energy policy. Let us encourage sustainable investments to power our way out of this downturn. We need to get started now. Thank you.

[The prepared statement of Mr. Izzo follows:]

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Mr. {Markey.} Thank you, Mr. Izzo, very much.

Our final witness, Mr. Edward Lowe, is General Electric's energy general manager of renewable energy and market development. GE is one of the country's largest renewable technology producers and actually supplies half of all wind turbines in the United States. We welcome you, Mr. Lowe. Whenever you are ready, please begin.

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^STATEMENT OF EDWARD LOWE

} Mr. {Lowe.} Thank you, Mr. Chairman and members of the committee. I appreciate the opportunity to testify on the potential impacts of a federal renewable electricity standard.

GE believes that a federal RES is the single most important step the Congress can take to lay the long-term foundation for a green collar workforce and a domestic renewable energy manufacturing base. Today GE's renewables business has an installed base of over 25 gigawatts in more than 65 countries, employs 4,700 people globally and we have created over 10,000 supplier jobs. Since entering the renewables business in 2002, GE has invested over $850 million in renewable energy technology and production. We have increased wind turbine reliability and efficiency 12 and 19 percent points, respectively. We have developed leading-edge integration technology and we continue to invest in wind and solar technology advancements. During the time period we have tripled our U.S. wind assembly facilities and increased wind turbine production six fold. GE is the leading wind turbine supplier, as the chairman indicated, with nearly one of every two wind turbines in the United States being a GE

wind turbine. This growth has created well-paying U.S. jobs. Nationwide, we employ 2,000 people in our wind and solar businesses in five States while supporting over 4,000 supplier jobs in 15 additional States.

An example of the economic benefits that we generate is a wind blade manufacturing facility that opened last year in Newton, Iowa, and was referenced earlier. This is owned by TPI Composites and employs 500 people in a facility that was previously closed by Maytag. In the past 2 years, wind turbine and turbine component manufacturers announced or added or expanded 70 facilities, 55 alone last year. This growth was driven by successive extensions of the wind production tax credit in 2005 and 2006 and the growth of State renewable portfolio standards. If Congress were to approve a federal RES this year, GE would expect to see considerable growth and demand for its renewable products. Responding to this growth would in turn prompt us to explore the expansion of our existing wind turbine facilities and construction of new facilities, increase commitments to component suppliers and add new suppliers. These investments could result in the creation of approximately 3,000 to 5,000 jobs to support our wind business. We are aware of 10 to 12 foreign suppliers who have expressed a strong interest in opening facilities in the United States but are awaiting a

long-term policy signal to support the required investment.

Recent studies point to the job creation potential of a federal RES. The Department of Energy estimates that achieving 20 percent wind by 2030 would create 500,000 jobs. With accelerated policy support, the solar PV industry predicts 230,000 jobs by 2016. Based on our experience, State RPS programs should have certain key elements, among which is an aggressive long-term goal out to 2020 or 2025, achievable interim goals, meaningful non-compliance teeth, tradable renewable energy credits and support for distributed generation. In addition, legislation to expedite transmission expansion is essential. Finally, a federal RES will be a critical down payment on future climate change legislation by accelerating the near-term deployment of wind, solar and other low- or zero-emission technologies.

In summary, a federal RES is essential to creating a sustained green collar workforce and a domestic renewable energy manufacturing base and a federal RES will also serve as a critical complement to climate legislation.

Thank you for holding this important hearing and the opportunity to present this testimony.

[The prepared statement of Mr. Lowe follows:]

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Mr. {Markey.} Thank you, Mr. Lowe, very much, and that completes opening statements from our witnesses. The chair will recognize himself for a round of questions.

Mr. Gruenspecht, there has been some opposition to a national renewable electricity standard from parts of southeastern United States based on the argument that the Southeast lacks renewable resources. Your analysis last year showed that the Southeast was actually a net exporter of tradable electricity credits because of the huge biomass resource there. In other words, the standard allowed southeastern states to actually export renewable credits instead of just importing coal. A lot of biomass use was mill and other waste that would have rotted on the ground if not used to satisfy the standard. Can you expand upon what your analysis found?

Mr. {Gruenspecht.} Yes, Mr. Chairman. Again, we looked at analysis at 15 percent RPS. I guess we got a letter from you yesterday and we are going to do further analysis on your standard. But we did on a region-by-region basis look at what would happen, I think it was a proposal by Senator Bingaman, and we did find that at least initially up until about 2020, the SERC region, the Southeast Electric Reliability Council region, was able to generate more

renewable credits, if you will, than it used internally. Beyond 2020, they did import some of their renewable energy credits but they still produced about 80 percent of what they needed within the region. It did not break down to State-by-State levels.

Mr. {Markey.} Thank you, Mr. Gruenspecht.

Mr. Izzo, do you believe that a 25 percent renewable electricity standard by 2025 is feasible in New Jersey and nationwide?

Mr. {Izzo.} Yes, I do. In New Jersey our primary focus will be offshore wind, onshore wind through PJM and local solar, and as you have already been told, the NREL map suggests that New Jersey has less of an abundance of those resources than other parts of the country.

Mr. {Markey.} Mr. Binz, what about Colorado? Do you think you could meet 25 percent by 2025?

Mr. {Binz.} Our current standard is 20 percent by 2020. I think 25 percent by 2025 will be a stretch but I think we will make it.

Mr. {Markey.} Mr. Lowe, if we delay in adopting a national policy such as a renewable electricity standard to encourage growth in renewables, is there a risk that other countries will end up dominating this growing global market in terms of control of this international market that is

clearly going to be there by 2020 or 2025?

Mr. {Lowe.} Absolutely. We see national renewable standards being adopted around the world. A highlight, too, number one, is the 20 percent renewable energy in Europe by 2020. That is expected to drive almost 200 gigawatts of wind installation there. The second one that I highlight is China. China used to have a goal of 10 gigawatts by 2020. They expanded that to 30 gigawatts by 2020. Last year they expanded this to 100 gigawatts by 2020.

Mr. {Markey.} That is 100,000 megawatts?

Mr. {Lowe.} That is 100,000 megawatts.

Mr. {Markey.} That is how much nuclear energy we produce on a daily basis in the United States.

Mr. {Lowe.} So as is said here, we have the potential for 60 gigawatts of wind in the United States based on the current state RPSs but that is dwarfed by these two other regions.

Mr. {Markey.} So based upon that, the Chinese industrialists hope we don't adopt a renewable electricity standard?

Mr. {Lowe.} I think you can look at a quote that came out of Germany by the German Wind Energy Association. Just so everybody knows, Germany ends up supplying about 37 percent of all wind turbines or components around the world,

and that is because according to the state, they have a very strong domestic policy standard that ends up driving that industry and therefore they can export. As an example, Wind Products is the second greatest exporter out of Germany, about 60 billion euros a year, only to cars.

Mr. {Markey.} I think that the Germans and the Chinese are hoping we don't have a renewable electricity standard, to be honest with you, because we would be importing their products by 2020 and 2025 and the work would be in their countries, not in ours.

Mr. Izzo, you have testified that a national renewable electricity standard would complement and strengthen climate legislation and be workable in concert. Could you elaborate upon that?

Mr. {Izzo.} Sure. Under a cap-and-trade system, what you would have is a cost for carbon which would then encourage all other forms of carbon reduction, in particular things like energy efficiency, greater improvements in current fossil fuel-fired-powered plants to increase their energy output per amount of CO2 emitted. However, such a climate change bill would not bridge the gap that is needed to bring about the longer term solutions that renewables are. So that would require a special portfolio selection that says in order to build the full portfolio of solutions, not just

energy efficiency, not just more efficient fossil fuel plants but carbon-free power. One simply needs to look at the fact that 76 percent of all renewables produced in 2007 were in RPS States.

Mr. {Markey.} Thank you, Mr. Izzo, very much. That is very helpful.

My time has expired. The chair recognizes the gentleman from Michigan.

Mr. {Upton.} Thank you, Mr. Chairman. Again, I want the record to show that I do support an RPS. We have it in Michigan, and we will see how it works. It was just approved by our State legislature. We didn't have to go to the voters. Our legislature did it. We are anxious to see how it works, and I must say that last week I spent a considerable amount of my time at two of our universities, who are really working on wind technology to make it better, and an interesting point, you know, in Michigan we have got a lot of storms, as you know, that come across the lake, and when I went out to one of these giant wind turbines, it wasn't turning, not at all because the wind was not blowing last week, and so my question is, as much as we want renewable sources of power--and it was a cloudy day too so solar wouldn't have worked either. What do you have to do in terms of building for the non-peak times or when the wind

doesn't blow and the sun doesn't shine, which in Michigan is a good part of the time. Mr. Izzo?

Mr. {Izzo.} Sure, Congressman. We advocate three forms of energy policy to achieve carbon reduction. One is energy efficiency, two is renewables and third is large baseload clean carbon-free technology, which could either be fossil fuel with carbon capture and storage or nuclear. We are also investing in compressed air energy storage systems, which allow us to store electricity from renewable supplies when it is produced and then use it when it is needed. One has to take an entire portfolio approach to this. No one slice of that will achieve our 80 percent reduction by 2050.

Mr. {Upton.} Mr. Binz, what has Colorado done for the non-peak times?

Mr. {Binz.} Congressman Upton, we are grappling with that very issue. The wind penetration in Colorado is pushing 20 percent on a capacity factor. If you are an Excel energy customer, one kilowatt-hour out of 10 in 2008 was wind generated. That presents some challenges but they are obviously able to solve those challenges to regulating and balancing the system. We use a number of resources such as pumped hydrostorage, natural gas peaking units to firm up the wind, but still in all, that is a lower cost total application than would be using to burn natural gas alone, so

we come out ahead in that. The other thing I would mention is that regional diversification is very helpful. We are looking right now at the advantages of bringing in wind from other states that happen to have patterns which tend to complement the Colorado wind resources. That is another approach you can take.

Finally, I want to endorse the storage notion. CAES, or compressed air energy storage, is going to be very important to the future of wind and a comparable but different technology for solar will make those dispatchable units in the off-peak and shoulder periods.

Mr. {Upton.} Mr. Lowe, I am told, I would like you to confirm this, that it takes about 60 acres, is that right, in terms of space for wind to produce one megawatt of power? Is that about right?

Mr. {Lowe.} I would say it is a little bit less than that.

Mr. {Upton.} A little bit less?

Mr. {Lowe.} Approximately.

Mr. {Upton.} Fifty acres?

Mr. {Lowe.} Forty, I believe.

Mr. {Upton.} Forty? Okay. So to provide 5 percent of our Nation's power using wind, and again I support wind, I support wind in Lake Michigan. I know we have a problem with

Nantucket in Massachusetts when they didn't want it. My district is along Lake Michigan. How many acres would it then take?

Mr. {Lowe.} I am sorry. I don't have that statistic with me.

Mr. {Upton.} We figured it was 12 billion acres, I think, is the figure that we came up with so we might have to encroach into Nantucket after all. I don't know if the gentleman is willing to acknowledge that or not. That is a lot of acreage to reach 5 percent. You know, we don't have the great ski mountains of Colorado in Georgia or other places that we are going to be able to use a lot of that acreage, but that is a heck of a lot, right?

Mr. {Lowe.} I would have to go back and check that number but certainly if you take a look at the areas of the country where wind is predominant, and one of advantages of it is in large swaths of the Midwest where you are still using that land for very vibrant agricultural use and yet you are also being able to produce renewable energy. One of the byproducts this really has is, the support from farmers. We know that a number of farms right now are in desperate financial condition and the leasing payments that they get by being able to put those wind farms on their property while also enjoying--

Mr. {Upton.} I understand. I want to ask one last question before my time runs on.

Mr. Binz, again, knowing Colorado a little bit, does Colorado include hydro as part of your portfolio?

Mr. {Binz.} RES includes new hydro.

Mr. {Upton.} New hydro. So existing hydro, it doesn't impact that at all then, right?

Mr. {Binz.} Actually our hydro opportunities are relatively modest in Colorado. This is where the rivers start, not where they end up, and so--but we do allow in our renewable energy standard new hydro.

Mr. {Markey.} The gentleman's time has expired. The chair recognizes the gentlelady from California, Ms. Matsui.

Ms. {Matsui.} Thank you, and you know, we all know that preventing climate change will require many strategies. We need climate legislation that caps carbon emissions. We need a federal renewable electricity standard that drives the deployment of renewable energy and stimulates further innovation and we need to focus on the easiest and least expensive emissions reductions, and that means major energy efficiency standards. In 2007, the House passed a renewable electricity standard and it required utilities to generate 15 percent of their electricity from renewable sources. I voted for this bill because I think it was the best we could have

passed at the time. But this bill included provisions allowing 4 percent of the 15 percent of the standard to come from energy efficiency improvements. I am a strong supporter of dramatically improving energy efficiency. The question I have is, how to address renewable energy with energy efficiency policies.

Mr. Izzo, do you think energy efficiency investment should be counted under a federal renewable electricity standard?

Mr. {Izzo.} No, I see them as separate issues, equally important.

Ms. {Matsui.} So you are concerned that including efficiency in RES standards would just allow efficiency to displace--

Mr. {Izzo.} Correct. You would diminish the necessary deployment we need for renewables.

Ms. {Matsui.} Mr. Binz, how about you?

Mr. {Binz.} I feel the same way. I would rather not reduce the effectiveness and I would add to that list. We are strong supporters, Governor Ritter in Colorado, strong supporters of research and technology having to do with clean coal. We would not want to see that defined as a renewable energy resource because it would work against the purposes of that bill but we think on a separate track those are very

important policies as well.

Ms. {Matsui.} Mr. Lowe, how about you? Does GE support separate standard for renewable and efficiency or a combined standard?

Mr. {Lowe.} I think it can be done either way but the one thing I would caution is, if you end up setting a standard and then you do not have a clear, articulated basis for what can renewables end up providing, then you are not going to see the investment and the job creation there. So there has to be a certainty of that and the larger portion you allow to be satisfied by other technologies, the fewer jobs you are going to create, the fewer renewable penetration you are going to have.

Ms. {Matsui.} Thank you, because your answers give us something to think about, because whether or not to separate energy efficiency from renewable electricity standard is an issue that we really definitely have to consider.

I want to ask you also about rates. We have talked a little bit about that. I want to step back and get a sense of what the panel feels on integration. Twenty-eight States plus the District of Columbia now have mandatory RPSs, and California, as I said, has led the way, and we have heard also about Colorado and the good work. But I would like to hear some of your thoughts about how to integrate all this

into various State plans moving forward.

Chairman Binz, your State has done really excellent work. How has your State coordinated with other States on best practices and renewable goals?

Mr. {Binz.} Well, I have several answers to that. We have been talking with regulators and air offices, environmental regulators in a number of States around the West. We are interested in unifying our transmission grid. We are right now improving transmission between Wyoming and Colorado. We have plans for improving transmission to the Southwest as well to New Mexico and Arizona for the purpose of making that an integrated market for these resources. So that is very important that we work with our neighbors on this.

You asked about rates. That is something very important, I think. Before I was named Public Utilities Commission chairman, I did a study predicting what the Colorado renewable energy standard would meet to costs in their State. It turns out I was pretty close to right. We have met the standard. Actually our utilities are ahead of the standard and the cost differential is less than 2 percent. It is about 1.6 percent at the moment, between what could have been built using traditional resources compared to what was built using renewable resources.

Ms. {Matsui.} Thank you, and I think I have used up my time.

Mr. {Markey.} The gentlelady's time has expired. The chair recognizes the gentleman from Texas, Mr. Barton.

Mr. {Barton.} Thank you, Mr. Chairman. Before I ask my questions, I am going to read a paragraph from Dr. Apt's statement or paper that he wrote because we are here debating a renewable energy standard because we think that there is a theory that manmade emissions, primarily from fossil fuels like coal, which reduce amounts of CO2, are causing climate change, i.e., the temperature to rise, and one of the solutions being proposed is an RES that is going to rely fairly heavily on wind power, which obviously doesn't create CO2. I am going to read a paragraph which is if true very ironic, and this is from Dr. Apt's paper and I quote: ``Wind energy is a finite resource. At large scale, slowing down the wind by using its energy to turn turbines has environmental consequences. A group of researchers at Princeton University,'' which is in New Jersey, parenthetically ``found that wind farms may change the mixing of air near the surface, drying the soil near the site. At planetary scales, David Keith, who was then at Carnegie Mellon, and coworkers found that if wind supplied 10 percent of expected global electricity demand in 2100, which is a

number of years off, the resulting change in the earth's atmospheric energy might cause some regions of the world to experience temperature change of approximately 1 degree Centigrade,'' which I think is about 1-1/2 degrees or 1.6 degrees Fahrenheit. Now, wind is God's way of balancing heat. Wind is the way you shift heat from areas where it is hotter to areas where it is cooler. That is what wind is. Wouldn't it be ironic if in the interest of global warming we mandated massive switches to energy, which is a finite resource, which slows the winds down, which causes the temperature to go up? Now, I am not saying that is going to happen, Mr. Chairman, but that is definitely something on the massive scale--I mean, it does make some sense. You stop something. You can't transfer that heat and the heat goes up. It is just something to think about.

Mr. Izzo, you are our utility representative but you are not officially representing the views of EEI, are you?

Mr. {Izzo.} No, that is correct. I am not here representing EEI.

Mr. {Barton.} Okay. Now, I have been told to paraphrase your company's position is to say we have to, because of these renewable mandates in our service territory, we think the rest of the country ought to have to do it too. Is that a fair assessment or is that an unfair

characterization?

Mr. {Izzo.} That is an unfair characterization. We are not here advocating New Jersey national security or New Jersey climate change. We are here recognizing the importance of national energy security and global climate change.

Mr. {Barton.} And doing it very well, I might add.

Mr. Binz, you at the very end of your answer to Ms. Matsui indicated that Colorado has been able to implement its RES with almost no cost increase. That is very commendable and somewhat amazing based on the testimony and the material that I have from other sources that show going to a massive RES is going to require cost increase of anywhere from 20 percent to 50 percent. Could you supply the committee in writing with how Colorado has been able to--I don't doubt what you said is true because you seem like a pretty credible guy to me--

Mr. {Binz.} In fact, Mr. Barton, it is the law in Colorado. There is a 2 percent ceiling on the cost differential that can be achieved as we meet our renewable energy standard.

Mr. {Barton.} Would you support such a component of a federal law, that there be a cost cap factor in it?

Mr. {Binz.} I haven't really thought about that. I

think that is something you may want to look at.

Mr. {Barton.} Well, think about it, because if we are going to do this and the Majority is big on caps, I think a cost cap might be a component of it.

Mr. {Binz.} I will be happy to supply the report I showed doing a modeling of that but also I will supply what the Commission has found in its borders.

Mr. {Barton.} In my last 1 second, Mr. Wise, could you comment on the cost of transmission to move wind energy from the Midwest to your region of the Southeast?

Mr. {Wise.} If the State of Georgia, if the ratepayers that I am elected to protect have to pay for the transmission of wind from the Midwest to Georgia, we think it would be just astronomical. It is just not an affordable project that we could sustain.

Mr. {Barton.} Let the record show, Mr. Chairman, astronomical in Texas means a big increase. Thank you.

Mr. {Markey.} The chair recognizes the gentleman from Texas, Mr. Gonzalez.

Mr. {Gonzalez.} Thank you very much, Mr. Chairman. Something that really stood out in Mr. Binz's testimony on page 6, ``Renewable Energy Systems of America relocated from Texas to Colorado in March 2008. The company designs, builds and operates wind farms.'' Next bullet: ``Texas-based

Dragon Wind will open a plant in Lamar, Colorado, to build wind towers.'' The question, Mr. Binz, are you finally going to like Texans?

Mr. {Binz.} We have always liked Texans, sir. They are probably our best ski immigrants.

Mr. {Gonzalez.} I am from San Antonio. We have a municipally owned utility obviously, CPS Energy, and in discussing with them renewables, this is what they reported to me, and I have known for some time and I commend them but we are in a very special situation in San Antonio. ``CPS Energy's goal is to achieve renewable energy capacity equal to 20 percent of our customers' peak electrical demand by 2020,'' so when we are talking about 15 in 2020, Tom Udall last year, it was doable. Twenty in 2020 is going to be doable probably. Twenty-five in 2025, like you said, it is not the easiest thing but probably doable for San Antonio. Among municipally owned utilities, CPS Energy ranks number one nationally in wind capacity. I don't think I have to tell you where Texas ranks as a State. CPS Energy is currently evaluating proposals from a number of companies interested in bringing up to 100 megawatts of solar power to San Antonio, enough to power about 23,000 homes. The plant could begin providing solar-generated electricity to customers in greater San Antonio by late 2010 or early 2011.

So when I think in terms of standards in renewables, my district probably will fare all right. My concern is those that have been expressed by my colleagues from other States, whether it is Michigan, Illinois, Pennsylvania, Georgia. Now, Mr. Wise has indicated that there may be problems that San Antonio would not experience, but by the same token, I do want to point out that San Antonio has invested at this point about $240 million just in the license application for a new nuclear plant that we just built, a state-of-the-art coal-fired plant, so we all over the place but nevertheless on the renewables we know exactly what the future holds. But we still have a vested interested in clean coal technology, tremendous interest in the development of new nuclear power plants, but what I am asking is, what about Mr. Wise? How do you respond to his testimony? I know you may have touched on it and I apologize because I had to absent myself from the hearing for a few minutes. This is what he states on page 2: ``On the other hand, establishing a uniform RPS focused exclusively on a limited number of sources like wind, solar, biomass or get without regard to crucial regional differences will unnecessarily drive up electricity costs, jeopardize reliability and divert capital that will be needed to achieve other objectives like meeting aggressive carbon targets. As a result, my State and our region must seek to encourage the

growth of research and development in the use of energy resources that are available and economically viable to provide for our future needs.'' And I would ask all the witnesses, if you were in Mr. Wise's shoes today, how would you respond to your testimony as well as his observations and his description of his predicament? I can start with Mr. Binz, who is getting all the Texas commercial business.

Mr. {Binz.} Congressman Gonzalez, Texas was an early leader in wind, and I think also the analysis that was done, the so-called REZ regions, the renewable energy zones that were identified so that transmission could be matched to those zones. That is important model that has been carried lots of other places and we do appreciate that as an important expert from Texas, the idea.

I would say that many of the arguments are very reminiscent of what we heard in Colorado before we got busy and figured out how to build a renewable energy industry. I know that there is reluctance to do this by utilities who have had a very traditional approach for a very long time and we had such utility in the State. They opposed the voter initiative. Two years later they supported the doubling of the requirement. Much has been said about biomass in the Southeast. I have also noted in here in my testimony significant solar potential in the Southeast. Biomass

doesn't have to be new plants burning only biomass. Cofiring of coal is an excellent way of using biomass, and it is my understanding you can cofire up to about 15 percent of the input feed to a coal plant without losing any significant efficiency of that plant. That is the place to start. If a State is unable at the very beginning of this to actually put an industry on the ground, they can buy renewable energy credits. They can say we actually own wind being produced in Kansas or North Dakota and credibly count that against their requirement in their State. That is not the permanent solution because you do want to grow renewable industry in your State. But I just would exhort States who have not done this to look at the experience of Colorado, and there are lots of other examples of this, of where you are going to turn your economy around with respect to this issue, find that you have opportunities you never understood you had. Governor Ritter's promise of a new energy economy in Colorado has come true and has overridden the skeptics, who thought that we couldn't do it. I think the same can be done in many other places.

Mr. {Gonzalez.} There is only about 29 seconds, Mr. Izzo.

Mr. {Izzo.} What I would say is, if I begin with the premise that we need to reduce 80 percent of our carbon

emissions, there are going to be a series of solutions that are critical and one part of the region achieves competitive advantage by reducing its carbon footprint through more efficient coal units and therefore attracts to it the revenues from a cap-and-trade system, or another region of the country achieves a competitive advantage by having an indigent source of renewable, be it wind or solar. That is all part and parcel of a vibrant interstate commerce system and it is something that we should applaud and strive to achieve, every part of the country doing its bit to reduce carbon. Remember, 25 percent renewable portfolio standard, 35 percent of CO2 from electricity, we are talking about 7 percent of the 80 percent coming from this RPS.

Mr. {Butterfield.} [Presiding] The gentleman's time has expired. Thank you very much.

Well, a logistical problem has developed. We have been called to the Floor for two votes. I am going to recess the hearing and ask the members to return 10 minutes after the second vote. The committee is in recess.

[Recess.]

Mr. {Butterfield.} All right. The committee will be back in session. At this time the chair will recognize the gentleman from Mr. Florida, Mr. Stearns.

Mr. {Stearns.} Thank you, Mr. Chairman. I ask

unanimous consent that my opening statement be made part of the record.

Mr. {Butterfield.} Very well.

[The prepared statement of Mr. Stearns follows:]

********** COMMITTEE INSERT **********

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Mr. {Stearns.} Coming from Florida, some of our utilities are concerned about a possible bill from our Chairman Markey, particularly in light of that it doesn't include anything about clean coal or nuclear or waste-to-energy and there is not even a clear understanding whether we are going to have energy efficiency as part of it. I think a question I might have for Commissioner Wise is, if we assume that many utilities will fall short of the RES mandate and end up paying millions of dollars in noncompliance fees, won't that cost the customers and hurt the economy? Why do RES supporters claim that this is good for the economy?

Mr. {Wise.} I think it does actually help the economy with new jobs and growth and opportunities in the new technology but ultimately the ratepayers do pay the difference in our States where we are regionally challenged with lack of resources, and if you don't give us credit for the new nukes or efficiencies, then ultimately it is going to be a substantial wealth transfer from the southern states and ultimately cost us jobs, growth and industry, and be a significant cost to the ratepayer.

Mr. {Stearns.} In January, T. Boone Pickens, I was at a symposium where he indicated that the cost per barrel is going to go up even higher than it was of $150 a barrel, it

might go up to $200. So with the possibility the next 2 or 3 years the cost of gasoline going up and then you assume that you add all these extra costs, it is going to be enormous cost, as you pointed out, to the customers. Now, some dismiss the argument that the RPS will result in a wealth transfer from areas of this country that lack renewable resources to those that are blessed with them. As a State regulator, can you explain why you believe a federal mandate will result in increased rates for those in the Southeast?

Mr. {Wise.} Again, you know, we even heard from Commissioner Binz just a few moments ago that he was talking about these credits that we could buy to go ahead and take credit for wind and solar from other parts of the country, but ultimately if they are not generated in our State and we are paying credits just to acquire them, then once again it just adds cost to our system. We take great pride in going ahead in the southern states to have reliable, affordable energy and so we have done our job with transmission lines. We are not constrained, as many other parts of the country that have not paid their way, and so at this point we are talking about adding, you know, real dollars to our ratepayers if we are required to buy these credits to offset what we simply can't meet under the standards being discussed by this committee and this Congress.

Mr. {Stearns.} Let us assume you and Florida, Georgia and Florida, have to do this. A lot of money from our States are going to go outside our States too, which would have an impact. Georgia has nuclear power?

Mr. {Wise.} Yes, sir, we do, and we are currently considering two new plants to be sited where we have a reactor today.

Mr. {Stearns.} It is puzzling to me that if the folks are considering this RES, want clean energy, why they wouldn't consider nuclear power. It is produced in the United States. It has zero carbon dioxide emissions. It does not put stress on the agricultural community, the timber industry. So why in your opinion have they not considered nuclear power?

Mr. {Wise.} Again, it might be agenda driven. I really believe that if somebody is promoting a new technology and they can benefit from it with jobs and growth and industry in their region, they are not going to want to give credit for efficiencies for new nuclear power, and I think it is unfortunate. These do take care of the emissions issues for at least 2,200 megawatts that we are talking about adding to Georgia's load.

Mr. {Stearns.} If you meet all the requirements of clean energy, you would think you would get some credit for

it. Do you agree that as it now stands, our country's transmission infrastructure is woefully inadequate to achieve a 20 percent by 2021 RPS requirement?

Mr. {Wise.} Yes, I do.

Mr. {Stearns.} How much backup power from conventional power plants is needed to meet a 20 percent RPS requirement by 2021, and if you know the cost?

Mr. {Wise.} The cost would add probably 15 percent, is the way we are looking today, just to add the backup cost to the shortfall that if we say put in wind and/or solar, we are going to see upwards of 75 percent backup probably from natural gas.

Mr. {Stearns.} Thank you, Mr. Chairman.

Mr. {Butterfield.} Thank you. The gentleman yields back. At this time the chair will yield 5 minutes to himself.

Let me thank all of you for coming out today to be a part of this hearing. On behalf of the chairman, we certainly thank you very much. I understand that Mr. Wise may have to depart for the airport somewhere around 1:00, but let me assure you that this hearing will probably be completed by 1:00. We are told that our next vote will be at or about that time, but thank you so very much.

Let me join my colleagues on this committee and the full

committee who support an RES. Some call it the RPS. I am not sure which acronym is more preferable to my office, but thank you for speaking on the subject today. But I am terribly concerned. I join those who have expressed concern and I too am terribly concerned about a national standard. I represent North Carolina. I am part of the Southeast that you hear so much about. North Carolina has developed a State standard, the only one in the southeastern part of the country. We have a State standard which is 12.5 percent.

To the gentleman representing the Department of Energy, the acting administrator, and I won't call you by name, because quite frankly, I can't pronounce it, but let me address this question to you. In your testimony earlier you mentioned an analysis that the Department of Energy has made. Would you elaborate further on that?

Mr. {Gruenspecht.} Yes. These were earlier analyses of earlier proposals. In June 2007, in response to a request from Senator Bingaman, we looked at a 15 percent RPS. Also, later that year in response to a request from, I think it was the ranking on Resources, the ranking on Ways and Means and the ranking on, I think Energy and Commerce as well, we looked at provisions that were in the House version of legislation that ultimately became the Energy Independence and Security Act. Those are all available on our web and we

can certainly make them available to the committee. Let me make clear, those are not analyses of the proposal that Mr. Markey and I believe Mr. Platts have put out. We did receive a letter yesterday from Mr. Markey requesting that we undertake an analysis of that proposal, and we will do that as best as possible.

Mr. {Butterfield.} But do you at least concede that the Southeast is extremely limited with respect to wind and solar? Do you make that concession?

Mr. {Gruenspecht.} Sure. We got very little--biomass was the key resource in the South for increasing renewable generation both through cofiring in existing plants, as discussed by some of the other panelists, and in dedicated plants. A little bit of solar came in as well. But again, biomass was the main thing.

Mr. {Butterfield.} And of course, our concern in the South is, how on earth are we going to find this biomass in order to satisfy the standard? I mean, we certainly want to be good Americans and play a valuable part in this process but where on earth are we going to find the biomass to meet the standard?

Mr. {Gruenspecht.} Well, we have worked with the University of Tennessee actually on the regional supplies of the biomass and again, this is not with respect to the

standard proposed by Mr. Markey but with these earlier standards. We did find that there is a fair amount of biomass available both from forest residues, possibly from energy crops. It is more expensive than coal but in the case of the analyses of those standards, it was brought into use.

Mr. {Butterfield.} It is going to be extremely difficult. Would you agree, Mr. Wise?

Mr. {Wise.} I would indeed, and clearly a sustainable--if we did it all on biomass alone, it would take--we have heard some numbers. To make the 20 percent number with biomass alone would take pretty much all of Alabama and Mississippi of the sustainable forest, and I am not sure they are going to volunteer.

Mr. {Butterfield.} I have 50 seconds remaining. Does anyone else want to respond to this?

All right. The chair yields back the balance of its time. At this time the chair recognizes Mr. Inslee from the State of Washington.

Mr. {Inslee.} I want to ask Mr. Gruenspecht, when you did your assessment, when the agency did the assessment of potential in the South, did it consider hydrokinetic power?

Mr. {Gruenspecht.} No, we did not look at hydrokinetic power. As described in our testimony, we have focused on the main sources of renewable energy that are sort of known

characteristics, known costs so we did not look at hydrokinetic power, we didn't look at hot dry rock, geothermal. We focused on the wind, solar, biomass, hydro and sort of I guess more conventional geothermal that is primarily in the West.

Mr. {Inslee.} So I am told that Commission staff estimates that the Southeast has the potential to develop about 30,000 megawatts of installed hydrokinetic capacity. Development of potential is estimated to be about 7,000 megawatts for wave energy, 10,000 megawatts for ocean current and 13,000 megawatts for in-river hydrokinetic projects. Now, except for perhaps the in-river hydrokinetic projects, these are pre-commercial application, so you just rule them out because they are not commercially in the water yet? Is that the reason?

Mr. {Gruenspecht.} Well, I don't know that we are ruling them out. It is just that it is hard for us to characterize what they would cost and, you know, again, there is very little basis for us to have it but we are being very clear of what we are including and what we are not including, and so in the analysis we did of the 15 percent standard and the language in the House bill, we found that again the biomass resource in the South, which we could characterize, was what was used. Certainly under a standard, other things

potentially could come into play if they were cheaper.

Mr. {Inslee.} So you are not taking issue with the report then, I take it?

Mr. {Gruenspecht.} I am not taking issue with it. You know, words like ``potential'' and ``could be developed'' without time frames, without, you know, any sense of what it would cost--now, it is important to look at it just like some of these advanced geothermal technologies, other things, but we could not really factor that into our analysis and say, you know, you got 6,238 megawatts of that.

Mr. {Inslee.} Well, the reason I ask that is that, you know, if we were going to ask ourselves, should we have a national goal of having 15 percent penetration of the phone market to be cellular phones in 1992, you know, I wonder what this discussion would have been at this hearing. I think probably DOE would come in and say well, commercial phones are not commercially available so we are only going to count bio phones or something. I mean, that is the point I am trying to make. You can respond if you like.

Mr. {Gruenspecht.} I will respond. I am not arguing with you. I just want to point out that I guess some of my fellow panelists have suggested that our analysis is, I don't know what the opposite of conservative is, it is too liberal, and I guess you are suggesting my analysis is too

conservative, and we just try to be very clear about what we did and why we did it, and really these are very thorny issues about new technology and will you catalyze new technology. You know, to be fair, I mean, everyone talks about, you know, if we have the mandate it will happen. California had a mandate for zero-emission vehicles in the 1990s that they envisioned as being battery powered, and that turned out to be something of a tougher nut to crack than people thought it was in the 1990s. Now, we are still very interested in battery power, so it is not always the case that if you--yes, if you mandate it, there could be things that aren't anticipated that could come in. I agree.

Mr. {Inslee.} But it is an interesting point though. I don't think any State has had an electrical standard that has not failed to meet it, is there?

Mr. {Gruenspecht.} I think on some of them so far--again, they are all phasing in. I think so far that would be a fair characterization. A lot of them have, if you will, I don't want to call them escape clauses but, you know, clauses that if the cost is too high or if something happens and a lot of that may depend on the availability of federal production tax credits and if the federal production tax credits didn't exist then maybe some of those provisions would get triggered. So like always, it is really--you know,

it is pretty complicated, as you know.

Mr. {Inslee.} I want to make sure I ask Mr. Izzo about the New Jersey experience. My understanding is, New Jersey considered a feed-in tariff at one time and actually had a study about costs and the study came back saying actually a feed-in tariff was the most cost-effective mechanism to really inspire development. I introduced a feed-in tariff and I just wonder if you have any comments about feed-in tariffs, what New Jersey is thinking of them or did you consider what the virtues or vices were?

Mr. {Izzo.} What we did, probably the best example of a successful feed-in tariff is the one that has been used in Germany. By successful, I define that to mean where lots of solar energy was encouraged. The reason why New Jersey elected to not use a feed-in tariff is, there is a little bit more art than science around selecting what the number needs to be. If you pick the, quote, wrong number, you could get more than you want, and if you pick it too high and if you pick it too low you can get less than you want. So New Jersey instead, despite the success of the feed-in tariff in Germany, has adopted for something that is really more dependent upon a REC market, which is to let the regulatorily created revenue stream float to meet the needs of achieving the standard. So rather than picking a set number, which is

a feed-in tariff, we let the number float so as to achieve the RPS. They are comparable methods. We believe the REC approach is a little bit more market based.

Mr. {Inslee.} I have one more question. I want to ask Mr. Wise, you have a concern about reaching these targets in a renewable electrical standard. A feed-in tariff works in a situation where you don't pay or you don't get--you are not compelled to buy or obtain any particular percentage but in fact you only are compelled to buy that which is offered to you by an energy producer. Is that a superior model for you, your concerns in the South or an inferior model? What are your thoughts on that?

Mr. {Wise.} I have no idea. All I know is that if we are talking about credits that we have to buy for what to buy if we can't make the number, that is going to add cost to the ratepayer, and it is clearly not jobs, it is not growth, it is just additional cost for goals that we can't attain.

Mr. {Inslee.} You may be familiar with this, but the one virtue of a feed-in tariff is, you wouldn't be required to buy it unless somebody offered to sell it to you. You would be required to buy it at a specified price, which is usually going to be somewhat overmarket at that moment for alternative capacities, limited to a certain amount by statute or regulation. Some of us think that is worthy of

consideration. Thank you

Mr. {Markey.} The gentleman's time is expired. The chair recognizes the gentleman from Utah, Mr. Matheson.

Mr. {Matheson.} Thank you, Mr. Chairman, and I would just also associate with what Mr. Inslee just said, that I do think that a feed-in tariff is something we ought to consider in this discussion. It merits being part of this debate. I think we ought to include it.

I have some questions, and I am not sure who should necessarily answer this on the panel, but you guys can decide, about how the issue of an RES fits in with other energy legislation that we are considering. If we have a federal RES and we have an energy efficiency mandate as well and we put in a cap-and-trade law in place with carbon reductions, how do we ensure that these programs are not duplicative, or maybe the more positive way to say it is, how do we make sure that the goals of these different programs are complementary and not in conflict with each other?

Mr. {Izzo.} I will begin, Congressman. I think the beauty of the RES program as envisioned here is that it really achieves about a 7 percent reduction in CO2 emissions and most scientists believe we need to achieve an 80 percent reduction. So we are not saying here today that renewables are the only solution. To your point, there are multiple

solutions. There is energy efficiency, there is carbon capture and storage, there is new nuclear, there is renewables. To that extent, the importance of a cap-and-trade program to set a price for carbon is essential so that different aspects of that portfolio will come into play more prominently in different regions. So, for example, one may be able to reduce the cost of carbon more effectively in the Southeast through nuclear energy, perhaps more effectively in the Midwest through wind energy, perhaps more effectively in New Jersey through energy efficiency. So cap and trade and a price for carbon seeks to set the price signals for reducing carbon. Each of these components, however, will be essential in bringing about the complete decarbonization of electricity and the complete electrification of transportation.

Mr. {Matheson.} But you don't foresee potential conflicts between the different--

Mr. {Izzo.} I don't. so for example, if the alternative compliance payment is 5 cents a kilowatt-hour, which is $50 per megawatt-hour, that is the equivalent of $70 per ton of CO2 for a coal plant in the Northeast. So if carbon dioxide is trading at $50 per ton, you will see some other solutions that will offset the need for the REC payment in the RPS.

Mr. {Matheson.} Are there other things out there about

how to accommodate the regional differences in this country and the ability for some places to pursue renewables more than others beyond the credit idea of paying for credits for renewable energy produced in another part of the country? Are there ways to look at tailoring this such that you get away from the one-size-fits-all approach and encourage different regions to do what is appropriate for that region? Do any of you have thoughts on that?

Mr. {Binz.} Congressman Matheson, Ron Binz from Colorado. Like Utah, we are a heavily dependent State on coal right now, and we are looking to move away from that and we are hoping to move to clean coal technologies in our region. But we see renewables and I hope every State sees renewables as one essential piece of this total solution. We have been talking about a ramp-up in Congressman Markey's bill, a ramp-up which I think will allow these industries to develop in States. I think it will be very transformative to put that requirement in. I will be very surprised if Georgia or any other southeastern State pays the penalty, if you will, for noncompliance with the 5-cent credit we have been talking about. I think they will do it much more effectively with either resources that they are generating themselves or purchasing.

Now, I want to also speak to an issue which I know a lot

of members are interested in is, I think we should be looking at strengthening the transmission side so we can move some of these electrons around. The virtual purchase of renewable energy by buying credits from out of region places works up to a point. At some point you actually do need to move the power when you don't have sinks in these regions with the excess capacity. So I guess what I am saying is, I think the gradual ramping up of the standard is what is going to answer the question you just raised. I think solutions get discovered along the way without an immediate problem being presented to these States, and purchases of RECs will eventually be phased out. That is in fact how Colorado met its renewable energy requirement its first year. We bought a lot of solar RECs from other States. We then said we don't want to be doing that, we want to develop our own industry in the State, and that is what is happening.

Mr. {Matheson.} Thank you, Mr. Chairman. I will yield back.

Mr. {Markey.} I thank the gentleman.

The chair will recognize himself, and we might have time for more questions if the member are interested. Oh, Mr. Scalise, have you been recognized yet for a round of questions?

Mr. {Scalise.} No.

Mr. {Markey.} Then the chair recognizes the gentleman from Louisiana.

Mr. {Scalise.} I thank the chairman.

I do have a couple of questions for Mr. Izzo. In New Jersey, I am not sure of the percentage but I know New Jersey generates a significant amount of power from nuclear, and maybe you can share with me what that is.

Mr. {Izzo.} Our company alone generates 50 percent of our electricity from nuclear. I think statewide is more like 40 percent.

Mr. {Scalise.} Do you believe that nuclear power should be included in the renewable definition?

Mr. {Izzo.} No, I don't. I think it is an important part of global climate change solutions but I don't think it is a renewable source of energy. It is a carbon-free source of energy.

Mr. {Scalise.} Exactly. But why wouldn't you think that encouraging our country to do what many other countries, especially in Europe and beyond, are going to as a carbon-free source that is very reliable, not intermittent?

Mr. {Izzo.} I am an advocate of encouraging it by setting a price for carbon and a cap-and-trade system. Nuclear is quite competitive if one allows for the externalities that are not being captured in today's energy

market to be captured. That is quite different than the nascent technologies that we are trying to make sure become an integral part of that solution mix through an RES. I mean, at the end of the day uranium 238 is not renewable. You use it up. It is carbon-free but it is not renewable.

Mr. {Scalise.} Mr. Wise, I would like to get your take on it as well as what some of these compliance fees may ultimately yield in consumer prices.

Mr. {Wise.} Say again?

Mr. {Scalise.} Well, first on Mr. Izzo's comments about nuclear as not being considered renewable.

Mr. {Wise.} We think including nuclear in this bill would be vital. We are currently considering two new reactors and feel like that if carbon emissions are one of the issues that we are looking for and the goal of renewables, then we think those are one of the mainstays of what we are trying to do in Georgia. Again, it goes back to the one size fits all. Clearly, we are constrained by lack of resources in this marketplace. As the model moves, as the technologies develop, as we have heard from this panel today, we think that we will be able to ultimately benefit from them if it is in solar if we can do more with the humidity and the cloudy days that we have, but ultimately it is just too fast a pace for somebody in a region that doesn't have the

opportunities that maybe they do in other States.

Mr. {Scalise.} If standards are set up in a way that don't encompass some of these other things I guess where we have a disagreement but where many have proven an ability to produce renewable sources that don't count in the definition, ultimately what would that mean in terms of prices for consumers?

Mr. {Wise.} Well, it would be significant, and every time a new proposal comes out we are looking at the impact of what it would be on the consumers, the average consumer in our State, and we have heard the same numbers that I am sure you have, anywhere from 5 to 25 percent is what it could be.

Mr. {Scalise.} Rate increases?

Mr. {Wise.} Rate increases on top of already a volatile marketplace.

Mr. {Scalise.} And obviously we can all agree that it is important to encourage and expand renewable sources of energy. That definition is probably going to be one of the more critical debates because it leaves out some things that truly are renewable but maybe aren't included in the definition.

Mr. {Wise.} Waste-to-energy is a classic example, and we are seeing the development--

Mr. {Scalise.} And clean coal.

Mr. {Wise.} Clean coal, the sequestration. Biomass is going to be something that is a part of it. I am not sure that we are still sustainable to do--

Mr. {Scalise.} And I do want to ask you about that because I know it has come up, and before my time runs out, there has been some talk that in the southeast part of the country where maybe wind and solar isn't as prevalent as a reliable renewable, that some have said that biomass could make up that difference. Others disagree. What is your take on that?

Mr. {Wise.} Again, it is not sustainable to make up the difference in our State with just biomass. Biomass would have to be a piece of it. It would be a significant piece but we couldn't meet the 20 percent. We couldn't make 10 percent with biomass in the southern states. We have a lot of trees but we don't have that many trees.

Mr. {Scalise.} And obviously then we have the concern about what that means to consumers in increased rates. Some of these things are thrown around without necessarily factoring in the consequences. I would be curious to see if there would be tracks on what consumers would pay because I think most consumers would say yes, I want to support expansion of renewable sources of energy, and many people have already started to conserve. Of course, they won't get

credit for that. That is not something they are going to get credit for but on the backside they could get penalized if while they are conserving, while their State is using renewable sources of energy that aren't included in the definition, they are going to be paying higher rates and they are going to say wait a minute, that is not what I said when I answered that poll question about whether I support renewables. It is a whole different story when my renewable isn't included and now I am paying 25 percent more on my utility bill.

Mr. {Wise.} Some of the users, the potential users of pulp and paper in our State are already complaining about the move toward biomass, about the impact that I will have on their customers, on their industry, and have actually been interveners in some of the cases before our Commission raising the issue of what it will do to prices for them.

Mr. {Scalise.} And we have already heard some testimony from industry who have talked about--one person earlier this week in testimony said they have laid off 100,000 people. Some of those have been jobs shipped overseas because of the concerns of some of these policies, and there is a big cost on the other side and that is why it is important that we encourage this but we watch the consequences too, so I will yield back. Thank you.

Mr. {Markey.} The gentleman's time is expired. The other gentleman from Louisiana, Mr. Melancon, is recognized.

Mr. {Melancon.} Thank you, Mr. Chairman. I apologize. Actually I had meetings in my office concerning just what we are talking about today in between votes.

One of the questions I guess I have got and to no one specifically but whoever feels they are best to answer this, is there a feeling--and I am looking at this. I don't see in the proposal nuclear anywhere. Would that not be a good alternative?

Mr. {Izzo.} Congressman, our company is as we speak working on an early site for a new nuclear power plant. With luck, it will be ready to produce carbon-free electricity in 12 years. Our company is working on an offshore wind farm. With luck, it will produce 350 megawatts of carbon-free electricity in 4 years. We are developing compressed air energy storage systems to make more economic onshore wind. With luck, it will produce carbon-free electricity in 2 years. We are also in the process of developing solar energy that will be deployed within the next few months, and hopefully in the 30 seconds it took me to say this, we have installed yet another compact fluorescent light bulb and a few more programmable thermostats to bring about energy efficiency this minute. We need to do all of it. Nuclear is

important but it is not a renewable energy supply and it doesn't need to impinge upon the need for solar, wind, biomass and the like.

Mr. {Melancon.} On the nuclear, it is not renewable in a sense but it can be reprocessed. Cannot that material be reused?

Mr. {Izzo.} You can get more of the energy content out of what we today call the waste. I guess you can call that reusing but you can be more efficient with the use of the fuel. At the end of the day, the fuel is consumed.

Mr. {Melancon.} Mr. Wise?

Mr. {Wise.} Yes, sir, I do agree that nuclear power should be considered in these standards.

Mr. {Melancon.} Do you think this is the area on the complementary or should it come under some other section of the bill?

Mr. {Wise.} I believe if you are going to have a renewable energy standard, that new nukes should be included.

Mr. {Melancon.} I guess the question I have here is, when you look at the sources of fuel, if nuclear is not part of the equation, if everything available is not part of the equation with proper credits and encouragement, do we end up just going to the cheapest fuel and we are back to coal? So if nuclear is not in here, is there anybody that would

suggest that we do nuclear in this section to give options and alternatives to the power companies?

Mr. {Wise.} I would clearly hope so.

Mr. {Binz.} Congressman, Ron Binz from Colorado. I would oppose the use of nuclear as a fuel that would satisfy the renewable energy requirement because that effectively will gut the provision. One nuclear plant will probably wipe out a State's renewable energy requirement. You won't get the impact that this bill is intended to effect, namely to bring some new technologies along. I completely agree that nuclear ought to be considered as one of the primary ways of fighting global warming and climate change but I don't think you do it through this bill. Nuclear power does today receive its share of research subsidies and insurance subsides and all sorts of other things as do most of the rest of the parts of this industry but I think that it would be a mistake to essentially qualify it as a renewable resource, and that is just semantics. Whatever it is, it is, but the point is that you don't want to, I think, take away the impact that this legislation is attempting to have for the wind, the solar, the biomass, the geothermal and all the other resources that this is intended to boost.

Mr. {Melancon.} Who can tell me what the life span of the material used in the generating facilities, the nuclear

facilities? How long a lifespan is one cylinder, or how do you measure it?

Mr. {Izzo.} Most power plants are on an 18-month refueling cycle where they replace one-third of their fuel core.

Mr. {Melancon.} And how much material is that?

Mr. {Izzo.} I don't know the answer.

Mr. {Melancon.} I am still trying to figure out what the megawatts consumed by--but anyway, I am out of time, but I appreciate it. Thank you, Mr. Chairman.

Mr. {Markey.} I thank the gentleman.

The chair recognizes himself one more time. There were 8,000 new megawatts of wind constructed in the United States in 2008. If we just take Mr. Izzo's projection for the nuclear power plant which he is building for his company, he is using a 12-year timeline. If you just multiply 12 times 8,000 megawatts, you are near 100,000 megawatts. That is if we stay at the same pace. Of course, if we have a national renewable electricity standard, wind will wind up at 150,000 or 200,000 megawatts within 12 years before the first nuclear power plant comes on line. So we just have to be realistic here. No one is saying nuclear is not going to be part of the mix but because of the timeline and the cost of nuclear and the fact that we have a history over the last 34 year sin

terms of its financing it, it has great difficulty in receiving financing in the private sector, as opposed to France and China and Japan where the government pays for it. Here we have to get private investors and they have been shying away from it. So just realistically in 2020, we might have 1,000 or 2,000 new megawatts of nuclear but we will have somewhere between 150,000 and 200,000 in megawatts of win by then at the pace at which it is going right now. That is just the reality of it. But no one is saying nuclear is going to be out but that is just the way it will turn out.

Let me ask Mr. Gruenspecht, Mr. Melancon raised coal. In your new Annual Energy Outlook 2009, it shows a fairly substantial reduction in projected coal-fired generation. Can you explain the magnitude of that decrease in your projections?

Mr. {Gruenspecht.} It is not really a reduction in coal-fired generation. It is a reduction in new builds of new coal-fired plants, and we try to reflect likely behavior under current laws and policies so we are not making assumptions about what you would do but we do rely on recent behavior as a key indicator, and although existing plants continue to be operated based on economic dispatch and produce about half the Nation's power as people have said, concerns about greenhouse gas emissions do appear to be

having an impact on investment decisions for new plants, and so because that impact is being felt, we are reflecting it.

Mr. {Markey.} And so can you give me an idea of how many fewer--can you quantify what you believe the reduction looks like?

Mr. {Gruenspecht.} There is certainly, what, about 10 to 15 gigawatts, I think, under construction now.

Mr. {Markey.} Ten to 15,000 megawatts?

Mr. {Gruenspecht.} Ten to 15,000 megawatts, excuse me, under construction now, and we see after that not much being built probably until about 2025 and then more. I can get you the specific numbers for the record.

Mr. {Markey.} That is pretty telling, that just looking at the marketplace today that you see only 10,000 to 15,000 in the pipeline whereas as we can see with wind that that is the projection for just the next three or four years at current pace absent the extra spur that a national renewable electricity standard would create to increase construction.

Mr. {Gruenspecht.} I mean, another thing to keep in mind, of course, is that different, that a coal plant or nuclear plant runs at a much higher utilization.

Mr. {Markey.} No, I understand that.

Mr. {Gruenspecht.} I know you do, sir.

Mr. {Markey.} But just the scale of construction.

Mr. {Gruenspecht.} Absolutely.

Mr. {Markey.} And Mr. Lowe, you talked about all the jobs that would be created in the near term if we move towards this renewable side, and if you could just talk a little bit, Mr. Gruenspecht, about the impact that a national renewable electricity standard could have in substantially alleviating the demand for natural gas in the power sector. How significant an impact on natural gas prices could a strong renewable standard have?

Mr. {Gruenspecht.} Well, we do in our past analyses. We haven't yet done the one that you have just sent to us, but in the past it is the case that beyond things like biomass cofiring, which clearly back out coal, you do tend to back out the most expensive things that you would otherwise be using, and in many regions of the country that is gas, so you would burn less gas and that can have an effect on the price of gas, which affects the price of gas used both for electric generation and the price of gas used for other purposes like home heating. So we got, as I described in the testimony, in the pervious analysis modest increases in what we looked at in expenditures for electricity by consumers for the reasons that have been discussed but to some extent offset by some reduction in the cost of gas.

Mr. {Markey.} I know Mr. Wise has to go. I would like

to let him have the last word here. Mr. Gruenspecht, if you look at 2008 where 50 percent of all new electrical generation installed was natural gas, 42 percent was wind, 6 percent was coal and the remaining 2 percent was low-head hydro, solar, all the rest, I am just looking for you to just make a comment about that because natural gas is half the CO2 emitted as coal. That is probably why we are seeing business decisions being made that are shying away from coal. But that seems like a good partnership natural gas and wind going forward with the other renewables playing an increasing role as the years go by.

Mr. {Gruenspecht.} Again, I don't want to take a policy position.

Mr. {Markey.} You are an analyst.

Mr. {Gruenspecht.} I am an analyst. A lot of gas capacity was built in the first 5 years of this decade, tremendous amounts, in part because many people had thought that gas prices, you know, would stay low for a long period of time. We are still working our way in some sense through that capacity but in the present environment where there is reluctance to build coal as we discussed, what is getting built is mostly the number of coal plants that I mentioned plus some combination of a lot of wind and some gas where additional capacity is needed. Gas is sort of kicking the

can down the road in terms of making a decision because most of the cost of gas-fired generation is in the fuel other than the plant, and if you don't know what is going to be happening, you don't want to put big money on your plant. You want to just need the need as cheaply as possible, be as flexible as possible.

Mr. {Markey.} What I would like to do, if the two gentlemen from Louisiana wouldn't mind, is give each witness down here 1 minute to summarize what they want us to know, and to let Mr. Wise, because he has to run for a flight, give you kind of an extended one because you are a little bit outnumbered here. Please give us the 1 minute you want us to remember on this committee as we move forward on a renewable electricity standard.

Mr. {Wise.} That is very fair, Mr. Chairman. I appreciate it very much. I think first and foremost that everybody in this room, your committee and this panel have all agreed that renewables and the future of energy in this country will be and have a significant part of renewables. We just ask for an ultimate understanding that one size fits all is not beneficial to my State, the southern States and that ultimately that all aspects of clean emissions need to be considered. That would include nuclear, it would include clean coal or sequestration, waste-to-energy and enhanced

hydro, and I think that would be my message.

Mr. {Markey.} Thank you, Mr. Wise, very much.

Mr. Gruenspecht.

Mr. {Gruenspecht.} Mine is easy. We are here for you and the members. These are thorny issues. The devil and the angels are in the details, as I said. There are lots of different ways to do things. Those are your decisions, not ours, but we will be glad to provide both data and analytical support.

Mr. {Markey.} Thank you, Mr. Gruenspecht, very much, and thank you for your good work.

Mr. Lowe.

Mr. {Lowe.} What I would like to leave with you is the fact that renewable energy has the ability right now to create significant green collar jobs in the United States. From a perspective of wind, that is about 500,000 jobs by 2030, on one projection. By 2016, there could be approximately 230,000 solar jobs. And we also have the ability, as you indicated in your statement, about 8,000 megawatts of wind going in in each year to immediately reduce carbon emissions for generation going in today.

Mr. {Markey.} Thank you, Mr. Lowe.

Mr. Binz.

Mr. {Binz.} Thank you, Chairman Markey. A couple

points. One is, I want to emphasize the transformative nature that a renewable energy requirement had in my State and I believe that a similar salutary effect would be had if it were adopted in other States via national legislation. We have got more jobs dedicated to this than we would have had if we had gone down the route of traditional fossil generation. I would also like to stress that the cost of renewables will come down as their proliferation in the market increases, and that is something which I think is a very important part of your legislation. Finally, I think we do a disservice to customers if we suggest that renewables are going to raise their cost as if other compliance measures won't. We have got a very substantial challenge with global warming to decarbonize the electric sector. I look at renewables are a very hopeful component but we should not be suggesting that 15 percent if somebody uses that number increase that that might drive is on today's base because we are looking at expensive new plants of every stripe that are going to be necessary.

Mr. {Markey.} Thank you, Mr. Binz.

Mr. Izzo.

Mr. {Izzo.} Yes, Mr. Chairman. We face some fairly daunting challenges and opportunities, climate change, national energy security and sustainable economic

development. We can lay the foundation for that with a carbon price through a cap-and-trade system. We need a portfolio approach to reducing carbon. Renewable energy is a critical component of that portfolio. A national approach is needed. It is only through a national approach that we can make the most economically efficient decisions. New Jersey joyfully buys its citrus fruits from the Southeast, its grains from the Midwest and we joyfully export our pharmaceuticals and telecommunication products to those places. The same should be had for energy policy.

Mr. {Markey.} We thank each of you and Mr. Wise for your testimony. This is a very important issue right at the heart of the revolution which is taking place in Germany, in China. If we don't move, they are moving. We will be importing their technologies. That is the bottom line. It is an engine of job creation which General Electric is now taking the lead in our country and in the world and I think we just have to keep pace and try to exceed the rest of the world in this subject. We should try to be number one looking over our shoulders are number two and three and four in the world because this is a job creation engine, and if we don't, we for sure will be importing 20 and 30 years from now having lost an opportunity to create a real manufacturing base in our country. So this is going to be a central part

of the debate of climate change over the next several months, and we thank you for your participation. It has been very helpful to the committee. This hearing is adjourned.

[Whereupon, at 1:10 p.m., the subcommittee was adjourned.]