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CHU NOMINATION

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

TO

CONSIDER THE NOMINATION OF STEVEN CHU TO BE SECRETARY OF ENERGY

JANUARY 13, 2009

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CHU NOMINATION

TUESDAY, JANUARY 13, 2009

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

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

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

The CHAIRMAN. OK. Why don't we get started?

The committee meets this morning to consider the nomination of Dr. Steven Chu to be the Secretary of Energy.

President-elect Obama will not officially nominate Dr. Chu until the new President is sworn in himself this next Tuesday. It is customary, however, for the Senate to confirm noncontroversial cabinet nominations at the beginning of a new Administration by unanimous consent without first referring them to committee. It is customary to do so immediately following the inaugural ceremony. We have extended this courtesy to 7 of President Bush's nominees 8 years ago and to some of President Clinton's nominees 16 years ago.

In keeping with the past practices here in the committee, I have scheduled today's hearing on Dr. Chu's nomination and scheduled another hearing on Thursday on Senator Salazar's nomination in order to give members an opportunity to ask questions of the nominees and consider the nominations prior to the inauguration.

Unless there is serious opposition to one or both of the nominees—and I am certainly not aware of any—it is my hope that the committee might also be able to take a vote on the nominations later this week as well.

Dr. Chu's nomination comes at a pivotal time in the Department's history. The Department faces the daunting challenges of reducing our dependence on foreign oil and fossil fuels, developing new sources of clean energy, finding ways to capture and store carbon emissions, modernizing our electric grid and developing more efficient energy technologies. At the same time, the Department must fulfill its traditional mission of maintaining our nuclear deterrence, cleaning up the environmental legacy of the cold war, and advancing the frontiers of scientific discovery and technological innovation.

We are very fortunate to have a nominee of Dr. Chu's high caliber to take on these responsibilities. He will bring to the job the

keen scientific mind of a physicist and Nobel laureate, the experience and understanding of the Department of Energy of a National Laboratory Director, and the insight and vision needed to forge an energy policy for the 21st century.

President-elect Obama has made an excellent choice in nominating Dr. Chu to be the Secretary of Energy. I strongly support his nomination, as I have said. I hope the committee will approve this nomination later this week and that the full Senate will confirm him for this position next Tuesday.

Let me call on Senator Murkowski to make any statement she would like to at this point.

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

Senator MURKOWSKI. Thank you, Mr. Chairman.

Dr. Chu, welcome. Good morning and thank you for your willingness to serve in this capacity this morning.

I would just like to note, as we begin, that when we think about the role that the Department of Energy plays and their mission to advance the Nation's energy security, whether it is promoting scientific and technological innovation, ensuring the environmental clean-up of the national nuclear weapons complex, the tasks that are before the Department of Energy are clearly not easy tasks.

The astronomer, Carl Sagan, once observed that we live in a society exquisitely dependent on science and technology in which hardly anyone knows anything about science and technology.

Now, that may be true of some people. It certainly is not the case with you, Dr. Chu, a Nobel Prize-winning physicist. I think it is probably fair to say that you are uniquely positioned in your ability to bring with you your background in the science and the technology. As the Director of the Department of Energy's Lawrence Berkeley National Laboratory, Dr. Chu brings a distinguished record of scientific achievement to the position of Energy Secretary.

Dr. Chu, I know that you are keenly aware of the magnitude of the position for which you are being considered. I commend you for agreeing to undertake the challenge. I appreciate the opportunity that we had to discuss a few of the issues that you will be facing when we met last week, and I look forward to your comments this morning as you elaborate even further.

The Senators that join this committee do so because of the importance of these issues to their constituents, as well as to the Nation as a whole. I encourage you to be mindful of our intense interest in the decisions that you will be making. I look for your commitment, if confirmed, which I fully expect will happen here, to work closely with each of us as you consider and develop the Department's energy policies.

Again, I thank you for your willingness to serve the President-elect and our country, and I do look forward to your comments this morning. Thank you.

The CHAIRMAN. Thank you, Senator Murkowski.

I note one of our colleagues is here. Obviously, Dr. Chu is a constituent of Senator Feinstein, and I believe she is here to make a short statement to the committee, and we welcome her. Go right ahead.

STATEMENT OF HON. DIANNE FEINSTEIN, U.S. SENATOR FROM CALIFORNIA

Senator FEINSTEIN. Thank you very much, Mr. Chairman, Senator Murkowski, members of the committee. Not only is Dr. Chu a constituent, but in the interest of full disclosure, both he and his wife Jean are friends. So this is very easy for me, and I am delighted to be able to introduce him to you at this time.

Simply stated, in my opinion, there is no one brighter or better equipped than this man to become Secretary of Energy. Dr. Chu is persistent, persuasive, and passionate about science. I think you will find that his determination is infectious. He also has the power to inspire action and produce change. He is certain to marshal the enthusiasm and the leadership of the Department when he takes the helm at the Energy Department.

Dr. Chu received a Ph.D. in physics from the University of California at Berkeley. He spent the bulk of his academic career at Stanford University and the University of California where he heads the pioneering Lawrence Berkeley Lab. At both schools, Dr. Chu is considered one of the great, brilliant thinkers of his generation, and his contributions to the field of science are internationally renowned. As Senator Murkowski stated, in 1997 his research was recognized with the Nobel Prize in physics I believe for using a laser to be better able to gauge the size of atoms. He will correct me if that is inaccurate.

In 2004, the Lawrence Berkeley National Lab recruited him to run the lab. His directorship has been nothing short of revolutionary. Dr. Chu has initiated and encouraged brainstorming sessions across scientific disciplines. He convinced great scientists from biotechnology, pharmaceuticals, and nanotechnology to switch specialties and work together to address our Nation's energy challenges.

When Dr. Chu first arrived, the lab did not push the scientific envelope of renewable energy technology. Today that has all changed. Dr. Chu has called global warming and the need for carbon-neutral renewables "the greatest challenge facing science" and has rallied his team of scientists to address it.

This collaboration has created cutting-edge ideas which he then fought to fund. He helped secure a $500 million BP, British Petroleum, grant for a biosciences institute and successfully established one of the Department of Energy's joint bioenergy institutes.

His efforts have yielded great results. At the Bioenergy Research Center, our best scientists are working to crack the mystery behind how enzymes in termites turn wood into energy. Lawrence Berkeley researchers have developed a new battery technology that holds 10 times the amount of electricity of existing batteries, and the lab's scientists are exploring and might be able to bring to reality the idea of artificial photosynthesis.

There is no doubt that we need a scientist of Dr. Chu's caliber at the Department of Energy.

But let me just mention one other pressing issue Dr. Chu will face at the Energy Department and that is nuclear policy. The cold war is over, but there remain thousands of dangerous missiles in the world's arsenals, most maintained by the United States and Russia. Most are targeted at cities and are far more powerful than

the bombs that destroyed Hiroshima and Nagasaki. Today the threat is even more complex as more nations pursue nuclear ambitions and the world becomes less secure.

The Obama Administration, under Steve Chu's leadership at the Energy Department, has the opportunity to develop a new bipartisan policy that will determine the role nuclear weapons will play in our Nation's security strategy and the size of the future stockpile. By law, President-elect Obama must set forth his views on nuclear weapons and U.S. national security strategy in his Nuclear Posture Review by 2010.

I hope that the Administration will move the United States closer to the dream of one of the predecessors, Ronald Reagan, who in his second inaugural declared: "We seek the total elimination 1 day of nuclear weapons from the face of the earth." I think Dr. Chu, a physicist who understands nuclear technology far better than I, will bring a valuable perspective to our efforts to reduce the nuclear threat. So I look forward to working with him.

It is just a delight to introduce him to you, Mr. Chairman. I know my colleague, Senator Boxer, is here. California is worse off for his loss and the Energy Department is much better off. So thank you very much.

The CHAIRMAN. Thank you very much.

Senator Boxer, did you have a statement for the committee?

STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM CALIFORNIA

Senator BOXER. I do. I would ask unanimous consent that the entire statement be included in the record.

The CHAIRMAN. It will be included.

Senator BOXER. I will make it shorter than the written statement.

Senator Bingaman and Senator Murkowski, my friend and colleague, Senator Feinstein, and all my friends on this committee on both sides of the aisle, I am very proud and pleased to be here to introduce such an accomplished choice for Energy Secretary, Dr. Steven Chu.

The reason I was late in getting here is I am sitting in Foreign Relations where Senator Clinton is about to speak. So forgive me if I jump up and run back, but we all have those conflicts today. It is an exciting day all over the Hill.

Today's nomination hearing is one of the many steps our country will take as we move in a new direction to secure our Nation's energy independence and tackle the enormous challenges of global warming. I believe the United States must be a world leader in developing new renewable and alternative energy technologies to protect our environment, to protect the health of our people, but even more important, to be a leader in the world. We do need a leader at the Department of Energy with a vision for moving our economy and our environment forward in these difficult times, and I think President-elect Obama has found that leader in Dr. Chu.

Thomas Friedman put it concisely in his most recent book, Hot, Flat and Crowded. I commend that book to all of you. He said—and I quote him—"the ability to develop clean power and energy efficient technologies is going to become the defining measure of a

country's economic standing, environmental health, energy security, and national security over the next 50 years."

The nominee before us today has made it clear he understands this. Dr. Chu is uniquely qualified to be Secretary of the Department of Energy with experience in the public, private, and academic sectors. A Nobel laureate physicist and a professor of physics and molecular and cell biology at UC-Berkeley, Dr. Chu has been on the forefront of research and development, winning the Nobel Prize in 1997 for work on the development of methods to cool and trap atoms with laser light.

Dr. Chu has served as Director of the Lawrence Berkeley National Lab since 2004, giving him direct knowledge and insight into the valuable work carried out at our national labs and work that this committee oversees. Dr. Chu developed innovative projects such as Helios, Lawrence Berkeley National Lab's solar initiative to create transportation fuels from water and carbon dioxide.

Dr. Chu earned undergraduate degrees in mathematics and physics from the University of Rochester, a Ph.D. in physics from the University of California at Berkeley, a postdoctoral fellow at UC-Berkeley before joining AT&T's Bell Labs. He has been awarded 10 honorary degrees, published 220 scientific papers, been awarded numerous awards, including the American Physical Society's Arthur Chalow Prize for laser science and a Guggenheim fellowship. He has served on numerous boards, including the Hewlett Foundation, the Executive Committee of the National Academy's Board on Physics and Astronomy. Dr. Chu has also served as an advisor to the directors of the National Institutes of Health and the National Nuclear Security Administration.

Mr. Chairman, I think all of us who have worked here for a long time have heard it so often stated that science must lead us. Science is the key. We have our man in Dr. Chu. When we demand good science, up-to-date science, we can trust that he knows it. I am so proud to be here with my colleague, Senator Feinstein, to introduce an extraordinary nominee from my home State of California, and I so look forward to supporting his confirmation before the full Senate.

Thank you, Mr. Chairman, and Ranking Member Murkowski, and thank you all.

The CHAIRMAN. Thank you for your statement. I thank both of you. I know that you do have other hearings you need to go to, and please feel free to excuse yourselves as appropriate.

The rules of the committee, which apply to all nominees, require that nominees be sworn in connection with their testimony. Dr. Chu, I would ask that you stand and raise your right hand.

Do you solemnly swear that the testimony you are about to give to the Senate Committee on Energy and Natural Resources shall be the truth, the whole truth, and nothing but the truth?

Mr. CHU. I do.

The CHAIRMAN. You may be seated.

Before you begin your statement, I will ask three questions that we address to each nominee before this committee. The first is this. Will you be available to appear before this committee and other congressional committees to represent departmental positions and respond to issues of concern to the Congress?

Mr. CHU. I will.

The CHAIRMAN. The second question is, are you aware of any personal holdings, investments, or interests that could constitute a conflict of interest or create the appearance of such a conflict should you be confirmed and assume the office to which you have been nominated by the President?

Mr. CHU. All of my personal assets have been reviewed by myself and the appropriate counselors with regard to conflicts of interest, and I have taken appropriate action to avoid any conflicts.

The CHAIRMAN. Thank you.

The third question is, are you involved or do you have any assets that are held in a blind trust?

Mr. CHU. No.

The CHAIRMAN. At this point, it is customary for us to invite the nominee to introduce any family members who are present. If you would like to do that, please go right ahead.

Mr. CHU. Thank you. Mr. Chairman, I would like to introduce two family members with me today. Joining me is my wife, Jean Chu, wherever she is, to whom I owe so much. She has been my steadfast partner, a highly valued counselor, and a great source of strength. Also joining us is my brother, Morgan Chu, who has traveled from Los Angeles for this event.

The CHAIRMAN. We welcome both of them.

At this point, why do you not go ahead and make your opening statement, Dr. Chu, and then we will undoubtedly have questions.

TESTIMONY OF STEVEN CHU, SECRETARY OF ENERGY-DESIGNATE

Mr. CHU. Thank you, Mr. Chairman.

Chairman Bingaman, Ranking Member Murkowski, members of the committee, thank you for the opportunity to appear before you today. I would also like to thank Senator Feinstein and Senator Boxer for that gracious introduction.

I am deeply honored that President-elect Obama has selected me to serve as his Energy Secretary and I thank him for his support and confidence.

Mr. Chairman, this committee knows well the challenges we face. Climate change is a growing and pressing problem. It is now clear that if we continue on our current path, we run the risk of dramatic, disruptive changes to our climate in the lifetimes of our children and our grandchildren. At the same time, we face immediate threats to our economy and our national security that stem from our dependence on oil. Last year's rapid rise in oil and gasoline prices not only contributed to the recession we are now experiencing, but it also put a huge strain on the budgets of families all across America. Although prices are now lower, we know that the economy remains vulnerable to future price swings. We must make a greater, more committed path toward energy security through a comprehensive energy plan.

President-elect Obama recognizes that we must take sustained action to meet these challenges and he has put forward a comprehensive long-term plan to do so. It is an aggressive plan, but one which I believe is achievable. I would not have accepted the President-elect's nomination if I had not thought it was essential

that we move ahead on this plan. In many ways, President Obama's plan builds on the good work of this committee in recent years. Elements of this plan include a greater commitment to wind, solar, geothermal, and other renewable energy sources; aggressive efforts to increase energy efficiency of our appliances and buildings; more efficient cars and trucks and a push to develop plug-in hybrids; greater investment in technology to capture and store carbon emissions from coal-fired power plants; a continued commitment to nuclear power and a long-term plan for waste disposal; responsible development of domestic oil and natural gas; increased commitment to research and development of new energy technologies; a smarter, more robust transmission and distribution system; and a cap and trade system to reduce our greenhouse gas emissions.

Taken together, these elements of President-elect Obama's plan will put us on a course to a better energy and environmental future, create new jobs and industries, restore U.S. energy technology leadership, and help form the foundation of our future economic prosperity. It will be my primary goal as Secretary to make the Department of Energy the leader in these critical efforts.

In pursuing this goal, I will use my experience as Director of Lawrence Berkeley National Laboratory. As head of this 4,000-person organization for the last 4 and a half years, I have worked to focus the lab on our energy problems. In particular, we have challenged some of the best scientists at the Berkeley Lab to turn their attention to the energy and climate change problem and to bridge the gap between the science that the Office of Science supports so well and the applied research that leads to energy innovation. We have also worked to partner with academia and industry. These efforts are working and I want to extend this approach throughout the DOE's network of national laboratories where 30,000 scientists and engineers are at work performing cutting-edge research.

At the same time, I recognize the Department of Energy's mission is extremely broad and has many additional priorities that will command my attention.

The work of the National Nuclear Security Administration in maintaining our Nation's nuclear defense and promoting nonproliferation throughout the world is critical for our national security. I take this responsibility extremely seriously, and I am committed to work with the President, the national laboratories, other agencies, Congress, and other organizations in the community to assure a safe and reliable nuclear stockpile and to address proliferation concerns as part of a long-term vision of a world without nuclear weapons.

The Department also has legal and moral obligations to clean up the waste left from over 50 years of nuclear weapons production. I know that many of you represent States where the Department has not yet fulfilled these obligations. Cleanup of these materials is a complicated, expensive, and a long-term process, but I pledge to you I will do my best to accelerate these efforts in order to protect human health and the environment and to return contaminated lands to beneficial use.

I also pledge to continue the important work of the Department in many other areas, including the Power Marketing Administration's delivery of affordable energy, the modernization of the elec-

tricity grid, and the assembly of reliable energy data by the Energy Information Administration.

Finally, I am a proud member of the committee that produced the report, Rising Above the Gathering Storm, commissioned by Chairman Bingaman and Senator Alexander. The overarching message of that report is simple: the key to America's prosperity in the 21st century lies in our ability to develop our Nation's intellectual capital, particularly in science and technology. As the largest supporter of the physical sciences in America, the Department of Energy plays an essential role in the training, development, and employment of our current and future core of scientists and engineers. If confirmed, I pledge to nurture this incredible asset that is so essential for our economic prosperity.

As diverse as these missions and programs are, my efforts as Secretary will be unified by a common goal: improving management and program implementation. Simply put, if the Department is to meet the challenges ahead, it will have to run more efficiently and effectively. One of my first priorities will be to put together a strong leadership and management team, one that shares not only my vision for the Department, but also my commitment to improving the way the Department does business.

I do not underestimate the difficulty of meeting these challenges. But I remain optimistic that we can meet them. I believe in the vitality of our country and our economy, and as a scientist, I am ever-optimistic about our ability to expand the boundaries of what is possible.

If I am confirmed as Secretary of Energy, I commit to you that I will provide strong, focused, energetic leadership. In particular, I look forward to a close partnership with this committee. In my role as Secretary, I look forward to a new chapter of collaboration with this committee and with others in Congress as we embark upon an ambitious mission to address our Nation's goals toward a sustainable, economically prosperous, and secure energy future. The challenges we face will require bipartisan cooperation and sustained effort. I know that President-elect Obama is committed to exactly this kind of effort. If confirmed as Secretary, I will do my utmost to serve him and our great Nation to the best of my abilities.

Thank you, and I would be happy to take any questions you may have.

[The prepared statement of Mr. Chu follows:]

PREPARED STATEMENT OF STEVEN CHU, SECRETARY OF ENERGY-DESIGNATE

Chairman Bingaman, Ranking Member Murkowski and members of the Committee, thank you for the opportunity to appear before you today. I am deeply honored that President-elect Obama has asked me to serve as his Secretary of Energy and I thank him for his support and confidence.

Mr. Chairman, this committee knows well the challenges that we face. Climate change is a growing and pressing problem. It is now clear that if we continue on our current path, we run the risk of dramatic, disruptive changes to our climate system in the lifetimes of our children and grandchildren. At the same time, we face immediate threats to our economy and our national security that stem from our dependence on oil. Last year's rapid spike in oil and gasoline prices not only contributed to the recession we are now experiencing, it also put a huge strain on the budgets of families all across America. Although prices are now lower, providing some relief to American consumers, we know that our economy remains vulnerable to future price swings. We must make a greater, more committed push towards energy independence and with it a more secure energy system.

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Taken together, these elements of President-elect Obama's plan will put us on a course to a better energy and environmental future, create new jobs and industries, restore U.S. energy technology leadership, and help form the foundation for future economic prosperity. It will be my primary goal as Secretary to make the Department of Energy a leader in these critical efforts.

In pursuing this goal, I will be building on my work as the Director of the Lawrence Berkeley National Lab. As Director of this 4,000-person organization for the last four years, I have worked to focus the lab on our energy problems. In particular, I have challenged some of the best scientists at the Berkeley lab to turn their attention to the energy and climate change problem and to bridge the gap between the mission-oriented science that the Office of Science does so well and the applied research the leads to energy innovation. I have also worked to partner with academia and industry. I know that these efforts are working, and I want to extend this approach to an even greater extent throughout the Department's network of National Laboratories where 30,000 scientists and engineers are at work performing cutting-edge research.

At the same time, I recognize that the Department of Energy's mission is extremely broad. For that reasons, many additional priorities will command my attention and focus.

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I also pledge to continue the important work of the Department in many other areas—the Power Marketing Administrations delivering affordable energy, programs to modernize the electricity grid, the Energy Information Administration's energy market data, and many others.

Finally, I was proud to be a member of the committee that produced the report "Rising Above the Gathering Storm," commissioned by Chairman Bingaman and Senator Alexander. The over-arching message of that report is simple: the key to America's prosperity in the 21st century lies in our ability to nurture and grow our nation's intellectual capital, particularly in science and technology. As the largest supporter of the physical sciences in the U.S., the Department of Energy plays an essential role in the training, development and employment of our current and future corps of scientists and engineers.

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I do not underestimate the difficulty of meeting these challenges. But I remain optimistic that we can meet them. I believe in the dynamism of our country and

our economy. And as a scientist, I am ever-optimistic about our ability to expand the boundaries of what is possible.

If I am confirmed as Secretary of Energy I commit to you that I will provide strong, focused, energetic leadership for the many missions of this Department. In particular, I look forward to a close partnership with this Committee. In my role as Secretary, I look forward to a new chapter of collaboration with this committee and others in Congress as we embark on an ambitious, and urgent, mission to move to a sustainable, economically prosperous, and secure energy future. The challenges we face will require bipartisan cooperation and sustained effort. I know that President-elect Obama is committed to exactly this kind of effort. If confirmed as Secretary, I will do my utmost to serve him and our great nation to the best of my abilities.

Thank you and I would be happy to take any questions that you may have.

The CHAIRMAN. Thank you for your statement. Let me start with a couple of questions, and I am sure other members will also have questions.

One of the issues, of course, that we are focused on is the development of this massive economic recovery bill, or stimulus bill, or whatever the phrase is you want to apply to it. The expectation that I think all of us have is that it will contain literally tens of billions of dollars for energy infrastructure development, for efficiency improvements, for weatherization, for research and development, for demonstration programs aimed at stimulating the economy but also solving our long-term energy problems.

There has been a lot of frustration here in our committee and more generally I think about the length of time it has taken to implement some of what we have previously enacted. I am particularly thinking about title 17 of the 2005 energy bill which called for establishment of a loan guarantee program. We still have no loan guarantees that have been made under that.

I guess my question to you is whether you are confident that the Department will be able to implement all of the new responsibilities that are contemplated in this economic recovery bill for the Department and do so in a rapid and responsible way.

Mr. CHU. Senator, thank you for the question. I share your concerns. As I said in my opening remarks, during my tenure as Director of the Lawrence Berkeley National Lab, although most people view me as a scientist, I spent probably three-quarters of my time paying attention to the operations side of the house. Economic stimulus really means that one has to move quite fast. It is very important that I and the management team that I hope to assemble can actually move very rapidly in this direction.

The CHAIRMAN. We wish you well in that regard.

Let me also ask you about the new organizational charts that we read about being established in the executive branch. There was a period, as you are well aware, when there was very little interest in the general public and perhaps in Government as well on the whole subject of energy, and I am sure during those periods there was very little desire on the part of others in the Government to weigh in on energy-related issues. Now my impression is that just the opposite is the case, and there is a great deal of interest on all sides. That is good.

I know the President-elect has established or indicated his desire to establish a White House coordinator for energy policy, that some refer to as a czar. I wanted to know your take on how does this affect your role and how do you see your role in the issue of climate

change, which you referred to, as it relates to others in the Administration. Will you be able to be a strong voice and policymaker on that issue as well as energy issues as you see it?

Mr. CHU. Senator, again you raise an important issue. I think the President-elect, choosing to start this office of energy and climate change as a coordinating body it speaks to the importance he views this area. Just as the country has a Council on Economic Policy, a Council on Nuclear Policy, this is one move that shows the country's energy and climate change future is a very important issue.

So I am looking forward very much to working very closely with Ms. Browner on this issue. She has a difficult task ahead of her in trying to coordinate people not only in the Department of Energy but many other stakeholders such as the Department of the Interior, EPA, the Treasury, and so on. I am very hopeful and looking forward to working with her. I have so far had very positive encounters, and I think it will be a collaborative and closely cooperative relationship.

The CHAIRMAN. Thank you very much.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

Dr. Chu, thank you for your comments this morning. I particularly appreciate the words about the importance of education and making sure that we are growing our scientists and those that will enable us to move this technology forward.

I also think that within the Department of Energy, one of the challenges that we face is how we educate the rest of the country on what it is that we need to be doing, educating them more on how as individuals and as families they can make a difference with conservation and efficiency within their own home. So the education piece is important, and I hope you appreciate that that is a big challenge within the Department itself.

I want to ask you specifically on a couple of issues. First is domestic oil and gas production. Last year in July, the President removed the Presidential moratorium that had prevented development on the Outer Continental Shelf, and then Congress let a similar ban expire at the end of the year. I know that your comments say that we must focus on conservation. I agree. I agree that we also need to be moving forward with renewable energy sources, but I also feel very strongly that we have to enhance our domestic oil and gas production.

Will you join us in opposing reinstatement of either ban and encouraging greater production of our domestic resources both onshore and offshore?

Mr. CHU. The President-elect has said that looking at oil production and gas production both onshore and offshore as part of a comprehensive energy policy is something that he supports, and I also support that.

But I should also say, Senator, as you well know, that the reserves of the United States are perhaps 3 percent of the world's reserves. I know the numbers from 2005. Something like 5 percent of the world's production of oil comes from the United States. So while it is important to fold into this the continued development of our oil and gas resources, one also should recognize those numbers.

As you and I both agree, the more efficient use of energy in the United States is the one big factor that can most help us decrease our dependency on foreign oil.

Senator MURKOWSKI. We certainly agree on that, but I think we also both agree, as you have said—that energy security should be our key issue here. I just came also from the Foreign Relations confirmation hearing of Secretary Clinton where, again, even upstairs in Foreign Relations, the focus is on energy security and how that melds with national security.

Let me ask you about nuclear energy. You have indicated in your statements and in our conversations that you support continued nuclear development. I think we recognize, as we want to move toward a world where we have greatly reduced our emissions, that nuclear is a very key component in our energy package there.

The Nuclear Waste Policy Act requires that in exchange for a $1 million per kilowatt hour fee on nuclear power, the DOE has an unconditional obligation to take and dispose of that nuclear waste. That was beginning back in 1998. Obviously, they are about 10 years late. The projected taxpayer liability for DOE's failure is $11 billion at this point and growing.

With regard to Yucca Mountain, I understand that the President-elect Obama has said he opposes its opening. If confirmed, what do you propose to do in the short term to meet the Government's obligation as it relates to the nuclear waste issue? Also, if you could speak just a little bit about the option of nuclear fuel recycling.

Mr. CHU. Thank you, Senator. I think these are very thorny questions, as you know. The President-elect has stated his position very clearly. On the other hand, the Department of Energy has an obligation, a legal obligation, to safely provide a plan that allows the safe disposal of this nuclear waste. Indeed, I am supportive of the fact that the nuclear industry should have to be part of our energy mix in this century. So in going forward with that, we do need a plan on how to dispose of that waste safely over a long period of time.

There is a lot of new science that is coming to the fore, and I pledge as Secretary of Energy that I would work with the members of this committee to try to use the best possible scientific analysis to try to figure out a way that we can go forward on the nuclear waste disposal. So it will occupy certainly a significant part of my time and energy.

Senator MURKOWSKI. Can recycling be a part of that solution?

Mr. CHU. Yes. Again, in the long term, recycling can be a part of that solution. Right now, even though France has been recycling and Japan is starting to recycle; and Great Britain is now beginning to look at this, I think from my limited knowledge about that, that the processes we have are not ideal.

There is an urge to increase the proliferation resistance of recycling. This dates back to the days of the Carter Administration where he said the United States will go to once through recycling in order to decrease the chance of nuclear proliferation. Now we are in a different place in time. There are other countries doing recycling. So the idea here now is to do it in a way that makes it more proliferation-resistant and there is an economic feasibility issue.

This is in my mind actually a research problem at the moment and something that the Department should be paying a lot of attention to. I think there is time to look at it and develop a means, but certainly recycling is an option that we will be looking at very closely.

Senator MURKOWSKI. Mr. Chairman, my time has expired.

The CHAIRMAN. Senator Johnson.

Senator JOHNSON. Welcome, Dr. Chu. As you know, the Lawrence Berkeley National Laboratory is named after a South Dakotan, Ernest Orlando Lawrence. He was not only a South Dakotan, but he was an undergraduate at the University of South Dakota. That is as an aside.

What do you believe are the most important policies in accelerating the construction of high voltage electrical transmission lines and for connecting new renewable energy projects to the grid?

Mr. CHU. Senator, you hit upon a very crucial element in our development of renewable resources because, as you know and many Senators in this room know, some of the greatest renewable energy resources lie in areas like the Dakotas; and great solar resources in the southwest of the United States which are far from population centers and the energy has to be transported to where there are more people. So the challenges are how do we construct these very expensive lines across State boundaries, sometimes through States that have not much to gain, quite frankly, from them to population centers that would benefit from these renewable energies.

So one really has to look perhaps at a new way of doing business. My understanding is currently the area that pays the brunt of this cost, if not exclusively the cost of these transmission lines, is the point of origin of power generation. I think we might have to relook at that and see what else can be done. The development of renewable energy in the United States is a national concern, and so we have to really think nationally about that.

So to answer specifically your question, there are two obstacles. The siting is one, and it is a complicated interaction between the Federal Government, State and local authorities, and the people whose back yards these transmission lines go through. So this is something that is critically important to how do you site these in a way that takes into consideration the local feelings but yet also recognizes the national need. So this is by far and away the biggest obstacle. Mostly we have the technologies, and it is really siting that I see as the biggest obstacle.

Senator JOHNSON. If the United States is going to produce 36 billion gallons of biofuel by 2022, what policies do you think need to be in place to make sure we get there? Would these policies include moving toward a higher level of blends of ethanol such as E–15 or E–20?

Mr. CHU. In answer to your question, Senator, this is partly a technical question as to whether this can be done, without major redesign, automobile manufacturers' engines. My understanding is when you go up to E–10, 10 percent ethanol, this is all right. You can replace the fuel lines to make them resistant to this ethanol blend. You can go to E–85, which is 85 percent ethanol, and that works. I frankly do not know, and this is one of the things we have to look at, in conjunction with the automobile industry, as to

whether one can safely go to E–15, E–20, and higher. But this is something again that is on the table.

Senator JOHNSON. Dr. Chu, I know you are aware of plans for a large scientific project being developed in the State of South Dakota known as the deep underground and engineering laboratory. Operation of this facility would ultimately require a great deal of collaboration between NSF and DOE, which you seek to lead.

Could you comment on the prospects for this kind of interagency scientific collaboration both with respect to this particular project and, more importantly, with respect to pursuit of DOE's overall mission?

Mr. CHU. Thank you for that question, Senator. You may or may not know I actually visited the DUSEL underground laboratory. I met with the Governor, and it is a very exciting project. As you said, it is headed by the National Science Foundation, but a member of the Berkeley Lab and an adjunct faculty member at UC-Berkeley is actually managing that project.

Now, going forward—and this has to do with conflict of interest—I am going to have to remove myself personally from any decisions with respect to that project because the Lawrence Berkeley National Laboratory is deeply involved with that.

But with regard to the cooperation of the Department of Energy, I think this is very important. My understanding is this is heavily, squarely in the sights of the Department of Energy in terms of what they plan to do with their high energy physics accelerator in Illinois, the Ferme Lab, to send a beam of neutrinos to the underground laboratory at DUSEL. So the cooperation between the NSF and the DOE is essential, and I am optimistic that that will not be a problem, but we'll see.

Senator JOHNSON. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Senator Burr.

Senator BURR. Dr. Chu, welcome. Thank you for the time you and I have spent together. I agree with the chairman. I hope we can expeditiously take care of your nomination out of this committee and on the Senate floor.

Let me follow up on Senator Johnson's question as it related to transmission. Do you support allowing FERC to have expanded authority as it relates to transmission?

Mr. CHU. That is a very pointed question, Senator. Let us just say that I know the bottlenecks, and there has been a lot of frustration. What little I know about this is that the Department of Energy has authority to designate critical corridors and FERC to actually enforce that as essentially a right-of-way. There are two designated corridors, one in the New Jersey area and one in California-Arizona, and we're now mired in what I believe are lawsuits.

So it is a difficult question because what you really want to do is to make these things happen as quickly as possible. So it has to be a negotiation, quite frankly, in my opinion. If one just expands the authority and gives it more power, my feeling is the States and the local people in those States might react. So one wants to try a gentler approach, but in the end I think, again, it is in the national interest to develop a national grid system that can port energy, especially renewable energy, across the country.

Senator BURR. I think we both share the common goal as to where we need to get to, and I look forward to working with you on how we accomplish that national grid that is sufficient for the future.

In 2005, we passed EPAct, and that Energy Policy Act incorporated a loan guarantee program for companies willing to step out and build new nuclear generation. It was authorized at $18.5 billion, not sufficient for the future, but a good start.

Just recently Progress Energy in North Carolina announced two new plants in Florida that they would construct, and they made the statement that they think that they will seek to do these without DOE loan guarantees because they had run into too many hurdles with the program. One, it has been slow to get up and running and structurally in place. Now, all of a sudden, we are hearing companies that talk about it is problematic to go that route. We are on a time line that from a reliability standpoint, we have to start construction and we have to do it soon.

Do you support the loan guarantee program, No. 1?

Mr. CHU. Senator, yes, I do.

Senator BURR. If confirmed, do you commit to expanding the authorization levels?

Mr. CHU. I think that is a matter for Congress.

Senator BURR. Seeking to expand.

Mr. CHU. I think it is something that is very important, as I said before, the development of nuclear power. But the little I know of what these companies are doing, it is a mixture of the loan guarantee program and the local regulatory authorities that can allow the utility companies to fold whatever they want to do into the rate base.

The point here is that nuclear power, as I said before, is going to be an important part of our energy mix. It is 20 percent of our electricity generation today, but it is 70 percent of the carbon-free portion of electricity today. It is baseload. So I think it is important that we push ahead.

I share—what little I know again—your frustrations with the time it has taken, and I will do my best to, as I said before, put together a leadership and management team that can do it in a more timely manner.

Senator BURR. Do I have your commitment that you will work to make this a more workable program?

Mr. CHU. You absolutely do.

Senator BURR. Thank you, Doctor.

Last question. Do you feel that a formal international R&D effort should be pursued on items like battery technology, all-electric platforms, waste reprocessing? Or should we pursue this as the United States of America, though there is a need globally for that technology?

Mr. CHU. Let me answer that, Senator, by saying what we, the United States, and the world need to do is to get to the place where we want to go as rapidly as possible. In many of these instances, I do believe that international cooperation is the best way to get there. So the short answer is yes.

Senator BURR. Thank you, Dr. Chu.

The CHAIRMAN. Senator Dorgan.

Senator DORGAN. Mr. Chairman, thank you very much.

Mr. Chu, I am excited by your nomination, and I am pleased that you are here today.

You and I have had an opportunity to visit several times, and I will be chairing the Energy and Water Appropriations Subcommittee, which funds your agency. I will have the opportunity to call you as a witness before my subcommittee, and we will talk at greater length about a wider range of issues.

But I am interested in virtually everything that has been talked about here. I am interested in the drilling issues, renewables, energy efficiency, coal, transmission, and Yucca Mountain. There is a lot to talk about, and you see the wide interests of the Senate Energy Committee.

I think this is an important time where urgent action needs to be taken on some energy issues. So I am pleased that you are a nominee, and I am happy to vote for you.

I do want to say that while I am a strong supporter of renewables, wind, solar, biofuels, and many others, I believe very strongly in energy efficiency. We need to work hard on this. The efficiency issues are critically important. All of those are important.

I want to talk to you today just for a few moments about fossil energy, especially coal. You and I have talked at some length about the issue of coal because 50 percent of all the electricity that we use in this country comes from coal. All of us understand we have to use coal differently in the future, but I think most of us understand we are going to change how we use coal in the future. I do not think anybody believes that beginning next month, next year, or the next decade we are going to decide we are not going to use our most abundant resource. The question is how do we use it. What kind of investment in technology and capability can we make that allows us to use coal in a way that does not injure this environment?

So I have a couple of questions mixed together. No. 1, what is your notion about promoting and developing clean coal technologies? How strongly do you feel about that, about continuing to invest in carbon capture and sequestration research?

As you give me your assessment of your interest in those issues, I want you for the committee, because you have done it for me—and I am perfectly well satisfied. A number of people have noted the statement you made that coal is your worst nightmare. I understand the context in which you made it. If we continue to use coal around the world and in this country and China and India with no controls, that is a scenario that I would describe as a nightmare as well. But we are not going to continue that way. So you said what you said and that has been ricocheting around the Internet. Please address that for the committee as well, as you talk about carbon capture and so on.

Mr. CHU. Senator Dorgan, thank you for giving me the opportunity to expand on that quote that has been ricocheting around the Internet.

I said that in the following context. If the world continues to use coal the way we are using it today—and by the world I mean in particular not only the United States but China and India and Russia—then it is a pretty bad dream. That is to say, in China, for

example, they have not yet begun to even trap the sulfur dioxide and nitrous oxide. There is mercury. There is particulate matter, as well as carbon dioxide.

But I also say many times in my talks that coal is an abundant resource in the world. Two-thirds of the known coal reserves in the world lie in only four countries, the United States first and foremost, followed by India, China, and Russia. India, China, Russia, and the United States I believe will not turn their back on coal. So it is imperative that we figure out a way to use coal as cleanly as possible.

So for that reason I am optimistic we will develop those technologies to capture a large fraction of the carbon dioxide that is emitted in coal plants and safely sequester them. So if confirmed as Secretary of Energy, I will work very hard to extensively develop these technologies so that the United States and the rest of the world can use them.

I also think there are some people in the United States who feel perhaps we should turn off coal, but even if we do it, China and India will not. So we are in a position to develop those technologies so that the world can capture the carbon. So I feel very strongly, as you know in my communications to you before the nomination, well before the nomination, that I feel very strongly that this is not only an opportunity, it is something the United States, with its great technical leadership, should rise to the occasion to develop.

Senator DORGAN. I think that is helpful to the committee. The fact is I think most of us believe we have to do almost everything well. I mean, there is almost no source of energy that we should not be embracing and deciding through research, technology and additional capability that we can use it to enhance this country's energy future.

One of my great concerns, I might just say in closing, is that the price of oil went to $147 in day trading like a Roman candle, shot way up, and now has come down. You go to the gas pump today, and the pain is gone for the moment. But that should not in any way diminish our appetite and the urgency to pursue the kinds of things on renewables, on conservation, and also as Senator Murkowski and others have said, more production. We need to produce more, conserve more and go to a different kind of energy future as well. As I indicated with coal and I think as you have indicated also we need to use coal in a different way. In order to do that, we need to put forward a substantial amount of money which President-elect Obama has pledged to do to give us the research capability to unlock these mysteries, and I believe we will. I am optimistic about it.

Dr. Chu, thank you very much. I am excited with your nomination.

Mr. CHU. Thank you.

The CHAIRMAN. Senator Barrasso.

Senator BARRASSO. Thank you very much, Mr. Chairman.

Dr. Chu, congratulations. Welcome. Thank you for having your family with you today. I appreciated the time that you spent with me in the office last week. It was very helpful.

One of the things we talked about is this past summer when energy prices were up. There were significant consequences for Amer-

ican families, for the American consumer, and for American business. In these economic times, a number of the members of the Senate are reading a book called The Forgotten Man about the history of the Great Depression as we compare and look for solutions and we look at a stimulus package.

In one of Franklin Roosevelt's last campaign speeches, when he was running for President, he talks about energy and he talked about suffering by the taxpayer. He says the taxpayers suffer when you pay $6 a month for electricity instead of $2. So he knew and they knew then that there are tradeoffs, and when costs go up and expenses are high, it impacts families all around this country.

It is interesting on this committee because 32 years ago when Jimmy Carter came into the United States, we had had the long gasoline lines. When you look at the history of that, he charged a small group of energy planners, James Schlessinger, to produce a comprehensive energy plan in 90 days, and they had a number of different plans in there. They came with a package to the committee, and at that time, they wanted tax incentives for companies switching from oil and natural gas to coal. They also wanted tax penalties for those companies that did not switch to coal. So I am encouraged by the comments by Senator Dorgan on our need for all of the sources of energy.

Concerns were raised with me when I read an article in one of the Wyoming papers that talked about President-elect Obama. He said America must develop new forms of energy, new ways of using it, to which I agree completely. He went on, however, to say that the dangers of being too heavily dependent on foreign oil are eclipsed—are eclipsed—only by the long-term threat of climate change which, unless we act, will lead to drought, famine, and so on, so that that is eclipsing the concerns we have for our national security, energy security as we look globally.

You have responded to the questions from Senator Dorgan about coal. I have other questions along that line, if I may. One has to do with Vice President-elect Biden's comments where he said during the campaign, no coal plants here in America. I would like to have your comments on that concept and where we really do go from here in terms of carbon capture and sequestration. I know you met with members of the Illinois delegation the other day to talk about the project that they have been looking at in Illinois.

Mr. CHU. So specifically let me just say that, as I said to Senator Dorgan, the coal resources in the United States are immense. I am very hopeful and optimistic that we can figure out a way to use those resources in a clean way. So I think, again, it is a question of science and technology and really putting the pedal to the floor on trying to develop as quickly as possible the capture and sequestration technologies. I am very hopeful that this will occur, and I think that we will be using that great natural resource.

Senator BARRASSO. That goes to the question of how dollars are allocated, how investment decisions are made, and with limited resources in our Nation, do we go ahead along those lines for carbon capture and sequestration knowing that coal right now is the most affordable, available, reliable, and secure source of energy? What would your advice be as you are trying to make careful spending decisions on what to invest in?

Mr. CHU. It is one in which—my advice would be, No. 1—to take your question to a slightly different place, as we go forward and build more power plants, we have good experience in my own State, California, where the conservation of energy, energy efficiency, the offloading of energy at peak time to less demanding times is a great investment of intellectual thinking because what it does is enable power companies to build fewer power plants, whatever they might be, whether they are the coal plants, nuclear plants, whatever. That actually means directly that there is a lower rate to American families because it is a return on investment for those utility companies that invest in these plants.

So the biggest thing we can do—and California has learned this very well—is that you can slow up the building of new power plants, and that is very important. As you slow up the building of new power plants, we in the Department of Energy, if I am confirmed, would be working very hard to bring up these technologies as quickly as possible. So I think it is very important that we do the best we can on energy efficiency. That in my mind really remains the lowest hanging fruit for the next decade or two.

Senator BARRASSO. Thank you, Mr. Chairman. My time has expired. If there is a second round, I would like to have some additional questions. Thank you, Mr. Chairman.

The CHAIRMAN. All right.

Senator Sanders.

Senator SANDERS. Thank you very much, Mr. Chairman.

Dr. Chu, thank you for being in the office the other day, and welcome.

Dr. Chu, this morning we have talked a little bit about nuclear. We have talked about coal and other technologies, but we have not talked about solar. Last year Senator Bingaman was kind enough to host a hearing in Albuquerque, New Mexico on the potential of solar thermal plants. There are some experts who believe that the Southwest of this country is, in fact, the Saudi Arabia for solar energy and that we have the potential to produce 15 to 20 percent of our electricity from these solar plants.

Right now on the drawing boards, there are probably a dozen different plants that are being talked about. Some are pretty far along. They are ready to go. But because of the current crisis in the flow of credit, many of those plants are not moving forward.

My first question, therefore, is would you be willing, as Secretary, to sit down with the solar industry and myself to see the role that the Government can play in expediting the development of solar thermal plants.

Mr. CHU. Senator Sanders, I definitely would be willing to do that. I share your enthusiasm. Ultimately going forward, solar energy is a great resource in the United States, and we need to learn to exploit that.

Senator SANDERS. You see potential in solar thermal plants in particular.

Mr. CHU. I see great potential in solar thermal plants.

Senator SANDERS. Thank you.

States like California and New Jersey have been very innovative through tax credits, through incentives in encouraging people to put photovoltaic units up on their rooftops. Can we learn some-

thing from those States in terms of Federal policy in creating an energy system in which people all over this country are encouraged to have solar panels on their roofs and businesses as well?

Mr. CHU. It would be foolish for me to say that the rest of the United States cannot learn something from California, although the rest of the Senators might think differently. But in any case, I think there are a number of policies in California that have been proven to be very effective. Solar is one of them, the encouragement to put solar panels on rooftops.

But let me go back. They have done wonders in promoting energy efficiency in California. In the last 35 years, the use of electricity per person in California has remained constant while the rest of the United States went up over 50 percent.

Senator SANDERS. Not in the State of Vermont. We have done a very good job in energy efficiency as well.

Let me ask you this question. As you well know, the Federal Government is a major consumer of energy in the military, in all of our buildings, and all of our vehicles. It has seemed to many of us for a very long time that the Federal Government can play an extraordinary leadership role in moving toward energy efficiency and moving toward a variety of sustainable energies.

Can you give us some idea of how buildings and Federal fleets and perhaps your work with the military—how at the end of the first Obama Administration our buildings and fleets will look differently than they are today?

Mr. CHU. Senator, thank you for that opportunity. Let us start with buildings. Buildings consume 40 percent of the energy used in the United States today, roughly half and half between residential and commercial buildings.

The Berkeley Lab has been talking and working with companies like United Technologies. We think that new commercial buildings can be built in a cost-effective way to actually reduce the use of energy in those buildings by 80 percent and with an investment that would pay for itself in 10 years. We are very gung ho on developing these ideas and to prove to the construction community that this is, in fact, not just fluff but it is real.

Senator SANDERS. Very good.

My last question is a simple one. We have many wonderful national laboratories throughout the country. We do not have any in New England and we think we have a lot to offer. Is that something that we might be able to discuss as well?

Mr. CHU. We can certainly discuss it. New England is one of the centers of the great universities in the United States.

Senator SANDERS. Absolutely. Also, given our climate up there, when we talk about energy efficiency and learning more about that and talking about sustainable energy, it would be a good idea to have some laboratory in a climate where the weather gets 20 below 0. Burlington, Vermont, for example.

[Laughter.]

Senator SANDERS. Thank you very much, Doctor.

The CHAIRMAN. Senator Sessions.

Senator SESSIONS. Thank you, Chairman Bingaman, and thank you for your leadership.

Mr. Chu, I would like the opportunity to visit with you as your confirmation goes forward. I have not had that opportunity. I hear good things about you. I think you are on a road to a successful confirmation. Good science, good management is important for America.

For every cabinet agency, in particular, Energy, we have had some frustrations on, I think, both sides of the aisle about some of the programs. You have been asked about the loan program. That really needs to move forward. It is just very frustrating to see it be delayed as it is.

There are so many things I would like to ask you, but let us talk about nuclear power. You have mentioned it as an option, as something that will be part of the mix. I guess my question to you is, if you accept the CO_2 as a global warming problem, is it not important that we accelerate this proven source of clean energy? Will you take a lead not just to talk about it, not just to opine about it, as we often do, but actually do the things necessary to see if we cannot restart a nuclear industry in America? Are you committed to that?

Mr. CHU. Senator, yes, I am. I think, first, to get these first several projects going. In the meantime, we have to do the work necessary to see if recycling in proliferation-resistant and economically viable ways is also feasible. I think those are two areas that are very important.

Senator SESSIONS. Now, recycling is something that I have offered legislation on and I believe is important because not only does it dramatically reduce the quantity of waste, but it actually reduces dramatically its toxicity and its dangerous life cycle to 600 years I think from 100,000 years. Other nations are doing it.

I was a bit troubled that you quoted Carter's decision. I think that was one of the more colossal disasters in the last 30 years in energy.

But certainly as you noted, France recycles. Japan is doing it. The Brits are talking about it. Russia, using basically the technology that we had.

So are you committed to making a breakthrough here? You know, we can study this and study it and, the perfect being the enemy of the good, not get around to starting now to develop a recycling system that we know will work, waiting to have one that is much better. How would you analyze that?

Mr. CHU. Again, I am not an expert in recycling technologies, but from the little I know, it is a technology that—in fact, I believe the technology that France is using, a modified version of that, was invented in the United States.

But as I said before, it is not a perfect technology, and the Brits and the Japanese are also looking to improve this. So this is something, in terms of the question on international cooperation—I think, one, to go forward and try to develop something that we in the United States and the rest of the countries would be happy with is something very important.

Senator SESSIONS. These delays tend to be a depressant on going forward with nuclear power in general, and so we, I think, need to make a decision pretty quickly about whether we would want to support current technology or wait on some new technology.

Mr. CHU. Senator, so there are two questions. One is do we start by restarting the nuclear industry and building some reactors, so-called generation 3 and 3-plus reactors. Plans are underway, as mentioned, to start those.

The recycling issue is something that we do not need a solution for today or even 10 years from today. I think we have to figure out a way to store that spent fuel safely, which is another critical issue in this, and then figure out a plan for long-term disposition.

So having said all of that, it does not mean that you stop everything today. It is very much like coal. We will be building some coal plants, and one does not have a hard moratorium on something like that while we search for a way to capture carbon and store it safely. It is very analogous in my mind.

Senator SESSIONS. Just to conclude, I would thank you for your service. I do believe you have an opportunity to be an important leader for the country and would hope that you would remember the burden on the individual by driving up costs of energy. I believe that had a big impact in our economic slowdown. It is hurting people throughout this country. Lower-cost energy is a good thing.

I would also urge you to consider that the real crisis economically for America is that liquid that we are importing for our vehicles and the crisis economically and on the national security is not on electricity, but really what we can do to reduce our dependence on foreign oil.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Senator Landrieu.

Senator LANDRIEU. Thank you, Dr. Chu. I too enjoyed our visit in the office and look forward to many more. Your confirmation looks like it is moving forward with dispatch. But two comments and then three very brief questions.

I listened with interest to your comments to Senator Murkowski about the known inventory in the United States of oil and gas and just wanted to point out that the emphasis is on the word "known" because we believe, many of us, that there are great resources that have yet to be discovered based on the fact that there has never been a comprehensive technology-driven inventory taken of oil and gas resources.

So one of the things that our chairman has been leading the effort with some degree of success with my support and others has been to push the U.S. Government on behalf of the taxpayers who might be interested to actually know how much oil and gas they have. So with so much off limit in the past and with limited access to just look, I would just urge you to be careful about the comment about 4 percent. It is true. We have 4 percent of the known reserves, but there is great evidence to suggest that there are lots of reserves that are unknown.

No. 2, the importance of developing the right kinds of technology in this country on safe soil and in water where there are high environmental standards can never be underestimated to the world. We do not have pirates in the Gulf of Mexico today. We did. Jean LaFitte, but since he left, I have not heard or read about one since. But there are pirates all over the world, just what happened last week, $3 million having to be parachuted to a tanker to release

men and women who had been held under the gun. Oil and gas industries cannot practice their craft safely in many places in the world.

If we would allow them to practice their craft here on and offshore with high standards and courts that can step in that exist transparently, we would do the world a great service because they do not have to practice in the Niger Delta or in places that have very fragile environments and great consequences to the earth.

So there are two facts I just wanted to leave with you. One, the reserves are not known, and B, the importance of allowing us to practice, if you will, on home turf before the world does things in bad ways that pollute everything and make the matter worse.

My question is to follow up—and I ask this not because it has not been asked 10 times to you this morning, but I think in asking, you will understand how many of us feel about nuclear. You have had at least six or seven questions. Mine is going to be the eighth.

It is just apparent to us, mainly based on the great leadership of Senator Domenici, who is with us, I think, this morning, and others, the importance of getting off the dime on nuclear. So would you just briefly state again what are your No. 1, No. 2, and No. 3 strategies to move us forward on nuclear?

Mr. CHU. The first is to accelerate this loan guarantee program for the several nuclear reactors that are needed to restart the nuclear industry. You have got to be going as you say. I agree with you, Senator.

The other question—and it is a concern of other Senators—is that we need to develop a long-range plan for the safe disposal of the waste. This is something that is the responsibility of the Department of Energy. That has to go forward as well because you have to develop that concurrently with the starting of this industry again.

So those are actually in my mind the two highest priorities.

The third is that there is research that has to be done, again because reprocessing has the potential for greatly reducing both the amount and lifetime of the waste and to extend the nuclear fuel.

Senator LANDRIEU. Can this committee count on you to go to bat in the atmosphere of these troubled financial markets? Can we count on you to go to bat with the Administration to make sure that the energy sector of this country is given priority in terms of stabilizing markets so that we can get a lot of this done with Government, you know, not being done by the Government, but supported by the Government?

Mr. CHU. Yes. It has been said—questioned again and again on the importance, for example, of that $18.5 billion loan guarantee program to start moving in that direction.

Senator LANDRIEU. My time has expired, Mr. Chairman, but I will submit for the record a question about the Department's policy to not include sugar as a base for producing biofuels, that it has been proven to be five to seven times more efficient than corn or wood products or biomass and if you would be willing to change that policy, given Brazil's tremendous success and the potential of so many of our agricultural areas to produce large amounts of sugar. But I will submit that in writing and expect an answer. Thank you very much.

Mr. CHU. Thank you.

The CHAIRMAN. Senator Corker.

Senator CORKER. Mr. Chairman, thank you.

Dr. Chu, thanks for being here. I enjoyed our phone conversation the other day.

I know that the chairman has already asked a question regarding the relationship between you and Mrs. Browner and how that is going to be. I hope that you set things up in an appropriate way. But I do wonder, Mr. Chairman, based on some of the articles that we have read—and certainly it is great to have somebody of Dr. Chu's intelligence running the Energy Department—would it make sense for us to possibly have Ms. Browner in for testimony at some point? You do not have to answer now, but I wonder if that is something that would be helpful for the committee.

The issue of nuclear. I am going to skip down and just be very brief since you have had now nine questions regarding that. I noticed a lot of people say that they support nuclear, but they also mention the waste issue. It is as if once we solve the waste issue, then we can pursue nuclear again. It is my understanding, based on what I have heard here today, you mean pursue nuclear now in spite of some of the issues that we have regarding waste. Is that correct? All out now, loan guarantees. Let us move ahead. We have 104 plants today. We probably need 300. Let us move on.

Mr. CHU. Yes, because I am confident the Department of Energy, perhaps in collaboration with other countries, can get a solution to the nuclear waste problem.

Senator CORKER. Perfect. So you would move ahead while that was being sought.

Mr. CHU. I think certainly we should use the loan guarantees to start these first several plants that we talked about. As you well know, Senator, I think this is a complicated economic decision by the utility companies that will invest in these plants. So it is partly loan guarantee. It is partly the rates that utility companies will allow. But there is certainly a changing mood in the country, because nuclear is carbon-free, that we should look at it with new eyes.

Senator CORKER. I have a number of questions that folks from our lab asked to ask. I will do that separately. I know those are more local in nature, but I certainly plan to ask those.

On climate change, I know that you advocate putting a price on carbon based on things that you have said in the past. Do you advocate doing that through a tax on carbon or through a cap and trade system?

Mr. CHU. Again, this is a position the President-elect has been pretty clear about. It is a cap and trade system for a variety of reasons, and I support that decision.

Senator CORKER. Is that the best decision or is that the politically best decision?

Mr. CHU. You are far more experienced about answering that question.

Senator CORKER. I do not know. You seem pretty good.

[Laughter.]

Mr. CHU. But certainly the simpler the cap and trade system is, the happier I will be.

Senator CORKER. That brings me to the next question. I noticed in 2007 you made some comment that stakeholders want loopholes, and of course, you did not give any editorial response. You said stakeholders want loopholes. We have noticed that stakeholders want lots of loopholes and that cap and trade systems that have been put forth in the past have all kinds of free allocations and domestic offsets and international offsets. At the end of the day, you are not achieving anything other than creating a system that a lot of people can make a lot of money off of but really does not have a lot to do with carbon reduction.

I wonder if you might, with us, give some kind of editorial comments as it relates to loopholes and those kinds of things that make the market less pure.

Mr. CHU. First, let me also go back a little bit and answer another question I did not answer yet or did not fully answer as to why the cap and trade system is something I favor. Countries around the world are in a cap and trade system, and one has to integrate with the rest of the world because the climate change problem is a world problem.

Senator CORKER. I hope we would not integrate much because the European system is not reducing carbon. So hopefully they would integrate toward whatever we ultimately did.

Mr. CHU. But again, philosophically I think—you know, I have not studied these bills that have been advanced in the Senate. But philosophically the simpler the cap and trade system, the clearer it is, I think the better. But I recognize there are stakeholders. So, again, I plead——

Senator CORKER. Stakeholders are usually those that emit carbon.

Anyway, I look forward to having some conversations. I know my time is almost up.

I know some of the folks here have asked you about coal, and obviously, coal is a part of our energy base right now and that is the way it is. Without some huge diminution in our standard of living, it is going to be a part of our base for some time.

I hear lots about carbon capture and sequestration. I am, again, just a junior Senator from Tennessee. I have a hard time sort of imagining this commercial maze of carbon being captured and sequestered and where it goes. It is just hard for me to get my mind around on a commercial base when you look at the amount of carbon that is emitted from coal. We certainly use coal extensively in the State of Tennessee, unfortunately, as has been noted in the press recently.

Do you have any comments about your sense of the real use of carbon capture and sequestration on a real scale that deals with the real issues of carbon from coal?

Mr. CHU. Very quickly, I think from the geophysicists/geologists that I have spoken with it is a possibility, but it is a significant challenge. We are sequestering in the world a few million tons of carbon per year. In the areas that I know about, it is being done safely, but there are many different geological sites that we have to actually test. Again, this is something the Department of Energy has begun to do and has to accelerate the testing to make sure we

can sequester the amounts we need in order to make a significant impact on the carbon emitted.

Senator CORKER. A lot of people think that will happen when donkeys fly, if you will, and I would love to hear any follow-up from you as to what we do with coal in that regard because it is a difficult situation.

Mr. Chairman, thank you for the time and for your leadership. As usual, I look forward to working with you the next 2 years.

The CHAIRMAN. Thank you very much.

Senator Lincoln.

Senator LINCOLN. Thank you, Mr. Chairman, certainly for the opportunity to be here and discuss some really critical issues.

Mr. Chu, welcome to the committee. I certainly enjoyed having the opportunity to visit with you earlier, last week I suppose, and am excited about the opportunities that lie before us all in terms of lessening our dependence on foreign oil, creating a greater environment for the future of our country and certainly for our children. I think you have got great opportunities to lead us in that endeavor. So we hope to be able to work through some of our questions.

I guess one of the ones I would like to start with—I know that you have heard from me an awful lot in terms of the rural aspect of my State. But what maybe perhaps are your visions for creating jobs in rural States like mine and communities through energy policy reforms, in stimulus, and also in other energy-related legislation?

Mr. CHU. Thank you, Senator, for the question. As you may know, I really believe in the probability that we can develop fourth generation biofuels, that is to say, biofuels that come from the agricultural waste streams that we now generate, the lumber mill waste streams, growing grasses that do not have to compete with prime agricultural land and the growing of food. So these are technologies that convert these streams like wheat straw, rice straw, lumber wastes into fuel not just ethanol but gasoline and diesel-like fuel that can be blended at any ratio and that can be used in existing pipelines.

Senator LINCOLN. I apologize for being late. I had another committee meeting.

But have you gone through your Helios project which is one thing that you have spent a considerable amount of your time on, which is reflected in the biofuels arena? Have you spoken about that already?

Mr. CHU. No, I have not. So let me just briefly mention that in the first 6 months at Berkeley Lab when we started on biofuels, we have trained bacteria and yeast—trained is perhaps an understatement, but we have gotten bacteria and yeast and modified them so that they take simple sugars and produce not ethanol but gasoline-like substitutes, diesel fuel substitutes, and jet fuel substitutes. The scientists—these are brilliant scientists who had spent most of their time in basic research—are very focused making this technology commercially viable.

Senator LINCOLN. So what you are talking about there is basically using, I guess, a greater starch or a more cellulosic material as opposed to just basic sugars?

Mr. CHU. We are actually looking at the entire—actually now we are getting into science. I love this.

[Laughter.]

Senator LINCOLN. I just want to make sure it is something I grow.

[Laughter.]

Mr. CHU. Definitely it will be something you grow.

It is a blank sheet of paper and we are looking at the entire possibilities of developing better plants that require less energy inputs, that are more robust. One has to look at algae as well, and how do you break those plants down into the kinds of sugars that these little critters, the yeast and bacteria, can actually use.

We are also looking at how we can actually in a single organism break down the cellulosic material in a way, a new so-called pretreatment processes that separates the protective molecules that nature has invented to protect plants from being attacked by microbes and fungi.

So we are looking at everything because you can improve all of these things. With a blank sheet of paper, you actually—instead of focusing on this thing within the confines of one person's expertise, what we are doing is we are looking at the possibility that you can improve the next thing in a different way. I think that is why I am so optimistic some real progress can be made.

Senator LINCOLN. We appreciate that. Optimism is good.

Just in terms of promoting renewable energies, I know you all talked about coal and you have talked about nuclear reprocessing, things that are important to me because of the diversity of our energy in Arkansas. So I will just continue on renewable energy, if I may, with just two last questions.

One, do you agree that promoting biofuels has the potential to play a significant role in a Federal climate change strategy in addressing our Nation's carbon footprint?

You have stated your views regarding different feedstocks for biofuels like the woody biomass and the animal waste, which is critical for us. But I also think it is important. I do not know if you have seen this map. I am sure you have. It is very colorful and pretty, but it also is very demonstrative in what it shows us about wind energy. We have a diverse Nation, geographic differences all across the great country with respect to renewable energy opportunities.

More specifically, the geographic disparities in the values that we are placing on renewable energy incentives that need to be taken into account because if you see the strong white areas on the map, it is mostly the southeastern part of our country where we do not have any wind. So I guess we are hoping that you will take a look at this and be someone that can be supportive in the analysis to support parity in terms of all of the incentives that we are providing for all of the different types of resources that we need for biofuels, particularly biofuels, but certainly renewable energies.

I do not know what your stand is on that, but I am specific on section 45 where we look at the renewables. Obviously, wind is critical. We love wind in Arkansas because we produce the blades and the turbines for the windmills, but we do not produce a lot of wind. So for us to be able to be a player and constructively engaged in

contributing what we have to contribute, our hope is that your studies and background in biomass and biofuels will be helpful to us in better understanding how we can do a better job at what we have to offer from rural regions, particularly in the Southeast, that produce an awful lot of agricultural waste and biomass combined.

So I just hope that you will take a look at that. I do not know if you have got any comments on how diverse we need to be, but I hope it is pretty diverse.

Mr. CHU. I think we have to be very diverse. The solutions have to come from just about every sector. So very briefly, I think the development of biofuels is very important to get us off of the dependency on foreign oil, and it is not a possibility, but I think a probability that we will develop those technologies.

Senator LINCOLN. Thank you, Mr. Chairman.

Mr. CHU. Quickly too.

The CHAIRMAN. Senator DeMint.

Senator DEMINT. Thank you, Mr. Chairman.

Thank you, Dr. Chu. I appreciate your visit to my office. I very much enjoyed our conversation, and I would like to just go back through a little of that maybe just to get some confirmation here on the record.

I think we both agreed on the importance of moving from where we are with heavy use of fossil fuels to renewables and non-emitting fuels. But we also talked about the importance of recognizing realities over the next 15 or 20 years, that we do have to bridge from where we are to where we want to be with coal, with nuclear. I guess I would like to hear you restate this in some way. You talked about our dependence on coal for another 15 or 20 years and the importance of nuclear generation of electricity replacing coal as quickly as we could.

We also talked about carbon taxes and climate change ideas now which concern me when they are talked about in the context of we need to begin penalizing the use of fossil fuels now. We need to have taxes on these fuels and to discourage their use now.

I think you and I agreed that the rational way to do that is certainly to create incentives for non-emitting fuels and discouragements, if necessary, for polluting fuels, but that these carbon taxes or penalties should not take place until we give businesses and utilities the time to convert to other forms of generation or other forms of energy. I just wanted to ask you to talk a little bit more about that just to give us a perspective of what to expect from the Energy Department under your leadership.

Mr. CHU. Senator, I believe what I said when I was meeting with you—and thank you for the discussion—was that coal and nuclear, as well as gas, of course, formed the baseload generation of electricity today. We have to evolve, recognizing that it cannot happen overnight, the nurturing of renewable energy resources. This takes a bit of time. I think we should push as hard as we can, but the reality is that the baseload generation today is not from those resources.

So again, we need all of the solutions. We need to make them as clean as possible as quickly as possible. So I have to say that we really need to do all of these things.

Senator DEMINT. Maybe I can ask again in the context of—I know you made a statement that we need—I do not want to put words in your mouth, and the media, we find, is not always correct. But we should do what is necessary to raise the price of gasoline in our country to that of the Europeans. I assume that is in the context of discouraging the use of fossil fuels. But that is an example for me—until there are alternatives available for people. All we are doing is raising the cost of living, in a sense adding a tax to folks who are trying to get to work.

How do we deal with that? Certainly we want to have those incentives out there to move to the right types of energy, but do we really want to add tax to living and business now when there are really no choices?

Mr. CHU. I think the President-elect has made it very clear that gasoline taxes now are off the table. It is not an option.

Thank you for pointing out that that was made in the context of how do we control our use of oil in the United States.

Now, I feel very strongly and deeply that what the American family does not want is to pay an increasing fraction of their budget, their precious dollars on energy costs both in transportation and in keeping their homes warm and lit.

So I go back to the first thing that I repeatedly go back to, that energy efficiency is the key to that, the weatherization of homes, more efficient cars. Both of those things are actually beneficial in two ways. It directly lowers the costs to the American family of what they pay in energy, and it reduces the demand of this energy. Therefore, as we saw as the world entered into this recession, the industry slowed down and the demand went down and the price went down.

So I think we should take as a goal keeping the energy costs to the American family—you know, we do not want to see ever-rising costs. So when we work toward more efficient cars and tighter homes in terms of insulation, this will do exactly that. So for the Department of Energy, this is one of the things that I would love to see happen and would greatly encourage in any way I could.

Senator DEMINT. Thank you. I can see I am out of time, but if I could just leave with just one comment. Nuclear is obviously important. For years, States like South Carolina that have received a significant amount of nuclear waste from the cold war and are holding that in temporary storage have been promised that 1 day we would have a site, Yucca Mountain, to move that to. The law allows us to send it back if that does not happen. We talked about it and I guess we can talk about it in another setting if there is not time today. But we are very concerned with the political quagmire of Yucca Mountain. At the same time, we have very real exposed danger, in South Carolina and other States, of ground storage of nuclear waste.

Thank you, Mr. Chairman. I will yield back since I am out of time.

The CHAIRMAN. Thank you.

Senator Cantwell.

Senator CANTWELL. Thank you, Mr. Chairman.

Dr. Chu, welcome. Congratulations on your nomination. I look forward to working with you. This is the first time we have had

someone nominated to the cabinet who has actually won a Nobel Prize prior to being in the cabinet. So congratulations on that.

I would like to ask you about a U.S.-China energy bilateral or the energy efficiency and renewable energy technology office. I see Mr. Reikert here this morning. I would love to talk to you about that. I would love to talk to you about smart grid legislation and the platform transformation that I think is available to us. But I am going to have to put all of those things aside and hope that we can have a dialog about them in the future, while we turn to something more specific today.

Your DOE budget is about $25 billion, and 10 percent of that is allocated for the cleanup of the Hanford site in the State of Washington. While that site is in the State of Washington, it really is a national priority. The most urgent need there is the 53 million gallons of radioactive waste stored in about 177 underground tanks, 67 of which are confirmed to have leaked into the groundwater and are reaching toward the Columbia River. Now, many of these tanks are 30 years beyond their originally intended lifespan.

So, first of all, are you aware of this problem? I think you are aware of the problem that exists there with groundwater contamination and this plume. Is that correct?

Mr. CHU. Yes, I am.

Senator CANTWELL. So my concern is that this funding over the last several years has basically fallen flat. Part of the problem is that many people look at that funding level and see that it is such a big number, 10 percent of the overall DOE budget. Yet that is the magnitude of this cleanup. So we have gotten into disputes over the process of this cleanup.

So I want to know if you support the Hanford Site Tri-Party Agreement, including the requirement that 99 percent of the tank waste be retrieved as part of the cleanup process.

Mr. CHU. As I said in my opening remarks, the Department of Energy has a legal and moral obligation to clean up these sites. I think the frustrations you have with the speed and effectiveness of with which the Department of Energy is going about its business is something of concern, and I will do what I can to make the funds available and have them used more effectively. I think there is also some concern about how effectively those $6 billion—I am not sure of the exact number, but something like that—have been used. So I am committed to cleaning up these sites.

Senator CANTWELL. So do you support the Tri-Party agreement and the provision that 99 percent of all the waste should be cleaned up?

Mr. CHU. I am going to plead a little bit of ignorance on the exact numbers of that, but I will certainly look into that and get back to you. I know it is of great concern to you.

Senator CANTWELL. Yes, if you could, give us an answer on the 99 percent. The last Administration thought that they could expedite the cleanup, but one of the ways that they would have done it was by leaving more of the waste in the tanks. Obviously, from a scientific perspective, this outcome would be unacceptable to us in the State of Washington and, I think, to the whole Northwest and probably to the entire country if they were more informed about this problem.

Second, what are your thoughts on this issue? I appreciate that you may have even suggested that the stimulus might include some waste cleanup. But would you support increasing the Hanford funding? It may need as much as $2 billion over the next 4 years to meet that cleanup schedule.

A related issue is the fact that the State has found that the plume and groundwater contamination from the Hanford Site is threatening both drinking water and salmon habitat. We have a short time period here to get the waste out of the tanks and into either new tanks or some other means of treatment. They have estimated that we need about $2 billion more over the next 4 years. So would you be supportive of that number?

Mr. CHU. Again, I am not sure of the exact number, but as I have told you and others, I did argue in the discussions for the stimulus package that this made good sense to me, that we actually get some funds, significant funds, into the stimulus package for this cleanup. Certainly we have to take every step we can to make sure that this plume does not get into the rivers, the Columbia River, for example. This would be very bad.

Senator CANTWELL. Some of the contaminants are getting there, but they are not yet at a dangerous level—but obviously, urgency is of the utmost. So I will look forward to getting a written response from you, if we could, regarding the $2 billion for the Hanford in the stimulus package and the 99 percent waste cleanup in the Tri-Party agreement.

One of the things we are also concerned about is BPA and ITS ability to continue to accommodate renewable energy; we support borrowing authority for the Bonneville Power Administration that would allow it to expand its transmission lines. Would you be supportive of that?

Mr. CHU. Yes. I think the expansion of transmission lines, especially for the development of renewable energy, is something that I definitely support.

Senator CANTWELL. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Senator Menendez.

Senator MENENDEZ. Thank you, Mr. Chairman.

Dr. Chu, congratulations on your nomination. I regret we did not have a chance to speak, but let me ask you a couple key questions to me.

In a previous answer you gave to Senator Burr about the national interest electric transmission corridor, you said there may be opposition but a national grid is in the national interest. I do not think anybody disputes that.

But the Department of Energy has designated the entire State of New Jersey as part of a national interest electricity transmission corridor. Many of us believe that designation was a result of a subpar congestion study. On the west coast, the Department of Energy produced a transmission-line-by-transmission-line study of congestion which resulted in a narrow, more targeted transmission corridor, achieving the goals but doing it in a way that was less of an impact.

The mid-Atlantic transmission corridor covers all or part of eight States and the District of Columbia and has been characterized by many State regulators as setting up a super highway to coal electricity.

My question is as the Department of Energy updates their congestion studies, will you ensure that they are accurate on a transmission-line-by-transmission-line basis? One.

Two, if the study shows it is appropriate, will you be willing to narrow the mid-Atlantic transmission corridor?

Mr. CHU. I am not familiar with the details of that, but having lived in New Jersey for 9 years while I was working at Bell Laboratories, I recognize that New Jersey is a bigger State then some other people think.

In answer specifically to your question about as we update the analysis, would I review that and be willing, based on the facts that we learn, to narrow it, absolutely. It is all about learning more about the details of these things.

Senator MENENDEZ. I appreciate that. Would you do what was done on the west coast? I do not understand why it would be a difference of a transmission-line-by-transmission-line congestion study.

Mr. CHU. Yes. I do not know the details of that. Just listening to you, it seems to be——

Senator MENENDEZ. If you could review that and get back to us. That is really critical.

Mr. CHU. Absolutely.

Senator MENENDEZ. Second, I have sponsored legislation. We are proud in New Jersey of being the second largest producer of solar-related equipment. One of our challenges is getting States to adopt net metering and interconnection standards so that we can integrate solar energy into the grid. We believe that if such legislation were enacted into law, a significant market barrier to distributed solar generation would finally be gone. Is that something that you support in terms of net metering and interconnection standards?

Mr. CHU. Yes. In fact, as you may or may not know, the National Academy of Sciences and Engineering has had an ongoing study by a very distinguished panel of people chaired by Harold Shapiro, the former President of Princeton, and I have been on that panel over the last 2 years. There are six subpanels. I specifically put myself on the transmission and distribution subpanel because I saw it as vital that we get it right, as we modernize the system. The so-called smart grid, including the metering and all of these things that you speak of, is a very important part of the overall strategy to a sustainable energy future.

Senator MENENDEZ. Then finally, Senator Sanders and I, working with others here, authored—and it is into law—the Energy Efficiency and Conservation Block Grant Program in the 2007 energy bill. This is to try to drive at municipal and county levels a lot of the efforts. It was the No. 1 priority of the U.S. Conference of Mayors to try to get a significant level of work in energy infrastructure and increasing the use of renewables at that level, saving money for the local property taxpayers, creating less demand, and obviously having a positive impact on the environment.

I certainly hope you will look at that as we have talked to the President-elect on the stimulus package. I know there are some elements of that in there. I hope it is something that you will see, in your new role, as something to be an advocate of at the end of the day.

Mr. CHU. I will certainly promise to look into that.

Senator MENENDEZ. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Wyden.

Senator WYDEN. Thank you, Mr. Chairman.

Dr. Chu, welcome. I too look forward to supporting you as our Secretary.

Senator Cantwell has laid out many of my concerns very well. The question comes down to this. Are you going to follow the flawed Bush blueprint for nuclear fuel reprocessing or do something different? This is a big tome—I can barely lift it—that essentially is the blueprint. What I think I and others are looking for is to see whether you are going to make a break with this essentially game plan, and if so, how.

Mr. CHU. As I talked about with the other Senators, the blueprint you are talking about is I believe the fuel recycling issue.

Senator WYDEN. That is part of it. I mean, it is processing. It is fabrication, more reactors. The bottom line is this essentially greenlights more without dealing with the enormous amount of waste that we have. I think what I and others are looking for is whether we can work with you to essentially change that blueprint. Would you be open to that?

Mr. CHU. Yes, I would, but I have stated and believe that nuclear power will be part of our energy mix going forward because it is carbon-free and because it is baseload. Now, having said that, we do not have all the answers today as to how to develop that in a way that would make us all happy, particularly about disposal of the nuclear material. So I certainly will be working with all the members of this committee and other Members of Congress to develop a plan that can make as many people as possible happy. But given the fact that nuclear power is 70 percent of our carbon-free electricity generation—that cannot be denied.

Senator WYDEN. Your answer for today's purposes is fine by me, and I essentially subscribe to much of the same philosophy. But the fact is we want to hear that you are open to modifying this blueprint. You have indicated that you are, and we want to work with you in that regard.

The second question. I think in a very real way, the ball game on climate change is bringing the Chinese and the Indians into a global agreement. I would like your thoughts particularly with respect to China where I know you have worked with Chinese scientists and environmental leaders. Lay out your sense of how you would bring the Chinese, in particular, into a global agreement on climate change.

Mr. CHU. First, I think the United States and China are now emitting more than 50 percent of all the carbon emissions in the world today. So if the U.S. and China do not get this right and do not move forward, I do not think the rest of the world can really follow. It is such a significant factor.

Now, currently we are in a standoff position. The United States' position is we do not go forward unless China goes forward, and China's position is, well, the richer countries of the world, in particular, the United States, have put most of the carbon up there previously. We think perhaps we should be given a bye. I feel pretty strongly that going forward all the countries of the world, China and India included, have to be included in a carbon plan to reduce the emission of carbon.

I think the United States can take the first step, and hopefully China will immediately, very closely follow. They too recognize the growing concerns of climate change on their own country. They are beginning to see these effects and have gotten increasingly concerned. Now, if China does not follow, we will have to relook at this, but I think it is very important to do both.

Second, we need to start working with China and India to actually concurrently develop some of the technologies, starting with efficiencies. It will be very beneficial if we can develop and invent new methods of, for example, building efficiencies that China can use as they build their new cities. After the recession is over, we expect an enormous amount of building in China. It is important that the United States and others help China do it right and build energy-efficient buildings. These are things that we should cooperate with. But I think all the countries of the world have to be part of this overall effort because it is the world we are talking about.

Senator WYDEN. Thank you. My time has expired. Just a bit of housekeeping. If you would also send me the documents you are going to send to Senator Cantwell both with respect to Bonneville and Hanford. I thank you. I think you are going to be an excellent Secretary, and I look forward to your leadership especially on this question of climate change.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Senator Udall.

Senator UDALL. Welcome, Dr. Chu. Everywhere I travel, there is an excitement about your appointment. There is a belief that a renewed emphasis on science would serve not only the State of Colorado but our country and our world in very important ways. I look forward to supporting your confirmation on the Senate floor when that occurs.

Like Senator Cantwell, I have spent much of my time in the arena of public policy focusing on energy policy and all the potential that it presents to us, and I would like to explore these marvelous opportunities that we have.

But I would, in the interest of keeping faith with those in Colorado, like to turn to a local concern but one that has broader national implications as well. That is the Rocky Flats environmental technology site. Currently there are three areas in which we have more work to do. We have closed that site. It is a wonderful success story, one that can be applied to other environmental technology sites around the country like Hanford. But we have to continue that monitoring there of groundwater contamination levels, soil contamination levels, and the like. That is the No. 1 concern that we have.

Second, we have a work force that literally worked itself out of a job in the interest of closing up that site, and there are promises that have been made to the people who worked there so loyally and in such a committed fashion to look after their health needs. There are many people who have been made sick by exposure to radioactive materials in the work site there.

Third, there is ongoing litigation that has been brought by surrounding property owners regarding the damage done by contamination over the 50 or so years that that site has been in place.

I would like a commitment from you that once you are confirmed, that you take a close look at these three issues, ongoing cleanup, worker health, and property damage claims, and make sure that we are doing everything we can to protect public health and to keep faith with these cold war warriors who put themselves in harm's way, in no less a way than those who fought in the hot wars of that cold war period. Can I receive your assurances that you will focus on this particular and important area?

Mr. CHU. Senator, you will have my commitment. I will certainly look into this.

Senator UDALL. Thank you for that. Again, I want to emphasize that by doing so, then we will send a message to other workers in other parts of the country that as we clean up places like Hanford, we work in Ohio and Oklahoma and South Carolina, Nevada, that those promises will be kept to those people there who worked so diligently.

Second, could I turn to the National Renewable Energy Laboratory, NREL as we know it, an important part of Colorado's economy, but again a leading factor in developing new energy technologies. I heard Senator Sanders speak about his interest in opening a facility in Vermont. Perhaps we could have an annex of the National Renewable Energy Laboratory in every State. But the Department of Energy has made a commitment to the mission of NREL, and I wanted to receive assurances from you that you will continue to focus on that commitment and make sure those resources are forthcoming.

Mr. CHU. I think NREL will play a key role going forward in the renewable energy development and energy efficiency. So you have my assurance that NREL is certainly on my radar screen and it has to play a vital role.

Senator UDALL. I do not know if you have had a chance to visit the laboratory. I think you have and have probably been a frequent visitor, but we would like to host you again in the near future.

Let me turn, as my time begins to expire, to an opportunity that is important to the chairman. He has been a champion here in the Senate. That is the renewable electricity standard concept. In Colorado, we passed the first citizen-initiated renewable electricity standard 4 years ago, and the results have been remarkable: thousands of new jobs, millions of additional revenues. Would you work with us here in the Congress to establish a national renewable electricity standard?

I know my friends from the South have some concerns about whether they actually have those resources. Other regions of the country feel like they might be disadvantaged, but I believe that to use maybe an ill-considered term, when you drill into the oppor-

tunities for renewable energy, they exist all over our country. We could make markets. We could lessen the cost of the natural gas for peaking power. There are many, many benefits.

But I would like to work with you on a renewable electricity standard at the national level. Would you comment in the last few seconds that we have?

Mr. CHU. Very briefly, I would be looking forward to working with you and all the Senators on this committee for that. As I said repeatedly, the renewable energy is something that we really have to develop as quickly as possible.

Senator UDALL. Thank you again. I see my time has expired.

The CHAIRMAN. Senator Bayh.

Senator BAYH. Thank you, Mr. Chairman.

Dr. Chu, it is nice to see you. I am grateful for your devotion to public service and I enjoyed our conversation on the phone yesterday.

I would like to just briefly reiterate some of the comments you have heard about coal. My State derives about 98 percent of its electric production from coal. Anything in that area is going to have a major impact upon businesses and consumers across my State. So the whole notion of clean coal technology, sequestration, those sorts of things is very important to our State. As a matter of fact, I think a company has in the works a facility in Edwardsport, Indiana that will sequester carbon from coal production. So it is one to keep your eye on as we go forward. I would recommend it to perhaps—I think, Senator Corker, who is no longer with us, was expressing some curiosity about this. Perhaps we will have some good data from Indiana.

Second, just as a housekeeping matter for your staff, we are a center of transportation production. The loan program for advanced technology vehicles, I am told by several of the companies in my State, is really struggling in the Department. As a matter of fact, we heard just today there is not much transparency. The applications are sitting there. It is not well staffed. The criteria that are used for giving the loans is not well understood. If you could really focus on this going forward. All those things that will go to improved conservation in the transportation arena are going to be very important. That program needs to be well administered and it really has not been to date. So if your folks can make a note of that. I would love to follow up with you at the appropriate time.

Just two or three brief questions in the few minutes that we have remaining. I would like to follow up on the last question that Senator Wyden asked you about China and your stated belief that it is important—indeed, essential—to include developing nations, particularly China and India in any regime of CO_2 reduction. I think you said that the U.S. will take the first step and hopefully China will follow. We will have to relook at it if they do not.

It is my honest conviction that that approach will not be enacted by the U.S. Congress. Simply trusting China to—they have their own internal needs to have high rates of growth. They have been proven to be willing to sacrifice just about any other concern to maintain that high rate of growth to maintain domestic political stability. They do not have a great track record, frankly, in abiding by some of the agreements, particularly honoring intellectual prop-

erty rights, other things. So a skeptic might say we are going to be going through dislocations here that will affect our economy, consumers, other things. The American people would make great sacrifices. You would have to really wonder about whether China would go along. For people who have to cast votes on these things, that probably will not be good enough to get the job done.

I have raised this with, hopefully, the Secretary-to-be, currently Senator Clinton, hopefully Secretary of State Clinton, about the need to engage in robust diplomacy before we come to Congress with a global warming initiative because we are going to need to have buy-in in the front if this thing is going to work.

Do you have any response to that?

Mr. CHU. Actually I agree with that. Absolutely.

Perhaps this would put you more at ease with what I said. As you know, I was co-chair of this report sponsored by the Inter-Academy Council. That is a council that represents over 100 academies of science around the world. It is a report called Lighting the Way and how one transitions to sustainable energy. In that report, we said quite clearly that all the countries, developed and developing countries, have to be part of the solution.

I agree that this is a touchy diplomatic, economic, multi-dimensional problem.

Senator BAYH. Doctor, I was not ill at ease with what you said. This is an important issue. We both believe that. So because it is an important issue, we have to make sure it is going to work, and without China participating, it is not going to work. I do not think it will get enacted, and a skeptic, viewing their past behavior, would have to say that is going to be a heavy lift in a way that is verifiable and transparent. It is just going to be very hard to get them there. So I think we are going to have to focus on that component early on in this process, and that is beyond your bailiwick. But since you were asked about it and responded, I just want to emphasize that point. If we are going to get this job done, we have got to focus on that.

In my estimation, it is going to be difficult, and frankly, I am a little skeptical about whether they will ever get there in a way that is—because of the political dynamic within their own country.

But let us give it a shot. Let us see. Let us do our best. Perhaps we can. I think it is well worth the effort.

In my 16 seconds left, I would like to ask you—our first hearing before this committee in the new year was on the topic of energy security. We had a marvelous presentation and some fairly aggressive goals over the next 20 to 30 years about reducing the need to import energy into our country. One of the proposals involved the electrification of the transportation system, and there were some other good proposals as well. I view this as one of the defining challenges of our time, and it has a great impact on global warming as well as our economy, our finances, and our national security interests.

Could you share with us just for a few moments here your thoughts about what we can do, what steps we can take to reduce the imports of energy into this country over the next 10 to 20 years?

Mr. CHU. Very specifically, as you and I both recognize, a lot of this is about oil and imported oil, efficiency, efficiency of our automobiles. We need to accelerate all efforts to develop the type of battery that the American consumer will buy in terms of plug-in hybrid cars. We do not have today the type of battery we need, quite frankly, in the sense that these first electric hybrid cars, which are a start, do not have the energy capacity, the lifetime of the batteries that we need. So this is another part. So if we can off-load that fossil fuel dependence on the imported oil onto electricity, you have many more options.

So those two things I think are very important. Let us invent a battery technology. Let us push hard for more fuel-efficient personal vehicles.

Senator BAYH. I agree with that.

Mr. Chairman, thank you.

Doctor, I look forward to working with you on that issue. I do think it is one of the great challenges of our time. So thank you for your service.

Can I say one final thing, Mr. Chairman?

The CHAIRMAN. Go ahead.

Senator BAYH. Any man who could work at both Cal-Berkeley and Stanford has to be adept at forging consensus. Dr. Chu has done that.

[Laughter.]

Mr. CHU. Thank you.

The CHAIRMAN. Senator Shaheen.

Senator SHAHEEN. Yes. Thank you, Mr. Chairman. I will be brief since I have learned that you never stand between your audience and lunch.

Dr. Chu, I want to echo what you have heard from so many people on this committee about how delighted I am that someone with your scientific and research background and credentials is going to bring those to leadership in the cabinet. I hope that portends a willingness of many other scientists and researchers to come and serve in the Federal Government. I think what you are talking about, particularly when we are talking about energy policy, science and technology and research are going to be critical to addressing what we need to do to change our energy policy for the future.

I was interested in the exchange that you had with Senator Lincoln about your work in the biofuels area. As we discussed when we visited, we have some very interesting work going on in that area in New Hampshire. But we still have not seen those fourth generation biofuels become commercially and economically viable. So what actions could you take as Secretary of Energy to promote moving those biofuels to become more commercially viable?

Mr. CHU. First, with this fourth generation work that has essentially just begun over the last 1 or 2 years you see acceleration in many different ways, I think recognizing that it is a research program but also we need to really challenge the scientists who are working on this to keep their eye on the ball. So this is not a 10- or 20-year program. This is something we can produce I think to get it into testing in a few years. You know, we have had other experiences in times of national emergency, national need. Some of

the best scientists have stepped up to the plate and said, yes, I was doing that, but this is of such importance that I am going to focus on this and really focusing on delivering solutions. So the good news is that because of the energy security, because of the climate change threats, and all these things, some of the best and brightest in the country, and some of the best and brightest students in the country want to work on this. So this is something one can work with. You want to unleash some funds to start to support graduate work, retraining at a postdoctoral level of some of the best and brightest who might have been trained in a traditional field of chemistry or physics to say I want to work on energy, but I want to be able to retrain. So things like directly working with universities, national labs, and industry is important. There are a lot of exciting startup companies. It seems every week I learn of another one and what they are doing. I think the Department of Energy has to find a means of encouraging that work. We do not know where the solutions will come from, but I do know that they will come from the best and brightest intellects that we have in this country.

Senator SHAHEEN. Are there other policy changes that you would recommend we look at as a Congress to move that forward?

Mr. CHU. I think we already have some policies that are creating the proper draw, like the fraction of our fuel that would be going toward something other than conventional oil. I think a clean carbon standard for our fuels is something that will actually draw this much more quickly. So policies like that are a good stimulus, good draws to encourage the investment in the new companies and the investment in the research in national laboratories and universities.

Senator SHAHEEN. Thank you.

The CHAIRMAN. Dr. Chu, thank you very much for being so generous with your time. We will do all we can to move ahead your nomination and get it through the full Senate. We wish you well in your new position.

That will conclude the hearing and the hearing is adjourned.

[Whereupon, at 12:13 p.m., the hearing was adjourned.]

[The following statement was received for the record.]

STATEMENT OF CHRIS DEVERS, CHAIRMAN, COUNCIL OF ENERGY RESOURCE TRIBES

On behalf of the Council of Energy Resource Tribes ("CERT"), I am very pleased to submit for the Committee's consideration this statement on President-elect Obama's nomination of Dr. Steven Chu to be the Secretary of Energy.

Founded in 1975 during America's first energy crisis, CERT is headquartered in Denver, CO, and boasts 57 member Indian tribes. CERT's member tribes are actively engaged in the development and production of renewable and non-renewable sources of energy.

CERT's mission is to support member tribes in the development of their management capabilities and the use of their energy resources to foster tribal economic development and political self-governance. CERT is governed by a Board of Directors comprised of the principal elected leadership of CERT's 57 member Indian tribes.

CERT was instrumental in the development and passage of the Indian Tribal Energy Development and Self Determination Act of 2005 and actively supported the tribal provisions in the Energy Independence and Security Act of 2007. CERT's policy objective in the 111th Congress is the furtherance of innovative energy development on tribal land.

As the Committee considers the nomination of Dr. Chu, CERT recommends that Indian tribes be included in the nation's ongoing search for sustainable energy development and energy security.

The department plays a vital role in assisting Indian tribes with state-of-the-art scientific technology and accurate information. To this end, CERT is mindful of the role the department plays in enabling science to support energy and environmental decision-making. Investing in the various science disciplines is crucial in our energy policy. Robust Federal actions should be complemented by financial and tax incentives for the private sector to do what it does best: bring capital and expertise to harness and market forces.

CERT strongly believes that an objective understanding of science and the full array of energy options should guide our decision-making and national policy rather than a narrow belief in certain energy sources and technologies.

In addition to energy development and environmental protection, CERT's mission includes the development of young Indian people in scientific and engineering disciplines. Through our Scholarship Program, CERT has made possible the higher education of hundreds of young Native people who more often than not return to their communities armed with best education in America. This element of CERT's activity is mirrored by the department's role in carrying out research and development and truly cutting-edge technologies.

Just as the "Defense Advanced Research Projects Agency" ("DARPA") does for the Department of Defense, I am of the opinion that the department should expand its research to include bold experimentation in projects that use technologies and practices we can only dream of in 2009.

CERT and its member tribes are hopeful that Dr. Chu will provide the kind of bold leadership he has shown during his tenure with the department's national labs and that his vision for America's energy future includes a commitment Indian tribes and communities at every level.

I thank you for the opportunity to include this statement in the Committee's hearing record and would be happy to answer any questions you might have.

APPENDIX

RESPONSES TO ADDITIONAL QUESTIONS

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR BARRASSO

Question 1. How would you characterize the Department: of Energy's initiatives to develop and deploy commercially viable CCS technologies among all of the DOE'S priorities?

Answer. President-elect Obama is committed to funding innovative, large-scale carbon capture and storage projects, and working with Congress to develop a policy framework under which CCS projects can move forward.

Question 2. Do you agree that carbon capture and storage programs/projects are vital for the future security and independence of the United States given the importance of coal to the US economy? If so, how will you lead the Department to achieve those goals?

Answer. I share President-elect Obama's view that we need to aggressively pursue carbon capture and storage technology. We're going to need this technology here in the United States, and it's going to be needed in China, India and elsewhere around the world. Both the President-elect and I agree that coal is a vital energy resource for our country. As you know coal currently provides fifty percent of our electricity, and we have enormous coal reserves that can provide power long into the future. At the same time, coal-fired power plants are the largest contributor to U.S. greenhouse gas emissions, and a growing source of global emissions. That's why, if confirmed, I plan to lead DOE forward on CCS technology as swiftly and as effectively as possible.

Question 3. Given the slow growth rates of renewable energies and recent NERC studies showing that domestic power demand will outpace new generation in the coming decades, wouldn't you agree that coal will and should remain essential in the nation's energy portfolio?

Answer. Coal currently provides fifty percent of our electricity, and we have enormous reserves that are likely to be part of our energy mix into the future. To ensure that we meet our energy needs as well as our climate goals, it will be important to develop new technologies for using our coal resources in more efficient, cleaner ways. I believe we can do that, and if confirmed, I will work hard to ensure that DOE's coal RD&D programs contribute to those objectives.

Question 4. With domestic oil reaching peaks of production over the past few decades and LNG imports making us more dependent, not less, on foreign sources of energy, do you see domestic coal as a viable alternative for imported natural gas, jet diesel fuel and other declining domestic energy feedstocks?

Answer. As I have stated, I believe that coal will continue to play an important role in our nation's energy mix. However, I also understand, based on EIA estimates, that we will also continue to have robust domestic gas supplies for some time to come. Nevertheless, I believe that DOE should continue to support coal RD&D programs and projects so that we can continue to make use of our vast coal reserves while also making progress toward our climate change goals

Question 5. Given its potential for having near zero emissions, do you support government funding for projects such as the FutureGen project with the goal of commercializing and deploying such dean coal and CCS technologies? At what level should government funding be established—full, partial, other?

Answer. I do not have a specific view about cost shares at this time, but I strongly believe that we must continue to work with industry to develop and deploy CCS technology, both here in the United States and abroad.

Question 6. What kind of business/government partnership for clean coal development and deployment would be most conducive in achieving environmental goals and protecting U.S. economic interests? Has the CCPI program at DOE been effective?

Answer. Carbon capture and storage technologies hold enormous potential to reduce our greenhouse gas emissions as we power our economy with domestically produced and secure energy. We must work to ensure that clean coal technology becomes commercialized. I have not yet formed a view regarding the optimal partnership structure(s) for clean coal work, nor do I have a basis for making informed judgments about the effectiveness of the CCPI program. However, if confirmed I will be reviewing all of DOE's activities in this area and working to identify how we can accelerate the research, development and deployment of clean coal technology.

Question 7. Do you believe that any cap and trade or system of taxing emissions will be environmentally effective and economically justifiable internationally, given the desire for growth and increased standards of living in developing economies around the world?

Answer. Climate change is a global problem that will require a global solution. President-elect Obama's Administration will move to advance domestic legislation while seeking to develop an international framework that will address the climate crisis in a manner that is effective and fair. No such framework will succeed without participation by developing countries, and I know that the President-elect intends to pursue an agreement that includes commitments by such nations. If confirmed as Secretary, I will engage with the President-elect, the rest of the Administration, and Congress to work towards these vital goals.

Question 8. Isn't global deployment of CCS the only way we can allow both CO_2 management and economic growth in developing economies?

Answer. I share President-elect Obama's view that we need to aggressively pursue carbon capture and storage technology, or CCS. And I agree that we are going to need this technology not only here in the United States, but also in China, India and elsewhere around the world. That said, there are many other new, efficient energy technologies that we can develop in the United States and that will find markets in the developing world. Such technologies will be critical to ensuring that international climate goals are met.

Question 9. What is the best way to ensure price relief for American families who will bear the burden of rising energy costs in the wake of new cap and trade legislation? Don't you agree that families should be spared increased expense for electricity especially during a time of economic distress? How can we manage carbon, keep our domestic energy supply vital, and prevent price increases on electricity for consumers?

Answer. President-elect Obama believes that unchecked emissions and continuing climate change poses serious threats to our environment, our economy, and our security. There is no question that doing nothing about climate change risks imposing huge new costs on our economy and our citizens. At the same time, however, it is essential that we develop market-based systems (such as a cap-and-trade program) for reducing greenhouse gas emissions, in order to minimize costs. But one of the most promising ways to meet both our climate change and energy goals without harming consumers is to develop the next generation of technologies that will enable us to transform the way we produce and use energy in America. If confirmed, I look forward to helping to lead that effort.

Question 10. Have you supported in the past, and will you support in the future, policies that will increase the gas tax consumers pay at the pump?

Answer. I recognize that last year's spike in gasoline prices caused economic hardship for many American families. In addition, we are sending hundreds of billions of dollars overseas each year for imported oil, which is harmful to our economy. To deal with all of these challenges, we need a comprehensive, long-term strategy. President-elect Obama has put forward just such a strategy—a comprehensive energy and climate change policy that will hasten the development of alternative fuels and efficient, advanced vehicle technologies. The President-elect does not support, and neither do I, raising federal gasoline taxes as an energy policy. Instead, we need a much broader-based approach to transforming America's energy future, and, if confirmed, I hope to be actively engaged in working with you and your colleagues in forging such a policy.

Question 11. As you know, President-elect Obama has appointed President Clinton's former Administrator for the Environmental Protection Agency, Carol Browner, as White House Energy Czar. I think it is fair to say that Ms. Browner agrees with your statement that coal is your "worst nightmare." Please describe for the Committee how you see your role, as well as that of Carol Browner, in setting energy policy for our country and for prioritizing research dollars towards coal technology research and demonstration projects.

Answer. During my confirmation hearing and during our meeting, I worked to clarify my views on coal, which are explained at greater length in answers to other questions you have posed. President-elect Obama's decision to create a new position

within the White House to coordinate policy on energy and climate change is a very positive development. First, it reflects the importance that the President-elect has put on reducing our dependence on foreign oil and dealing with the growing threat of climate change. It also reflects the fact that meeting these challenges will depend on coordinated actions from across the federal government. This is a model that has worked successfully in other areas, such as the National Economic Council and the National Security Council. As for Carol Browner, she is an extremely accomplished and capable leader; we have met and I'm confident that we will have a strong working relationship. However, the job of implementing a research agenda for the development of new coal technologies will be the responsibility of the Department that I will be honored to lead, if confirmed.

Question 12. You have told me that science, not politics, should determine policy direction. Given that Ms. Browner will be closely advising the President from her position, ad has very limited background in science, I am concerned that the Obama Administration takes an opposing view from yours'—that politics will trump science. How will you prevent that from happening, and if does occur at anytime, what action will you take in response.

Answer. President-elect Obama has made it clear that science will guide his decisions in many policy areas, including energy and climate. I am one of a group of scientists who have been selected by the President-elect to help lead this effort, and if confirmed, I will do my utmost as Secretary to advise him and help him to make decisions that reflect the best available science.

Question 13. Given that you have little political experience, what assurances can you give the Committee that you have sufficient skills to successfully challenge the career politicians that will be "coordinating" your work?

Answer. If confirmed, I am confident that I will be able to work effectively with other members of the Administration in helping President-elect Obama to make decisions and implement his energy and climate change plans. As a long-time scientist and recent DOE laboratory director, I hope to be an effective leader of the Department of Energy and a constructive collaborator with others in Washington and across the country. I also expect to play a leadership role in any interagency deliberations about energy and climate policies.

Question 14. Is corn-based ethanol a viable, affordable and sustainable resource to supplement America's transportation fuel needs? If not, should we shift investment/tax incentives away from corn based ethanol to other commodities?

Answer. Corn-based ethanol is an important bridge technology in helping make America more energy independent, but if we are going to displace a large fraction of the oil we use for transportation, we will need to go beyond corn and begin to use other feedstocks. That's why President-elect Obama is committed to accelerating the transition to advanced biofuels. If confirmed, I am open to reviewing biofuels policies across the board in order to ensure that we have an effective set of policies in place to keep the bridge technologies intact and to expeditiously develop more advanced biofuels technologies.

Question 15. Should Congress make changes to the renewable fuel standard? If so, what changes do you believe are appropriate?

Answer. I have not yet had an opportunity to study the impacts of the renewable fuels standard, but if confirmed, I am open to reviewing biofuels policies to ensure that we have an effective framework in place.

Question 16. Wyoming and many other western states have significant wind resources. The best areas for wind development are often found at great distances from large metropolitan areas and adequate transmission infrastructure. As a result, the ability to harness the wind and get it to market is limited. Will the economic stimulus proposal include incentives—tax incentives, loan guarantees, borrowing authority—that will encourage investment in building and modernizing our electricity transmission system? What role can/will you play in 1) arguing in favor of such incentives and 2) for moving forward investment in electric transmission construction for the nation's grid?

Answer. I agree that fully exploiting wind and other renewables will require infrastructure improvements. Our transmission and distribution system is aging and in need of investment and modernization. The stimulus proposal can offer significant and timely opportunities to make investments in this area, and I will support such investments. In addition, we will need to encourage greater private investment in electric transmission by working towards new solutions to barriers posed by siting, cost allocation and other issues.

Question 17. Energy independence goes hand in hand with economic and national security. We can eliminate our dependence on foreign oil by aggressively developing our oil shale resources. It is estimated that the three state region on Wyoming, Colorado and Utah holds more than 800 billion barrels of recoverable oil. Fully devel-

oping those reserves, combined with making more fuel efficient vehicles, would eliminate the daily transfer of billions of dollars to countries around the world. I believe that from a national security standpoint, developing this resource is critical. Do you agree? Please explain your position?

Answer. I support a comprehensive national energy strategy that includes assessing the potential contributions of oil shale to the nation's energy mix and to national energy security. It is important that any future development of our nation's oil shale resources be done in a way that does not exacerbate our climate change problems or otherwise inflict severe environmental harm. Of course, many of the decisions affecting the future of oil shale in America will be driven by the price of oil and by the technical and economic judgments of private companies. In the case of leasing of shale formations on federal lands, the Department of the Interior will play a major role, but DOE should continue to provide leadership in assessing the state of oil shale technology, and in helping to understand the characteristics of the shale deposits and the environmental impacts of developing them.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR BURR

Question 1. Dr. Chu, you are obviously a capable and well-qualified nominee for this post. What role do you see Ms. Browner, in the newly created White House position, having on the decisions and program implementation at DOE?

Answer. I have met with Ms. Browner and look forward to working with her. Ms. Browner will play an important role in the coordination of policy across Federal agencies that work on energy and environmental issues—a function that reflects the fact that a number of federal departments and agencies will be working on the key energy-related challenges articulated by the President-elect. We have experience with this type of coordination, as we have seen with the National Security Council and the National Economic Council. Implementing programs at DOE, as well as running the organization, will of course remain the responsibility of DOE's leadership.

Question 2. How can the US set up a dual-transmission infrastructure—one for renewables, one for "traditional"—without setting ourselves up for more problems down the road? Doesn't a "smart" transmission grid require us to look past the political and look to the practical? In other words, shouldn't we be smart about developing a smart grid?

Answer. Our transmission and distribution system is aging and in need of investment and modernization. President-elect Obama has put forward a vision to stimulate major investment in our national utility grid, including smart metering, distributed storage and other advanced technologies to accommodate 21st century energy requirement. I agree that we need a well-thought-out approach, but done right, upgrading the grid will create jobs and result in greatly improved electric grid reliability and security, increased renewable generation and greater customer choice and energy affordability. If confirmed, I look forward to thoroughly reviewing all of DOE's efforts in this area and working with you on this important issue.

Question 3. Do you support the decision to scale back the FutureGen program in favor of smaller test facilities? What is your view on the role of clean coal technology in addressing climate change?

Answer. I am not familiar with the details of the Bush Administration's decision-making with respect to the FutureGen program. If confirmed, I will undertake a thorough review of the program, and do whatever I can to ensure that DOE moves forward in collaboratively testing the variety of technologies that hold promise for cleaner-burning coal plants. More broadly, I believe that it must be a top priority of the Department to accelerate research and development of a range of carbon capture and storage technologies.

Question 4. CCS will play an important role in a carbon-strained future. Do you support funding for more CCS demonstration projects? What funding structure do you envision?

Answer. I share President-elect Obama's view that we need to aggressively pursue carbon capture and storage technology. We're going to need this technology here in the United States, and it's going to be needed in China, India and elsewhere around the world. I do believe that we need to test a variety of CCS technologies, but at this point, I am not in a position to offer specific plans regarding the optimal funding structure for doing so. Once confirmed, however, I look forward to working with you and with Congress as a whole to move forward on CCS technology development as swiftly as possible.

Question 5. CCS projects also face above ground/below ground property rights issues with regard to the issuance of permits. What federal role do you see in the resolution of these issues?

Answer. As I understand it, these issues are largely within the purview of the Environmental Protection Agency, which is working on draft rules for underground carbon dioxide injection. If confirmed, I will support the continued cooperation of DOE with EPA and others to develop the policies and procedures necessary to make CCS a safe and reliable long-term option for addressing carbon dioxide emissions.

Question 6. Do you agree with me that, at least for the next 10-20 years, we need to continue our development of traditional sources of energy—such as coal, oil, and natural gas—while working to develop the energy resources that will eventually replace them?

Answer. There is no doubt that traditional fossil fuels will continue to represent major contributors to our nation's energy mix. Moreover, I believe we should accelerate the development of technologies that will enable us to use those resources more efficiently and with fewer emissions—to reduce costs, reduce dependence on imported oil, and cut our emissions of greenhouse gases.

Question 7. How do you see a cap and trade market being designed? What cost-containment mechanism do you support? What role do you see international and domestic offsets playing?

Answer. President-elect Obama believes that unchecked emissions of greenhouse gases and continuing climate change poses serious threats to our environment, our economy, and our security. As you know, he has proposed a cap-and-trade program to reduce greenhouse gas emissions, but the details of that program will not be developed until after the new Administration takes office. At that time, the issues of environmental targets and timetables, cost containment, offsets, linkages to other nations' commitments, and the many other program elements and options will be fully examined. The President-elect has said that he plans to work with Congress to develop an effective, bi-partisan program. In the meantime, I believe there is much the Department of Energy can and should do to spearhead the development of energy efficient technologies that will help us meet our greenhouse gas reduction goals. The fastest and largest near-term reductions are through improvements in energy efficiency, something that I have worked on at LBNL, and which I hope to emphasize as Secretary if confirmed.

Question 8. President-elect Obama is focusing much of his attention on the creation of green jobs as a way to stimulate the economy. Would you consider nuclear jobs as green jobs?

Answer. Nuclear power currently accounts for 20 percent of U.S. electricity generation, more than 70 percent of U.S. zero-carbon electricity generation, and employs people in communities throughout the country. President-elect Obama has made it clear that he understands the contribution that nuclear energy makes to our economy, and that he believes it will be part of our energy mix into the future. Obviously, the construction of new nuclear power plants can provide many well-paying construction jobs. However, my understanding has been that the term "green jobs" applies mostly to those in energy efficiency and in the newer alternative energy industries, such as solar, wind, and geothermal energy, and advanced vehicle technologies and liquid fuels.

Question 9. Loan guarantee program—It's my understanding that the Department is requiring a first lien on the entire project, and that this would preclude many utilities who have mortgages on their property from taking advantage of any loan guarantees. Would you support the DOE relaxing its position on this?

Answer. If I am confirmed as the Secretary of Energy, I would examine the rules and regulations under the Title XVII Loan Guarantee Program, including the first lien issue, to determine if any modifications should be made. I look forward to sharing the results of such a review with you and your colleagues.

Question 10. Loan guarantee program—I have read that a number of investor-owned utilities are having municipal and electric cooperative utilities as joint owners in some of these nuclear projects. It's my understanding that having a first lien on the entire project, even if the utility owns only a portion of the plant, might stymie the joint ownership arrangements with public power participants, because this would violate the bonds issued by the public power participants. Would you support the Department taking a lien on less than the entire project?

Answer. Again, if I am confirmed as the Secretary of Energy, I would examine the rules and regulations governing the Title XVII Loan Guarantee Program to determine whether any modifications should be made.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR CORKER

CAP-AND-TRADE

Question 1. I think that putting a price on carbon would give us a good opportunity to implement a standard for energy technology and stop picking winners and losers. In April 2008, the Energy Information Administration released a detailed report, "Federal Financial Interventions and Subsidies in Energy Markets 2007," regarding subsidies in energy markets. Would you and your team review that analysis and respond to the Committee regarding which subsidies could be eliminated under a cap-and-trade program or carbon tax,-and which ones you think should be maintained?

What is your opinion of both international and domestic offsets in the context of a cap-and-trade program? If you support them, how big a role do you think they should play in a cap-and-trade program?

Answer. While I am not familiar with the study that you cite, if confirmed I will certainly review it and respond to the Committee, as you request. With respect to offsets, President-elect Obama has proposed a cap-and-trade program to reduce greenhouse gas emissions, but the details of that program will not be developed until after the new Administration takes office. At that time, the issues of environmental targets and timetables, cost containment, offsets, linkages to other nations' commitments, and the many other program elements and options will be fully examined. The President-elect has said that he plans to work with Congress to develop an effective, bi-partisan program.

NATIONAL LABS

Question 2. I am concerned that there are some operational issues that are getting in the way of the Department's science mission. Will you commit to working with me and other committee members on an ongoing basis to find some creative solutions to some of these issues, and would you be open to including a pilot project at one or more of the national labs to test new ideas in areas like construction management and safety oversight?

Answer. Improving operations at DOE is a key goal that I will pursue as Secretary if I am confirmed. As Director of the Lawrence Berkeley National Lab, I spent a significant amount of my time working to ensure that projects were delivered on time and on budget, and provided quality scientific research. If confirmed, I look forward to discussing ideas for improving DOE's operations and working with you and other members of the committee to find solutions.

PENSION PLANS

Question 3. Members of the Coalition of Oak Ridge Retired Employees (CORRE) are deeply concerned about the benefits they receive compared to the benefits received by retirees at other DOE labs. Will you conduct a careful review of the benefit plans offered to retirees by the Oak Ridge DOE contractors, as well as those provided by other DOE contractors at other facilities and tell us if you believe there are inequities in those plans? If so, should they be addressed by the Department?

Answer. If confirmed I would certainly be willing to request a review of the benefit plans provided to retirees at Oak Ridge and other DOE sites, and to examine the issue closely. As you are aware, this is not an issue that I have been previously involved in beyond the Berkeley Laboratory, so I do not currently have a view of whether there are inequities in the Oak Ridge plans. I would look forward to discussing the issue further with you after conducting a review.

GENERAL SCIENCE AND RESEARCH

Question 4. There is bipartisan consensus that our country needs to invest in applied research on known potential energy sources. What priority would you give to funding of basic research, which often provides the foundation for such important discoveries but may not result in energy breakthroughs for a number of years?

In what specific areas of energy research is additional government investment most needed? Why are such investments important? How do we ensure adequate and stable government funding for these areas of highest priority?

Answer. I believe that both basic and applied energy research must be strengthened at DOE, and directed towards the goal of producing energy technologies that improve our energy security and help us meet the climate change challenge. As Director of the Lawrence Berkeley National Laboratory, I have challenged some of the best scientists to turn their attention to our energy and climate change problems and to bridge the gap between the mission-oriented science that the Office of

Science does so well and the type of applied research that leads to energy innovation. I have also worked to partner with academia and industry. I know that these efforts are working, and I want to extend this approach throughout DOE's network of national science laboratories. Once confirmed, I will more closely examine the research agenda of the Department, and I look forward to discussing with you in greater detail the issue of research priorities and funding streams.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR DORGAN

FOSSIL FUELS AND CARBON CAPTURE AND STORAGE ISSUES

Question 1. What will be your stance on promoting and developing clean coal technologies? How will the Department of Energy, under your direction, continue to invest in carbon capture and sequestration research? What role do you think that CCS will play in decarbonizing fossil fuels? Beyond coal, how should we be incorporating opportunities to incorporate CCS opportunities in the economy?

Answer. I share President-elect Obama's view that we need to aggressively pursue carbon capture and storage technology. We're going to need this technology here in the United States, and it's going to be needed in China, India and elsewhere around the world. I know that this committee has taken a strong interest in CCS. Both the President-elect and I agree that coal is a vital energy resource for our country. As you know coal currently provides fifty percent of our electricity, and we have enormous coal reserves that can provide power long into the future. At the same time, coal-fired power plants are the largest contributor to U.S. greenhouse gas emissions, and a growing source of global emissions. That's why, if confirmed, I look forward to working this committee and Congress as a whole to move forward on CCS technology as swiftly as possible.

ACCELERATED RESEARCH, DEVELOPMENT, DEMONSTRATION AND DEPLOYMENT IN THE FEDERAL GOVERNMENT ISSUES

Question 2. There is considerable evidence that many innovative ideas on dealing with energy and greenhouse gas emissions reduction have stalled between applied research/pilot projects and the first two or three commercial sized projects. Many have referred to this proverbial problem as the "Valley of Death". What do you see as the Department's role in promoting early commercialization of new energy projects? If you think the Department should be more involved, how do you propose to implement a strategy, including moving more quickly in the Title XVII Loan Guarantee Program?

Answer. As director of the Lawrence Berkeley National Laboratory I have challenged some of the best scientists there to address our Nation's energy and climate change problems by bridging the gap between the mission-oriented science that the Office of Science does so well and the applied research that leads to energy innovation. Commercialization is the end of this process, and so I have also worked to partner the research community with industry. If confirmed, I will encourage this approach in all 17 of the Department's national laboratories, and I will commit to better focus and integrate our research efforts and to better utilize the tools Congress gave the Department in the Energy Policy Act of 2005, including the Technology Transfer provisions in Title X and the Loan Guarantee program authorized in Title XVII.

BIOFUELS ISSUES

Question 3. If the United States is going to produce 36 billion gallons of renewable biofuel by 2022, what policies do you think need to be in place to make sure we get there? Would those policies include moving to higher level blends of ethanol, such as E15 or E20? What steps would we need to take to make that happen?

Answer. Increasing production of home-grown biofuels is an important element of President-Elect Obama's strategy to reduce dependence on foreign oil and reduce greenhouse gas emissions. The plan includes includes a number of policies and measures to help us achieve this goal, including research funding for cellulosic and other advanced biofuels; incentives to expand ethanol infrastructure; incentives to encourage the commercialization of advanced biofuels technologies; and a national "low-carbon fuel standard" to spur low-carbon fuels. Looking at higher blends is something that I am interested in doing. If confirmed, I pledge to work to implement these policies, building on the strong base that this committee has helped to put in place.

RENEWABLE AND ENERGY EFFICIENCY ISSUES

Question 4. In May, the Department of Energy released a report saying that we can get to 20% of our electricity from wind by 2030. How do you plan to use the resources of the Department of Energy to help make that vision more of a reality?

In addition, other renewable resources would benefit from a similar analysis to see what their potential is in the same time frame. Ideally, the same analysis would be done for each renewable technology and then integrated to see what our nation's renewable resource potential is over the next couple of decades. Is this an idea that you support and would implement at the Department?

Answer. As we have discussed, wind has enormous potential. The most important policies that we need to put in place are a long-term signal to investors, and policies to accelerate the development of new transmission capacity. With respect to other renewables, I agree that a resource assessment makes a great deal of sense, and if confirmed, I would be happy to look into ways the Department could help to accomplish this goal.

Question 5. The Department of Energy has been a leader in federal energy efficiency and the Energy Savings Performance Contracts (ESPC) have contributed significantly to the progress federal agencies have made. I understand that there are many projects in the pipeline today that are currently "on hold" and facing potential further delays due to an issue with the contract ceilings. Agencies and industry have already invested substantial time and effort to get these projects completed. How can DOE expedite moving those projects?

Answer. Energy efficiency is the cheapest energy resource that we have. It will be a high priority for me if I am confirmed, starting with the Federal Government, which is the world's largest single consumer of energy. In addition, President-elect Obama recently set new goals for building efficiency within the federal government. I am not familiar with the reasons for the delays in completing the Energy Savings Performance Contracts that you cite, but if confirmed will certainly work with you to address this important issue.

TRANSPORTATION POLICY ISSUES

Question 6. We are trying to accelerate the use of electric drive vehicles like plug in hybrids and hydrogen fuel cells. We are also looking at natural gas for other sectors and are attempting to expand the use of biofuels (intermediate blends and E85). Although each of these technologies has been looked at independently, is it time to put together a roadmap for how these advanced technologies could be integrated together to change our transportation markets and infrastructure? Do you have ideas on a more integrated policy approach so that all of these vehicles can play a role in our transportation future?

Answer. President-elect Obama is committed to creating new research and development programs to accelerate innovation in our transportation options, including advance technologies for batteries, fuels and vehicles. I agree that integration of these technologies is essential, and developing an appropriate roadmap makes good sense. If confirmed, I pledge to work with Congress and other members of the Administration to work on this critical issue.

NUCLEAR POWER ISSUES

Question 7. Throughout the campaign, President-elect Obama asserted that since Congress was debating the negative impact of CO_2 emissions "on the global ecosystem, it is reasonable—and realistic—for nuclear power to remain on the table for consideration."

In his New Energy for America speech, the President elect said: "Nuclear power represents more than 70 percent of our non-carbon generated electricity. It is unlikely that we can meet our aggressive climate goals if we eliminate nuclear power as an option. However, before an expansion of nuclear power is considered, key issues must be addressed including: security of nuclear fuel and waste, waste storage, and proliferation."

Do you agree with the President elect that nuclear energy is part of the solution in achieving our climate goals? If so, what is your plan to dispose of spent nuclear reactor fuel at the current waste repository, in dry casks on site or through other means?

Answer. We are going to need a range of low-carbon energy technologies to meet the global warming challenge. Today, nuclear power currently accounts for 20 percent of U.S. electricity generation, and more than 70 percent of U.S. zero-carbon electricity generation. For those reasons, President-elect Obama has said made it clear that he understands the contribution that nuclear energy makes to our econ-

omy, and that he believes it will be part of our energy mix into the future. As we move forward with nuclear power, President-elect Obama believes that we need to resolve issues around waste management, proliferation. In addition, industry, as well as state utility commissions, will play a major role in determining whether investments in new nuclear plants are economical in the future. In addition, we must work to ensure that the waste stored at current reactor sites is contained using the most advanced dry-cask storage technology available and is adequately secured. These issues will be a priority for me, if I am confirmed.

INDIAN AFFAIRS QUESTIONS

Question 8. North Dakota has the greatest wind generation potential in the country, and North Dakota's Indian tribes are interested in developing wind generation. The Department of Energy's Western Area Power Authority (WAPA) has the transmission infrastructure to carry North Dakota wind generation to energy markets, but WAPA has been slow to provide transmission space and develop interconnection for Indian tribes and renewable energy. What direction will you provide WAPA to ensure that we can tap into the great potential of this wind resource and provide Indian tribes with needed opportunities for energy and economic development?

Answer. I recognize the importance of the role the federal government can play in working with Indian tribes in renewable energy development. While I am not familiar with the details regarding WAPA's dealings in the instances you cite, I believe that WAPA and other power marketing associations should be leading the way when it comes to renewable electricity. If confirmed, I will look more closely at this important issue.

Question 9. The Energy Policy Act of 2005, Title V, Indian Energy, created two Indian energy offices. One office within the Department of the Interior (DOI) and the other with the Department of Energy (DOE). DOI's office is now known around Indian country as a fantastic source for technological resources and funding for tribes to start tribal energy projects. On the other hand, it took two years for DOE to select a director for its office. This office remains so unsupported that it does not provide the services Congress wrote into its authorizing law. Congress authorized DOE's Indian energy office to support to Indian tribes in energy planning, energy efficiency, and carbon sequestration opportunities on reservations. How will you promote DOE's Indian energy office so that it can become effective in supporting energy activities on Indian reservations?

Answer. I recognize the importance of the role the federal government can play in working with Indian tribes in renewable energy development. While I am not familiar with the details regarding DOE's Indian energy office, I agree that DOE should work with Indian Tribes to maximize opportunities in clean energy. If confirmed, I will look more closely at this important issue.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR MENENDEZ

Question 1. As you are aware, basic research such as fusion science serves as the foundation for important energy breakthroughs that will lead to the future of energy production. In my state, the Princeton Plasma Physics Laboratory is working on the type of transformational science that will be necessary to meet the long-term challenges of our world's future climate and energy needs. Could you please explain what you see as the role of fusion science in the nation's energy research portfolio, particularly in light of the apparent worldwide interest in this field, as demonstrated through the seven nation commitment to the international ITER project?

Answer. Fusion science research, such as that conducted at the Princeton Plasma Physics Laboratory, is important because fusion power systems hold the potential to produce abundant energy without producing long-lived nuclear wastes or greenhouse gases. I look forward to working with closely with you on fusion science research issues if I am confirmed.

Question 2. The Department of Energy has designated the entire state of New Jersey as part of a National Interest Electricity Transmission Corridor. The designation was the result of a subpar congestion study. On the West Coast the DOE produced a transmission line-by transmission line study of congestion which resulted in a narrow, targeted transmission corridor. The Mid-Atlantic transmission corridor covers all or part of 8 states and the District of Columbia and has been characterized by some state regulators as setting up a "superhighway to coal electricity." As the DOE updates their congestion studies will you ensure that they are accurate on a transmission line-by-transmission line basis? And if the study shows it appropriate, will you be willing to narrow the Mid-Atlantic transmission corridor?

Answer. Our transmission and distribution system is aging and in need of investment and modernization. President-elect Obama has put forward a vision to stimu-

late major investment in our national utility grid. Siting new transmission lines is a key component of this effort, and striking the right balance between local, state and federal authorities and interests is paramount. At this point, I do not have a view on the balance struck in EPACT 2005 with respect to the designation of National Interest Electricity Transmission Corridors, but if confirmed, as I said in by testimony before the Committee, I will review the new study and if appropriate certainly consider adjustments to the Mid-Atlantic corridor. I look forward to thoroughly reviewing this critical issue and working with you on it.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR SESSIONS

You have stated a need for and support the implementation of a cap and trade program in the United States to limit greenhouse gas emissions, which will associate a cost with the amount emitted. However, recently a growing number of scientists are questioning how quickly the warming is happening and whether humans are actually the leading cause. They are worried that people are too focused on carbon dioxide as the culprit. Recent warning has stopped since 998, and they want to stop measures that will hurt our already spiraling downward economy. More than 31,000 scientists across the world have signed the Global Warming Petition Project, a declaration started by a group of American scientists that states man's impact on climate change can't be reasonably proven.

Question 1. If you are confirmed to be the Secretary of the Department of Energy, will you treat with respect those who raise questions about global warming and have minority views on this important issue?

Answer. Consistent with one of the important elements of the scientific method, scientists are always challenging the prevailing view, looking for weak spots and places where new discoveries can lead to breakthroughs or even can overturn entire paradigms. I respect that scientific process, and always approach new information with an open mind. That said, the state of climate science continues to improve steadily, and the weight of international scientific opinion continues to favor heavily the conclusion that human activities are, in fact, causing fundamental changes in Earth's climate.

Question 2. A desire to transition away from our current energy mix and towards lower carbon energy sources, while incredibly important, is also very expensive. If you are confirmed to be the Secretary of the Department of Energy, what will have a higher priority for you capping green house gas emissions or the certainty of higher costs to our already struggling economy?

Answer. President-elect Obama believes that unchecked emissions and continuing climate change poses serious threats to our environment, our economy, and our security. There is no question that doing nothing about climate change risks imposing huge new costs on our economy and our citizens. At the same time, however, it is essential that we develop market-based systems (such as a cap-and-trade program) for reducing greenhouse gas emissions, in order to minimize costs. But one of the most promising ways to meet both our climate change and energy goals without harming consumers is to develop the next generation of technologies that will enable us to transform the way we produce and use energy in America. I believe that R&D and other policies to promote efficiency and renewables will dramatically reduce the costs of controlling climate-changing emissions. In addition, they will help eliminate the threat to American families from the recurring energy price shocks that our current dependence on imported oil have caused. If confirmed, I look forward to helping to lead that effort.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR WYDEN

TRIBAL ENERGY AND TRUST RESPONSIBILITIES

Question 1. Section 502 of the Energy Policy Act of 2005 created a new Office of Indian Energy Policy and Programs to promote energy planning, management, education, and infrastructure development on Tribal lands. In addition, the Federal Government has broad trust and treaty responsibilities with regard to Indian Tribes. In the Northwest, there are a number of Department activities that impact, or have the potential to impact, Tribal interests ranging from the clean-up of the Hanford Reservation to operation of the Bonneville Power Administration under the Northwest Power Act. If confirmed, what steps will you take to ensure that the Department consults with the Tribes on critical issues, such as impacts of these activities on salmon, and meets its obligations to them?

Answer. I recognize the importance of the Department's obligations to federally recognized Indian Tribes. Just as important, I am aware that many tribes have significant energy resources within their reservations, and want to work to develop

them in ways that work for the tribe's economic development and to help meet our nation's energy challenges. Both of these situations create new opportunities for working together in the future. The missions of the Office of Indian Energy Policy and Programs and the Office of Environmental Management ("EM") have been focal points for these efforts within the Department, and there may well the need to develop strong ties in the future. If confirmed, I will work to improve the relationship between the Department and Indian Tribes, and to examine related programs within the context of an overall review of the Department's budget.

BALANCED RENEWABLE ENERGY PORTFOLIO

Question 2. Under the Bush Administration whole sectors of energy technology and energy management were essentially discarded as immaterial to solving our Nation's energy problems—geothermal was zeroed out. Hydroelectric technology funding, including wave energy and tidal energy, was zeroed out. While funding was provided for ethanol research, very little was provided for advanced biofuels or direct biomass utilization technologies. The industrial efficiency program was almost completely eliminated. And, almost nothing was spent on energy storage technologies—a valuable tool for both grid management and for maximizing the benefits of intermittent renewable energy generation technologies. Would you agree that we need a broad portfolio of green energy technologies and would you commit to resuscitating these previously underfunded programs, so that we truly have a balanced portfolio of energy technologies?

Answer. Yes, I believe that we must step on the accelerator on a wide range of renewable energy research, development, and deployment to the marketplace. That includes things like solar, wind, hydrogen, biomass, hydro and others. Advances in biofuels, including cellulosic ethanol, biobutenol and other new technologies that produce synthetic petroleum from sustainable feedstocks offer tremendous potential to break our addition to oil. DOE has a major role to play. DOE supports research in a number of scientific disciplines that are relevant for renewable energy. Many, but certainly not all of these research efforts take place at the National Research Energy Lab. My own former laboratory, Lawrence Berkeley Lab, for example, also does research on renewable energy issues. The range of research sponsored by DOE is large—from support for research on materials, to development of software systems for integration of renewables into the grid, to research on bioenergy systems, and so forth. DOE is the premier sponsor of research on renewable energy in the U.S., and if confirmed, it will be my goal to make these programs not just bigger, but more effective in harnessing the scientific talent we have across the country to develop energy solutions and help get them into the marketplace more quickly.

RENEWABLE ENERGY RESOURCE ASSESSMENTS

Question 3. In addition to policy support, the Department of Energy has supported resource assessments and promoted growth targets for other renewables, most recently the 20% by 2030 wind report. Such reports are critical components to promoting the potential of renewable energy industries to the public and policymakers alike. Other technologies, such as hydropower's growth potential, are not as well documented by the Department. Would you support the development of a similar report for the hydropower industry that includes conventional hydropower, and new ocean, tidal and in-stream hydrokinetic technologies?

Answer. I agree that there is substantial untapped potential in these other renewable technologies that needs to be explored. A formal resource assessment makes a great deal of sense, and if confirmed, I would be happy to look into ways the Department might achieve them.

LOAN GUARANTEES

Question 4. During your confirmation hearing a number of Senators urged you to expedite the loan guarantee program established in Title XVII of the Energy Policy Act of 2005. While the loan guarantee program has had some very strong supporters on this committee, and I think it is fair to say that I am not among them. Since the program is with us, however, there are two principles I think we should insist that it observe. The first is objectivity, fairness, and transparency. I think it is essential that DOE ensure that in awarding guarantees, it will adhere to clear, objective decision-making criteria and establish a selection process that is transparent and fully documented. This has not been the case to date. Some technologies were deliberately excluded from the first round solicitation and DOE refused to provide any documentation of its ranking methodology or any explanation of how it selected the finalists. The second basic principle is fiscal prudence. We are in challenging economic times. DOE needs to make sure that they do not become more challenging

because of guarantees awarded to projects and applicants that are not creditworthy. Some of the guarantees under consideration are in the billions of dollars, and DOE could readily add to our expanding deficits by guaranteeing projects that present a significant risk of default. Would you commit to observing these principles and administer a loan guarantee program that is fair, transparent, and fiscally sound?

Answer. President-elect Obama has made transparency a key objective of his Administration. If I am confirmed, I will work to make the program effective, objective, fair, transparent and prudent.

LNG EXPORTS

Question 5. Pursuant to Section 3 of the Natural Gas Act, the Secretary of Energy is obligated to approve the export and import of natural gas. On June 30, 2008 and July 30, 2008 respectively, the Department issued and affirmed an order to allow two major integrated oil companies—ConocoPhillips and Marathon Oil—to export liquefied natural gas (LNG) from Alaska to Japan notwithstanding warnings from the Department's Energy Information Administration that American's were going to pay dramatically higher heating bills in the lower-48 states and that key natural gas customers in Alaska did not have an assured supply of gas. Given the facts in the case, I do not understand how the Department arrived at its decision that the proposed exports were in the public interest and wrote to Secretary Bodman asking him to review the decision, a request he never responded to. How would you interpret the public interest standard required for natural gas exports?

Answer. I am not familiar with the details of this particular case, but I recognize that decisions affecting domestic natural gas supplies are critically important. If confirmed, I will acquaint myself with this issue, and will work with you to ensure that the Department makes careful decisions under the law that you cite.

SPR EXPANSION

Question 6. In the name of energy security, the Bush Administration has proposed to double the size of the Strategic Petroleum Reserve to 1.5 billion barrels at a cost of upwards of $10 billion in capital costs and billions of dollars more for the oil to fill it. This considerable investment will not leave the United States any less dependent on imported oil for its daily energy needs, nor will it reduce our oil requirements by a single drop. What is your position on expanding the size of the Reserve beyond the current 727 billion barrels? What is your position on continuing the Bush Administration's program to expand the reserve to 1.5 billion barrels?

Answer. Although I do not know the program in detail, I understand that Congress directed the DOE to expand the SPR to 1 billion gallons. DOE recently took steps to move in this direction. I believe that the SPR does provide an important safeguard against disruptions in oil supply, but also believe that management of the SPR, like many other programs, can be improved. If confirmed, I will review SPR policies with a goal of making the program more flexible, more effective and less costly.

ENERGYSTAR

Question 7. The EnergyStar program has been an enormously successful program under which the Energy Department and the U.S. Environmental Protection Agency work with the private sector and energy experts in developing voluntary energy efficiency standards for a wide variety of consumer products. These standards enable consumers of all kinds to rely upon these standards in their purchasing decisions and have resulted in substantial energy savings. However, EnergyStar standards only measure direct energy use of the product. They do not take into account the lifecycle energy use of manufacturing and use, nor do they take into account other environmental impacts such as green house gas production. As a result, the current approach to EnergyStar standards may result in certification of products and corresponding consumer purchasing decisions that do not result in the best overall national energy or environmental outcome. If confirmed, would you support a reexamination of the EnergyStar standards formulation process, or a pilot program, that would take into account lifecycle energy and climate impacts?

Answer. President-elect Obama has made clear his support for clean and efficient energy production and use, and for aggressive greenhouse-gas reduction goals. The EnergyStar program certainly plays an important role in guiding consumer purchasing decisions in directions that support those goals. If confirmed, I will review the program with attention to an examination of the issues involved in incorporating lifecycle energy and climate impacts.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR BUNNING

CTL

Question 1. In your testimony you state that we must make a greater commitment to achieving energy independence. I, too, share this goal and believe that coal can play a vital role in achieving this through the development of coal-to-liquid fuels technology. Through the use of clean coal initiatives and the Department of Energy's loan guarantee program, we have the opportunity to create American jobs, cut our dependence on Middle East Oil and substantially reduce emissions. As the Secretary of Energy will you continue to support this DOE loan guarantee program as well as efforts to utilize clean coal initiatives, such as coal-to-liquid fuels, to achieve energy independence?

Answer. I believe that we can and should pursue energy policies and technologies that advance both our energy security and climate change goals. I also believe that the loan guarantee program can help accelerate the development of new energy facilities and technologies that can contribute to meeting some of our national goals. I also support further research and development into technologies that can help us use our vast coal reserves in new, more efficient, and less-polluting ways. The objective of coal-to-liquids R&D should be to develop technology that is superior to conventional gasoline in terms of life-cycle greenhouse gas emissions.

COAL-FIRED ELECTRICITY

Question 2. Mr. Chu, in the past you have described coal as your worst nightmare despite the fact that coal keeps more than half of all Americans' utility costs at an affordable rate. As Secretary of Energy, will you support coat-fired electric generation and the construction of new coal-fired plants as a means to provide reliable, cost-effective electricity for the American people?

Answer. Coal is a vital energy resource for our country. Coal currently provides fifty percent of our electricity, and we have enormous coal reserves that ensure that coal will be part of our energy mix into the future. At the same time, coal-fired power plants are the largest contributor to U.S. greenhouse gas emissions, and a growing source of global emissions. That's why I share President-elect Obama's view that we need to aggressively pursue carbon capture and storage technology. We're going to need this technology here in the United States, and it's going to be needed in China, India and elsewhere around the world. If confirmed, I look forward to working you and with Congress as a whole to advance CCS technology as swiftly as possible.

PUTTING A PRICE ON CARBON

Question 3. In the past you have supported efforts to put a price on carbon emissions whether it be through a carbon tax or cap and trade legislation. As we have seen in Europe and elsewhere, cap and trade legislation or carbon taxes do little to reduce actual carbon emissions and resulted in higher emissions and higher utility prices for consumers. Do you believe that increased development of carbon capture and sequestration technologies is a more reliable way to achieve effective CO_2 management while ensuring that American families will not bear the burden of increased energy costs?

Answer. I believe that a cap-and-trade program, which President-elect Obama has endorsed, and carbon capture and sequestration technologies, which he also supports, are complimentary. As the President-elect has said, we must rapidly develop the technologies that will enable us to use our vast coal reserves in more efficient and environmentally benign ways. A cap-and-trade program can provide incentives to move in this direction. By combining the use of such technologies with new policies to develop renewable energy sources and to cut energy waste, we can achieve our energy and climate goals. And we can do so using market-based systems that do not impose costly burdens on consumers and businesses.

NUCLEAR ENERGY CLEANUP

Question 4. Mr. Chu as you may know my state is home to the only operating nuclear enrichment plant in Paducah, Kentucky as well as a large stock pile of depleted uranium. Do you support recycling spent nuclear fuel as a means to meet our obligations in the Nuclear Waste Policy Act? Also, do you believe that the communities that are home to this nuclear waste should play a role in deciding what will be done with it?

Answer. I believe that we should conduct R&D into technologies to reduce and recycle nuclear waste. However, I share the President-elect's view that in doing so,

we must not compromise our non-proliferation or safety objectives. I also believe that all stakeholders should be allowed the opportunity to offer opinions about waste management options.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR CANTWELL

HANFORD CLEANUP

Hanford, the most contaminated radioactive waste site in the Western hemisphere, is a constant challenge for us in the Pacific Northwest. Unfortunately it has also been the source of constant friction with DOE, because for decades the Department failed to meet its legal obligations to clean up Hanford, threatening the health and well-being of citizens of central Washington.

I know better than most that Hanford is not a glamorous issue, but that does not mean it's any less urgent. Hanford cleanup accounts for almost 10 percent of DOE'S entire budget, so I hope that, in notable contrast to your predecessors, you will commit as Secretary to turn the page on years of broken DOE promises and ensure that the DOE finally lives up to its responsibility at Hanford.

The most urgent threat to human health and the environment at Hanford are the 53 million gallons of radioactive waste stored in 177 underground tanks—67 of which have been confirmed to have leaked and are reaching groundwater and moving toward the Columbia River.

If all the tank waste is not contained and eventually reaches the river, this would be catastrophic and could eliminate the ability to use Columbia River water for fish or drinking water.

Over the last 8 years, the Bush Administration has failed to live up to its legal obligations to fund a safe and timely clean up as mandated by the Tri-Party Agreement between the state of Washington, the Department of Energy, and the Environmental Protection Agency.

With the Department of Energy missing major tank waste cleanup and Waste Treatment Plant milestones in the last two years and with no hope of timely compliance, the Columbia River is becoming even more threatened by the potential for a catastrophic and irretrievable radioactive leak.

There are 149 single shelled tanks, each of which is beyond its design life by as many as 30 years, unless we retrieve the remaining tank waste more expeditiously, we could have a catastrophic radioactive leak into the Columbia River as soon as thirty-years from now.

However, this thirty-year estimate is not even certain because DOE hasn't made the necessary investments in analyzing the groundwater contamination or tank waste leakage.

The state of Washington believes that this catastrophic event is more likely to be avoided with a commitment to retrieve 20 single shell tanks by the time the Waste Treatment Plant if fully operational by 2019, and accelerated cleanup of contaminated groundwater to protect the Columbia River and restore the groundwater to beneficial use.

The state of Washington recently came close to an agreement with DOE to revise the cleanup milestones and reinvest in DOE'S commitment at Hanford. Unfortunately the agreement that the state worked out with Secretary Bodman fell through in part because the Department of Justice would not support it. Now the state has announced that it is suing DOE to force it to meet the cleanup milestones.

Question 1a. Do you support the principles articulated in the Tri-Party Agreement, especially including the requirement that the tank waste must be 99 percent retrieved to prevent further groundwater contamination?

Answer. I support the principles of the Tri-Party Agreement including the prevention of further groundwater contamination. As to the detailed provisions of the Agreement, I will conduct a thorough review once I am confirmed, and pledge to work closely with you on this issue.

Question 1b. If the threat to the Columbia River could be resolved with increased Hanford funding of $2 billion over the next four years, which could be part of the stimulus package to create thousands of jobs, would you support it?

Answer. I cannot comment on the specifics of potential stimulus legislation at this time, but I certainly appreciate the importance of having the necessary funding available to move forward with the cleanup at Hanford. If confirmed, I know that you and I will be working closely on this matter.

Question 1c. Can you also, like Secretary Bodman, commit to resolve the state's lawsuit and agree to a legally enforceable cleanup schedule to ensure no additional delays and missed milestones?

Answer. I am committed to work with the U.S. Department of Justice, Washington State, and EPA in an effort to resolve outstanding issues regarding Hanford cleanup.

Question 1d. What is your plan to get the Department of Justice to agree to the necessary concessions to meet the cleanup milestones of the Tri-Party Agreement?

Answer. My staff and I will work with our counterparts at the Department of Justice to address the outstanding issues with Washington State.

Question 1e. What will you do to turn the page on years of broken DOE promises and ensure that the DOE finally lives up to its responsibility at Hanford?

Answer. DOE will work with Washington State and EPA to establish achievable enforceable milestones and then work towards achieving those goals.

BPA BORROWING AUTHORITY

The Bonneville Power Administration owns 70 percent of the grid in the Pacific Northwest. Having such a vital resource in public, non-profit ownership has been a boon to our economy and enabled us to utilize our abundant and emissions free hydropower.

However, future demand growth and the need to accommodate vast new wind farms threaten to overwhelm BPA's current infrastructure and its ability to meet national reliability standards.

A timely increase in BPA's borrowing authority is needed to maintain the value of BPA's existing systems and to add new transmission capacity and smart grid technologies to meet regional load growth and a more diverse array of energy sources.

Increasing BPA's borrowing authority, unlike many proposed stimulus measures, will have virtually no long term cost to taxpayers given BPA's 25-year record of making its annual payments, with interest, to the U.S. Treasury.

Providing BPA access to capital unavailable on today's frozen credit markets will immediately stimulate the economy by allowing 4,700 megawatts of new renewable resources to come online in the next two years and helping create an estimated 50,000 direct and ancillary green jobs. Green power means green jobs, construction jobs and economic multiplier spinoffs that benefit local communities.

During this time of serious economic challenge, it is important that an economic stimulus package provide a high return on job creation and also move our nation toward a cleaner energy future. This is why now is the time to make the long neglected investments necessary in our nation's electricity grid to increase its efficiency and reliability and to meet future demand growth by integrating more renewable and distributed sources of energy.

Question 2. Will you support efforts to increase BPA's borrowing authority by $5 billion in the stimulus package, which we note will all be paid back to the U.S. Treasury?

Answer. As I stated in my testimony before the Committee, I do support efforts to increase BPA's borrowing authority. I look forward to working with you on this important issue.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR DEMINT

NUCLEAR ENERGY

Question 1. Do you believe nuclear energy can play a valuable role in reducing greenhouse gas emissions?

Answer. Today, nuclear power accounts for 20 percent of U.S. electricity generation, and more than 70 percent of U.S. zero-carbon electricity generation. Certainly, it will be part of our energy mix, and contribute to meeting our climate change goals, into the future.

Question 2. Recently you signed a report titled, "A Sustainable Energy Future: An Essential Role of Nuclear Energy," that you and nine other national laboratory directors sent to Secretary Bodman? Do you still support the report's findings and recommendations? If not, what specific recommendations do you oppose?

Answer. I agree with President-elect Obama's views on nuclear power. He has made it clear that he understands the contribution that nuclear energy makes to our economy, and that he believes it will be part of our energy mix into the future. The President-elect supports license extensions for plants that meet NRC standards, and will support continued R&D into improved waste reduction and safety advances. President-elect Obama has also stated that he does not believe that Yucca Mountain is a workable option for the permanent disposal of spent fuel, but has pledged to work towards resolving issues around waste management, proliferation.

These views are in line with many of the recommendations in the report that you cite.

Question 3. The report said that expanding the use of nuclear energy is essential for establishing a sustainable energy future. Do you agree?

Answer. President-elect Obama has said repeatedly that he understands the contribution that nuclear energy makes to our economy. The Energy Policy Act of 2005 provides a number of incentives for nuclear power, and the Nuclear Regulatory Commission has seen a resurgence of applications from utilities. If confirmed, I pledge to work to implement those EPAct incentives effectively, including the loan guarantee program, and also to support a research effort to improve recycling and proliferation-resistant technologies.

Question 4. On page 6 of this report, it states ... "The disposition of used nuclear fuel must be considered from both a short-and long-term perspective. Confidence regarding the disposal of waste is needed before the NRC will grant a license for a new plant and before private investors will accept the financial risk of ordering ne nuclear plants. In the short term, this confidence can be achieved by continuing the licensing of a geologic repository at Yucca Mountain and enabling the continued interim storage of used fuel in dry casks and fuel pools. Do you support the license application for Yucca Mountain that is before the Nuclear Regulatory Commission?

Answer. President-elect Obama has stated that he does not believe that Yucca Mountain is a workable option for the permanent disposal of spent fuel. At the same time, he understands the concerns about some current storage arrangements for the waste. Fortunately, the NRC has affirmed the safety of dry cask storage, but I believe DOE should support research into additional means for assuring the long-term, safe, and cost-effective transportation and storage of waste, as well as into proliferation-resistant techniques for waste reduction. If confirmed, I will work with Congress, the nuclear power industry, and other stakeholders to address these important issues with objective, scientific analysis and with other important considerations including cost and technical issues.

Question 5. If not, why not? And if not, then what in you view is the likely impact of not licensing Yucca Mountain have on the confidence of regulators and investors in going forward with plans for new nuclear plants?

Answer. Again, the President-Elect has provided clear guidance that Yucca Mountain is not a workable option for the permanent disposal of spent fuel. The utility industry has made clear that, while it would prefer to see the Yucca Mountain Project go forward, it does plan to proceed with building new nuclear plants regardless of the lack of a permanent disposal site. In fact, a little over a week ago, Progress Energy announced plans to build two new reactors in Florida. In addition, there a number of applicants for DOE's nuclear loan guarantee program, a program that I will support if I am confirmed.

Question 6. In the absence of Yucca Mountain, what would be your plan for the disposition of DOE spent fuel and high level waste accumulating at DOE EM cleanup sites at Hanford, Idaho and Savannah River?

Answer. I understand that DOE has a continuing responsibility for managing its defense waste, regardless of the outcome of either regulatory or policy decisions concerning Yucca Mountain. Currently, I am not in a position to know the range of alternatives for carrying out that responsibility in the absence of Yucca Mountain. However, I do understand that resolving the important issue you raise will be an important task for the Department to undertake. If confirmed, I will certainly look forward to discussing this matter with you further and to developing a sustainable policy for managing the spent fuel and waste at federal sites using the best technologies for ensuring public safety and environmental protection and remediation.

Question 7. Without Yucca Mountain, won't these cleanup sites become de facto permanent storage/disposal facilities? Without Yucca, what is your plan to comply with the current legally binding agreements between the federal government and the states that require the removal of these radioactive materials?

Answer. I concur that the agreements between the federal government and states are an important factor in any evaluation of alternatives to Yucca Mountain. Again, I am not currently in a position to know the range of alternatives that might be available—or their legal, technical, or economic ramifications—but I do understand that the Department will have to develop such alternatives, and I look forward to hearing your views about them.

Question 8. Are you aware that the U.S. Navy's current disposal plans for U.S. Navy spent fuel are based on disposal at Yucca Mountain. Without Yucca Mountain, what is your plan for complying with the BATT agreement?

Answer. If confirmed, I will work with Congress and other federal agencies to ensure that spent fuel from the federal sector is fully incorporated into the evaluations and development of safe and secure long-term storage solutions.

Question 9. With the current Federal liability for failure and non-performance of DOE to begin accepting commercial spent fuel for disposal from utilities is at about $ 11 billion. In you view, if the Yucca program does not go forward, is not properly funded or is otherwise terminated, what in your view would be the total estimated liability if U.S. utilities filed for full breach of contract with DOE?

Answer. I understand that the Department could have significant potential liability under the scenario you describe—in which DOE does nothing to fulfill its responsibilities under the Nuclear Waste Policy Act and U.S. utilities successfully sue for full breach of contract. However, I currently am not in a position to know the full range of issues that could affect the total amount of such potential liabilities, nor do I yet know the full range of alternatives that may be available to avoid such an outcome. If confirmed, however, it is my intention to work with the Congress to craft a strategy that satisfies the Department's legal obligations and provides a reasonable path forward for the nation's utilities.

Question 10. In the absence of moving forward on Yucca Mountain, are you aware of any "Plan B" for disposing of DOE's spent fuel and high-level waste and for meeting DOE's contractual and statutory obligations? If so, what is it and please provide the Committee with the details of your plan.

Answer. If the Bush Administration has developed such a plan, I am not familiar with it. However, I do understand that, in the absence of Yucca Mountain, it will be important to develop alternatives for complying with DOE's statutory and contractual obligations. If confirmed, I will ensure that the necessary work to develop those alternatives is undertaken, and that it emphasizes the protection of public health and safety and the environment. I also understand that such alternatives need to reflect and balance the interests of ratepayers, taxpayers, states, and utilities.

Question 11. If you don't have a "Plan B" would you agree that it would be irresponsible and imprudent not continuing with the Yucca program, its funding, the licensing and design, etc.?

Answer. As I have indicated, I do not know if the Bush Administration has developed an alternative plan for spent fuel in the absence of Yucca Mountain, and I have not developed my own plan. Again, I emphasize that I do believe that the development of alternatives that provide long-term assurance of safe and secure waste management, based on sound science, will be an important task for the Department in the absence of the Yucca Mountain option.

Question 12. If confirmed and sworn in as Secretary of Energy, will you unequivocally adhere to and enforce the Nuclear Waste Policy Act, as amended, and the Yucca Mountain Development Act of 2002.

Answer. If confirmed, I will of course comply with and carry out all my responsibilities under the law, as Secretary of Energy.

Question 13. Do you believe that the U.S. Nuclear Regulatory Commission is a credible technical and scientific regulator of the nation's nuclear facilities? Do you believe that the NRC is best qualified in determining the suitability and safety of Yucca Mountain as a repository?

Answer. The Nuclear Regulatory Commission has significant technical and scientific expertise, which it brings to bear in its role as the primary regulator for commercial nuclear energy facilities. However determining and assuring the suitability and safety of Yucca Mountain is a responsibility shared among a number of agencies.

Question 14. Do you believe that the U.S. spent fuel and high-level disposal policy should be guided more by science than by politics?

Answer. I believe that nuclear waste policy should be guided by several criteria. For example, it certainly should reflect sound science and meet the highest feasible technical standards. It must also be safe and secure, and ensure the protection of public health and the environment. Finally, it should reinforce public trust and confidence, and search for workable solutions that take economic and other factors into consideration.

ENVIRONMENTAL MANAGEMENT

Question 15. More than half the DOE budget is dedicated to the Cold War legacy and the sites that currently have nuclear waste—do you support an aggressive clean up schedule to clean up and close the remaining sites? Or do you support managing the waste on site?

Answer. I support a safe and environmentally responsible cleanup program that meets the commitments DOE makes to its stakeholders, including its regulators. I understand DOE is moving as expeditiously as possible in its cleanup mission with the resources provided by Congress. These commitments include both on-site and

off-site disposal of wastes. I might also note that I am encouraged by recent Stimulus Package proposals that could help shrink the "footprint" of DOE's clean-up sites, which I hope would lead eventually to new opportunities for local communities to re-develop them.

Question 16. If Yucca Mountain does not open what policies will he support to ensure that defense waste is stored safely and securely?

Answer. I believe that DOE has a clear obligation to the states, to the public, and to Congress to ensure that defense wastes are safely managed. As I stated in my earlier answers, I do not at this point know what the range of alternatives may be for fulfilling the Department's responsibilities, but I do understand that, in the absence of Yucca Mountain, it will be important to develop them.

ENERGY INDUSTRY

Question 17. You once said: "We want to partner with companies at the very beginning, because the companies can tell us, 'No, don't go down this pathway. It won't scale right,' or, 'We know of things that perhaps an academic would not know about,' so we don't go marching down a road and find out, after five, 10 years, no, this isn't going to be a solution."

What types of partnerships do you intend to build with industry to improve coordination and successfully move technology into the marketplace.

Currently, the Department of Energy has been slow to negotiate and sign Cooperative Research and Development Agreements with independent labs and companies. Do you support CRDAs and what will you do to improve the process for these agreements to move forward quickly.

Answer. I believe CRDAs have been an important technology transfer tool linking the government and private sector. In my capacity as Director of Lawrence Livermore National Laboratory, I have been keenly aware of the issues associated with these agreements—what works, what can be improved, how to more effectively manage the different operational cultures of the private and public sectors. Seeking ways to improve upon these public-private partnerships will be a top priority of mine if I am confirmed, and that includes examining how the Administration of these agreements can be improved.

Question 18. What do you think about partnering with the cold war site communities, to build areas of expertise? Allowing communities to develop business interests that are in line with the missions at these sites or use them as energy parks on the sites—i.e. SRS could be a commercial nuclear site, Los Alamos could be used for solar, Hanford for geothermal?

Answer. I think that is an interesting proposal, and if confirmed, will review it further, and would welcome your additional thoughts. American technological leadership rests on the shoulders of the talent of our nation's scientists. Exploring ways to strengthen this resource and deploy that knowledge to achieve national energy goals is of personal interest to me, and would be among my priorities. I agree with the President-elect, who believes we need to rely more heavily on the expertise and resources of our national laboratories in developing and deploying next-generation energy technologies for the marketplace.

Question 19. Despite all the government money for R&D, it is still dwarfed by the amount of funding the private sector provides far research. How do you intend to partner with business and the private sector to improve R&D in the US?

Answer. The President-elect is committed to identifying and implementing ways to use our federal dollars more wisely and more effectively, and that includes mechanisms for leveraging federal dollars with the private sector. As Director of the Lawrence Berkeley National Laboratory, I have challenged some of the best scientists to turn their attention to the energy and climate change problem and to bridge the gap between the mission-oriented science that the Office of Science does so well and the type of applied research the leads to energy innovation. I have also worked to partner with academia and industry. I am confident that these efforts are working, and I want to extend this approach to an even greater extent throughout DOE's network of national science laboratories.

Question 20. Do you believe companies need a predictable time line to transition from one technology to another in the area of energy generation? How long do you believe is necessary for a energy utilities to transition from one technology to another, and how much government do you believe is necessary to accomplish that timeline?

Answer. Yes, I believe that companies can benefit from a predictable timeline in making such transitions. That is one reason, for example, that the new Administration hopes to work collaboratively with Congress in developing a set of emissions-reduction goals and schedules. In that way, utilities and businesses can make long-

term investment plans based on the need for more energy efficient technologies that emit fewer greenhouse gases. Obviously, other factors, including some that are difficult to predict—such as energy and materials costs and the pace of technological innovation—will always complicate transition planning, regardless of the role of government. If confirmed, I hope to lend by experience as a scientist and lab director to the discussions about policy, timing, science, and economics that lie ahead as we undertake a historic transformation to a cleaner, more sustainable energy future.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR MARTINEZ

Question 1. I am a strong proponent of nuclear power. My state of Florida will potentially build three new reactors that will provide hundreds of thousands of households with clean, reliable, and emissions-free power. As the former director of a prestigious national lab, what types of research priorities remain to help truly facilitate a nuclear renaissance and what do you plan to do to ensure that it becomes a reality?

Answer. Today, nuclear power accounts for 20 percent of U.S. electricity generation, and more than 70 percent of U.S. zero-carbon electricity generation. The Energy Policy Act of 2005 (EPAct) provides new incentives for nuclear power, and there has been a resurgence of applications to the Nuclear Regulatory Commission to build new nuclear power plants. If confirmed, I pledge to work to encourage the development and deployment of all low-carbon sources, including nuclear, to support innovative research in advanced technology and processes, and to provide more effective management of the loan guarantee program provided in EPAct.

Question 2. Along those lines, what types of regulatory or bureaucratic hurdles do we need to eliminate to bring nuclear power on-line in a safe manner? I ask this because the Nuclear Regulatory Commission estimates that its best case scenario for successful review of a new license application is roughly three and a half years.

Answer. At this point in time, I am not in a position to render judgments about the Nuclear Regulatory Commission's license review process. However, if confirmed, I do expect to examine the technical factors that affect both the timelines and cost structure of siting, building, and licensing of new nuclear plants. In addition, as stated above, I will ensure that the nuclear loan guarantee program is supported with the necessary resources and management attention.

Question 3. Florida ratepayers have spent over $1.2 billion to send stored spent fuel to Yucca Mountain. Where do you stand on this issue? On January 5, 2009, Majority Leader Harry Reid issued a release stating, "(the) President-elect reiterated his promise to work with me to prevent the dump from ever being built. The first step is to make even deeper budget cuts this year than I have already been able to make in the past. Yucca Mountain was a dangerous proposition from the start and T am very pleased that President-elect Obama shares my commitment to come up with a more responsible solution to our nation's nuclear waste challenges."

Do you share those sentiments? If so, what solutions would you suggest in storing spent fuel in addition to honoring the obligations required by law under the Nuclear Waste Policy Act?

Answer. President-elect Obama has stated that he does not believe that Yucca Mountain is a workable option for the permanent disposal of spent fuel. At the same time, he understands the concerns about some current storage arrangements for the waste.

Fortunately, the NRC has affirmed the safety of dry cask storage, but I believe DOE should support research into additional means for assuring the long-term, safe, and cost-effective transportation and storage of waste, as well as into proliferation-resistant techniques for waste reduction. I also recognize that DOE has ongoing statutory obligations with respect to spent fuel. If confirmed, I will work with Congress and other members of the Administration to ensure the development of safe, long-term waste management solutions.

Question 4. As you well know, we had a very difficult time getting the Title 17 Loan Guarantee Program up and running at DOE which was authorized in the 2005 Energy Policy Act. I believe it took over 2 years to get DOE to simply offer the Notice of Proposed Rulemaking for the loan guarantee program.

Answer. Today, nuclear power accounts for 20 percent of U.S. electricity generation, and more than 70 percent of U.S. zero-carbon electricity generation. The Energy Policy Act of 2005 (EPAct) provides new incentives for nuclear power, and there has been a resurgence of applications to the Nuclear Regulatory Commission to build new nuclear power plants. If confirmed, I pledge to work to encourage the development and deployment of all low-carbon sources, including nuclear, to support innovative research in advanced technology and processes, and to provide more effective management of the loan guarantee program provided in EPAct. As far as ex-

panding nuclear incentives, I think it will be important first to get this first package of incentives implemented. I know that there are still economic, market and regulatory uncertainties regarding new nuclear plants, which I hope can be clarified in the course of licensing the first several new plants

Question 5. Last Congress I joined a bipartisan effort with members of this Committee in introducing the Clean Energy Investment B& legislation. This bill would have created a new financing authority similar to the Export-Import Bank. This concept has been embraced by many groups including the Institute for 2 1' Century Energy. According to the Electric Power Research Institute and other industry estimates, the US will need massive investments in new power generation to meet growing demand requiring $350 billion over the next 15 years. Private institutions are reluctant to take on significant, long-term debt for new alternative energy projects. What are your thoughts about finding new financing avenues for alternative energy projects?

Answer. I believe that we need a range of approaches to stimulate research, development and deployment of clean energy technologies. Certainly, the loan guarantee program represents one important opportunity to advance the state of renewable energy technologies and to stimulate investor interest in them. If confirmed, I will ensure that the DOE loan guarantee program is managed in a way that treats the development of such technologies as a priority.

Question 6. Do you support long-term extensions of the renewable production tax credits?

Answer. President-Elect Obama has put forward aggressive but achievable goals for renewable electricity production, and a set of policies to help achieve them. One of these policies is an extension of the production tax credit for renewables. I look forward to working with Congress and others in the Administration in support of this policy.

Question 7. You have been quoted in several news publications regarding speeches you have given where you state, "coal is my worst nightmare." Can you elaborate on what you meant from those speeches so we can get an idea of where you stand on coal-fired generation? Coal provides over 50% of our nation's power and DOE has a significant fossil research budget, as well as R&D efforts for clean coal power generation. It would be helpful to know where you stand so that your comments are not being taken out of context by media reports.

Answer. I share President-elect Obama's view that we need to aggressively pursue carbon capture and storage technology. We're going to need this technology here in the United States, and it's going to be needed in China, India and elsewhere around the world. Both the President-elect and I agree that coal is a vital energy resource for our country. As you know coal currently provides fifty percent of our electricity, and we have enormous coal reserves that can provide power long into the future. At the same time, coal-fired power plants are the largest contributor to U.S. greenhouse gas emissions, and a growing source of global emissions. That's why, if confirmed, I plan to lead DOE forward on CCS technology as swiftly and as effectively as possible.

Question 8. You were quoted in December 12th Washington Post article where you stated that electricity prices were "anomalously low" in the United States. Power bills have been going up all over my state to pay for the increases in fuel prices, and new utility infrastructure. Do you really believe electricity prices are too low in the U.S., and if so, what should our constituents be paying?

Answer. As I noted during the confirmation hearing, my goal is to reduce the amount that American families pay to heat, cool and light their homes. I think there are many ways that we can do that, particularly through policies that promote deployment of energy efficient technologies.

Question 9. In your new role as Secretary what is your vision for the Office of Science and what would you pursue with President-elect Obama to enhance our nation's competitiveness in math and sciences?

Answer. I strongly believe that regaining U.S. preeminence in science and technology is critical to our future economic growth and prosperity. It will be one of my highest priorities as Secretary to strengthen the Office of Science during my tenure to better achieve this goal.

Question 10. You have been very involved at Berkeley National Lab on research and development of second generation biofuels. Florida has a great deal of potential in this arena with biomass and cellulosic ethanol—what steps do we need to take to ensure that DOE is leading the way in cutting edge alternative fuels?

Answer. I am optimistic about biofuels because, as you note, I have been very actively assessing their potential as Director of LBNL. Advances in biofuels, including cellulosic ethanol, biobutenol and other new technologies that produce synthetic petroleum from sustainable feedstocks offer tremendous potential to break our addic-

tion to oil. DOE has a major role to play as the premier sponsor of research on renewable energy in the U.S. If confirmed, it will be my goal to make these programs not just bigger, but more effective in harnessing the scientific talent we have across the country to develop energy solutions and help get them into the marketplace more quickly.

Question 11. In that same vein, what policies would you embrace to make that a reality? I believe it is time to remove the foreign ethanol tariff, which is acting as a trade distorting subsidy and denying coastal states like Florida the ability to develop ethanol infrastructure. Since there are no pipelines to transport ethanol from the Midwest to Miami, how else will the infrastructure get there?

Answer. President-elect Obama's energy proposals include a number of policies and measures to help develop next generation biofuels that can be produced in all regions of the country, including research funding for cellulosic and other advanced biofuels; incentives to expand ethanol infrastructure; incentives to encourage the commercialization of advanced biofuels technologies; and a national "low-carbon fuel standard" to spur low-carbon fuels. If confirmed, I will work to implement these policies, and will assist the President-elect in reviewing current biofuels policies across the board in order to ensure that we have an effective set of policies in place.

Question 12. In a December 2008, a Washington Post article you were quoted in saying that we need to build a "new kind of photosynthesis" to help catalyze the development of second generation biofuels. Are you referring to algae-derived fuels? If so, it is my understanding that these types of fuels do not qualify for advanced biofuel tax credits. Should this be remedied?

Answer. Algae-derived fuels are but one of many potential sources of clean, secure, economic biofuels we expect to be available in coming years. Certainly, if confirmed, I will work with Congress and others in the Administration to ensure that we address all aspects of research, development, and distribution of energy supplies in a way that promotes economic growth and an improved environment, within the U. S. and around the world.

Question 13. Your testimony stated that you support the Obama Administration's approach in dealing with climate change via a cap and bade system to regulate greenhouse gas emissions. When do you anticipate this plan or approach will be released by the President-elect? Do you anticipate that it will be placed on hold given our nation's current economic difficulties?

Answer. The President-elect has made it clear that turning the economy around and putting people back to work is his highest priority. At the same time, he continues to believe that energy and climate change are pressing problems that need to be addressed, and he has rejected the idea of waiting to pursue solutions to them. Many of the programs being discussed for inclusion in the economic stimulus package are designed not only to produce jobs and economic activity, but also to advance an energy system with lower greenhouse gas emissions. The details of a climate plan are yet to be developed by the incoming Administration, and many of the people who will help lead that discussion are not yet in place, so it is difficult to predict the timing of any new climate initiatives or proposals.

Question 14. In your testimony you mentioned that the President-elect supports "responsible development of domestic oil and natural gas." Many of us on the Committee are anxious to learn what that exactly means. As a Senator from a coastal state, do you expect him to push for more oil and gas leasing in the Outer Continental Shelf (OCS)? Will he reinstate the Presidential moratoria in the OCS?

Answer. President-elect Obama supports increased domestic exploration and production in many places, including in the OCS, provided that it is done responsibly. Several years ago, Congress opened new areas in the Gulf of Mexico, where exploration is underway. President-elect Obama has said that he is open to a limited expansion of OCS drilling as part of a comprehensive energy proposal that includes accelerated renewable energy development and greater investment in energy efficiency. If confirmed, I pledge to work with you, other members of Congress and other members of the Administration to enact comprehensive energy legislation along these lines.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. Dr. Chu, here in the Energy Committee, we take pride in the good working relationship between the majority and minority, both Senators and our staff. If confirmed, will you pledge to cooperate in this type of a working relationship with all Senators on this Committee, Democrat or Republican—by promptly responding to any written or phone inquiries, sharing information as soon as it becomes available—and directing your staff to do the same?

Answer. The Committee's reputation for collegiality is well known. If confirmed, I certainly plan to work cooperatively with all the Senators on the Committee. In that spirit, I will be as timely as I possibly can be in responding to requests and in providing information to you and your colleagues.

OIL AND GAS

Question 1a. In what circumstances do you believe it is appropriate to release oil supplies from the Strategic Petroleum Reserve (SPR)? Do you believe SPR actions should be tied to the price of oil?

Answer. It is my understanding that releases of SPR oil are triggered by a presidential finding of an energy emergency, meaning a severe supply interruption. Generally, oil prices are not, in the absence of a physical supply interruption, considered to be sufficient grounds to meet the requirements of the statute regarding a release.

Question 1b. Do you believe the contents of SPR should he diversified to include not only unrefined oil but also finished products?

Answer. While I am not sufficiently versed in all the ramifications of adding these components to the SPR, if confirmed, I would note that, as currently administered, the SPR facilities are not configured in a way that lends itself to storing refined products.

Question 1c. If confirmed as Energy Secretary, would you seek to fill the reserve to the 1 billion barrel capacity?

Answer. President-Elect Obama believes that the Strategic Petroleum Reserve is a critical tool to deal with disruptions in oil supplies. The timing and amounts of additional SPR purchases are issues that will require—and receive—careful review if I am confirmed. The prohibition against purchasing SPR oil has expired and, with oil prices heading down, it may be advantageous to consider making additional purchases in 2009.

Question 2. What is your position on the imposition of a "Windfall Profit Tax" on oil companies?

Answer. I support the President-elect's position that with oil prices at current levels, and possibly falling further, such a tax would not be appropriate.

Question 3. According to the Wall Street Journal, you recently expressed support for a higher gas tax that would eventually put the price of gasoline in America on par with European levels. As Secretary of Energy, do you plan to encourage increases in the federal gas tax? If so, would you seek to keep them revenue neutral by reducing other taxes by equivalent amounts?

Answer. I recognize that last year's spike in gasoline prices caused economic hardship for many American families. In addition, we are sending hundreds of billions of dollars overseas each year to purchase imported oil, which is harmful to our economy. To deal with all of these challenges, we need a comprehensive, long-term strategy. President-elect Obama has put forward just such a strategy—a comprehensive energy and climate change policy that will hasten the development of alternative fuels and efficient, advanced vehicle technologies. The President-elect does not support, and neither do I, raising federal gasoline taxes as an energy policy. Instead, we need a much broader-based approach to transforming America's energy future, and, if confirmed, I hope to be actively engaged in working with you and your colleagues in forging such a policy.

Question 4. Do you support efforts to establish gasoline price gouging as a federal crime?

Answer. This is likely a more appropriate issue for the Federal Trade Commission. I am not currently sufficiently familiar with the issue to make a specific commitment at this time; I will be pleased to work with you and the other members of the Committee to determine the appropriate approach, if confirmed.

Question 5. Do you support or oppose efforts to authorize the Department of Justice to sue the Organization of Petroleum Exporting Countries?

Answer. I am generally aware of legislation that has been proposed in this regard, but I am not currently sufficiently familiar with the issue to make a specific commitment at this time. However, I believe that it is likely that the new Administration will want to review the various legal, foreign policy, economic, and energy dimensions of that issue before developing a position on such legislation.

Question 6. Do you support the expansion of existing oil refineries and/or the construction of new facilities?

Answer. I am not yet in a position to determine what new refining capacity may be needed, or where, although I certainly understand that maintaining a robust American refining sector is critically important to maintaining stability in energy markets. With oil demand projected to continue falling this year, and with profit margins shrinking in recent months, the industry may not be inclined to build addi-

tional capacity in the near future. However, as economic recovery takes hold—hopefully later this year—it will be important to monitor the need for new refining capacity. If confirmed, I will make sure that the Department of Energy does its job in that regard.

Question 7. As you know, in 2008 the price of oil was marked by extreme volatility. Many experts attributed these price movements to supply and demand factors such as geopolitical uncertainty and the growth of developing nations. Others believed excessive speculation by institutional investors drove oil prices. What is your position on the issue?

Answer. As you have noted, there are many factors that affect the price of oil, and I think it is clear that speculation has played a role. President-elect Obama has proposed addressing this issue through a series of steps, including fully closing the so-called "Enron loophole" that protects some electronic trading in energy futures from Federal oversight.

COAL

Question 1. Coal currently supplies 50% of our nation's electricity supply and is an abundant, inexpensive domestic resource. What role do you see for coal in the nation's energy mix in the future? Compared to commercial-scale carbon capture and sequestration, how important are incremental efficiency improvements within the existing coal fleet?

Answer. Coal is a vital energy resource for our country. As you note, coal currently provides 50 percent of our electricity, and we have enormous coal reserves that can provide power long into the future. At the same time, coal-fired power plants are the largest contributor to U.S. greenhouse gas emissions, and a growing source of global emissions. That's why I share President-elect Obama's view that we need to aggressively pursue carbon capture and storage technology. We're going to need this technology here in the United States, and it's going to be needed in China, India and elsewhere around the world. I know that the Committee has taken a strong interest in CCS, and I look forward, if confirmed, to leading the Department in the effort to develop new, cleaner technology for both new and existing plants. In addition to developing effective new technologies designed for new plants, I believe that cost-effective improvements can and should be made to the existing fleet. The pace of those technology improvements is hard to predict, but, if confirmed, I look forward to working with this committee and Congress as a whole to move forward on CCS technology as swiftly as possible.

Question 2. As you know, the Energy Department has restructured the "FutureGen" project, which had been slated for the construction of a single plant in Illinois, to instead focus on carbon capture and sequestration at several sites. Do you support that decision or do you intend to reverse it?

Answer. I am not familiar with the details of the Bush Administration's decision-making with respect to the FutureGen program. If confirmed, I will undertake a thorough review of the program, and do whatever I can to ensure that DOE moves forward in collaboratively testing the variety of technologies that hold promise for cleaner-burning coal plants. More broadly, I believe that it must be a top priority of the Department to accelerate research and development of a range of carbon capture and storage technologies.

Question 3. Twenty-three of the 25 power plants with the lowest operating costs in the United States utilize coal as their primary feedstock. In a carbon-constrained future, how can we alleviate the additional costs associated with carbon capture and sequestration?

Answer. I believe that a cap-and-trade program, which President-elect Obama has endorsed, and carbon capture and sequestration technologies, which he also supports, are complimentary. As the President-elect has said, we must rapidly develop the technologies that will enable us to use our vast coal reserves in more efficient and environmentally benign ways. A cap-and-trade program can provide incentives to move in this direction. By combining the use of such technologies with new policies to develop renewable energy sources and to cut energy waste, we can achieve our energy and climate goals. And we can do so using market-based systems that do not impose costly burdens on consumers and businesses.

Question 4. In terms of federal assistance for the advancement of carbon capture and sequestration, what volume of carbon dioxide sequestered annually do you believe is sufficient to prove whether or not the technology is safe, reliable, and cost-effective? What funding structure do you envision for such a task?

Answer. Carbon capture and storage technologies hold enormous potential to reduce our greenhouse gas emissions as we power our economy with domestically produced and secure energy. We must work to ensure that clean coal technology be-

comes commercialized. If confirmed, I will be closely reviewing all of DOE's activities in this area and working to identify how we can accelerate the research, development and deployment of clean coal technology in a safe, reliable and cost-effective manner. Until I am able to conduct that kind of review, however, it is not possible for me to be more specific regarding exact sequestration goals, but clearly it will be important to develop a set of metrics by which to judge the cost-effectiveness of such investments. If confirmed, I will look forward to having your input in that important effort.

Question 5. Assuming that carbon capture and sequestration is proven safe, reliable and cost-effective, do you see a role for the Secretary of Energy in streamlining the federal permitting process?

Answer. If confirmed, I will certainly support the coordination I understand is already underway with EPA to develop rules and standards for underground sequestration of carbon dioxide, using the results generated from the various Regional Carbon Sequestration Partnership projects. Establishing regulatory certainty is key to advancing the commercial application of these technologies.

RENEWABLES

Question 1. As we seek to increase the use of renewable energy and reduce greenhouse gas emissions, it is important to differentiate between sources that can provide baseload power and those which cannot. What do you believe are the challenges and opportunities associated with using baseload and intermittent power sources n combination with one another?

Answer. Transmission challenges will need to be addressed, including issues related to siting and cost allocation of new transmission lines to access the Nation's best renewable resources. Our transmission and distribution system is aging and in need of investment and modernization. The key to integration of intermittent power sources with baseload lies in advanced technologies. President-elect Obama has put forward a vision to stimulate major investment in our national utility grid, including smart metering, distributed storage and other advanced technologies to accommodate 21st century energy requirements. Done right, upgrading the grid will create jobs and result in greatly improved electric grid reliability and security, increased renewable generation and greater customer choice and energy affordability.

Question 2. In transitioning to an increased role for renewables, what steps should be taken to address the energy storage and transmission concerns that accompany such a shift? Also, what role do you see for coal with carbon sequestration and nuclear in terms of ensuring electric reliability at times when the wind may not be blowing or the sun may not be shining?

Answer. Our transmission and distribution system is aging and in need of investment and modernization. The key to integration of intermittent power sources with baseload lies in advanced technologies. President-elect Obama has put forward a vision to stimulate major investment in our national utility grid, including smart metering, distributed storage and other advanced technologies to accommodate 21st century energy requirements. Coal is a vital energy resource for our country. Coal currently provides fifty percent of our electricity, and we have enormous coal reserves that can provide power long into the future. Coal-fired generation with carbon sequestration will be needed for some time to come as a contributor to our baseload production, as will nuclear.

Question 3. There have been some legislative proposals to require the build-out of transmission to move only renewable sources of electricity. In general, is it advisable, or even feasible, to mandate a transmission line to carry only renewable resources? Given the capacity factor issues, shouldn't the construction of facilities needed to deliver wind power also be available to deliver back-up power and move other electricity resources when the wind is not blowing?

Answer. Building new transmission lines is a key component of the effort to utilize our renewable resources, and striking the right balance among local, state and federal needs and interests is critically important. Clearly, our transmission and distribution system is aging and in need of investment and modernization. President-elect Obama has put forward a vision to stimulate major investment in our national utility grid, including smart metering, distributed storage and other advanced technologies to accommodate 21st century energy requirement. Done right, upgrading the grid will create jobs and result in greatly improved electric grid reliability and security, increased renewable generation and greater customer choice and energy affordability. To the greatest extent practicable, new transmission infrastructure should be configured so as to maximize the efficiency of the lines so that costs can be reduced and benefits enhanced. If confirmed, I look forward to thoroughly

reviewing all of DOE's efforts in this area and working with you on this important issue.

Question 4. Do you support a one-size-fits-all national Renewable Electricity Standard (RES) or does it make more sense to take a state's individual renewable resources into account when establishing targets and timetables? Do you agree that one of the goals of any RES should be the promotion of emission-free sources of power?

Answer. President-elect Obama has put forward aggressive but achievable goals for renewable electricity production, and a set of policies to achieve them. These policies include a national RPS, as well as an extension of the production tax credit for renewables, a cap on carbon emissions, increased R&D for renewables, and support for loan guarantee programs to accelerate deployment of renewables. I believe these policies will have enormous benefits in terms of both reduced greenhouse gas emissions and improved human health due to reduced NO_X, SO_X and mercury pollutions.

NUCLEAR ENERGY

Question 1. In June 2008, after more than 20 years of review, and with the recommendation of both Congressional chambers, the Department of Energy submitted a construction and operation license to the Nuclear Regulatory Commission for the Yucca Mountain spent nuclear fuel repository. That independent regulatory agency is now tasked with evaluating the proposal and establishing the safety of the repository. Do you support the full and adequate funding of the Yucca Mountain license review? In your opinion, what is an appropriate window for the program to demonstrate proof of compliance with EPA standards?

Answer. The Nuclear Regulatory Commission's review of the Yucca Mountain License Application is proceeding under the Nuclear Waste Policy Act. If confirmed as Secretary, I will work with Congress and other members of the Administration to find safe, long-term solutions for spent nuclear fuel that meet our legal obligations, maintain nuclear power as part of our energy mix, and provide a secure disposal path based on the best scientific analysis. The issue of funding for the NRC's license review will of course have to be developed in the context of the larger set of budget decisions facing the new Administration. It will also have to reflect the President-Elect's position that Yucca Mountain is not an option as a disposal site for spent fuel.

Question 2. Please describe the measures you believe the next Administration should take to increase the use of emission-free nuclear power.

Answer. Today, nuclear power accounts for 20 percent of U.S. electricity generation, and more than 70 percent of U.S. zero-carbon electricity generation. The Energy Policy Act of 2005 (EPAct) provides new incentives for nuclear power, and there has been a resurgence of applications to the Nuclear Regulatory Commission to build new nuclear power plants. If confirmed, I pledge to work to encourage the development and deployment of all low-carbon sources, including nuclear, to support innovative research in advanced technology and processes, and to provide more effective management of the loan guarantee program provided in EPAct.

Question 3. What role do you believe the U.S. has in establishing a sustainable and secure international nuclear energy infrastructure?

Answer. Since the advent of nuclear power, the U.S. has been a leader in the peaceful uses of nuclear power, beginning with the Atoms for Peace program begun in the 1950s under President Eisenhower. If confirmed, I pledge to work with Congress and with others in the Administration to continue to work through a number of international and bilateral arrangements to promote policies and practices that provide security, promote affordable, sustainable energy supplies, address long-term high-level radioactive waste management and disposition, and protect against proliferation.

Question 4. Recently a group of scientists from MIT and Harvard released a discussion paper promoting the use of nuclear power in the next administration. The discussion paper highlighted several obvious issues that need to be addressed, such as concerns over proliferation; spent fuel; and continued safe operations. This group also identified the large size (1,000-1,600 MW) of our existing technology and capital costs as a potential concern. In my opinion, there are regions of the country and around the world where demand is strong enough and rate bases are large enough to support our next generation of large reactor technology. But what this paper appears to ignore are a series of small, scalable, modular nuclear electric power plants which are currently under development which have significant potential to serve as non-emitting, base load resources for less populated areas. These small-scale, modular designs run the gamut of new battery-like devices to traditional light water re-

actor designs. What steps can Congress and the Administration take to help move this technology along?

Answer. President-elect Obama has said repeatedly that he understands the contribution that nuclear energy makes to our economy. The Energy Policy Act of 2005 provides a number of incentives for nuclear power. One of the best things we can do is work to effectively implement those incentives, including the loan guarantee program and focused research efforts, especially on improved recycling and proliferation-resistant technologies.

ELECTRICITY

Question 1. We all support increasing the use of renewable energy but we must build more transmission capacity in order to move location-restrained renewable resources to load. The Committee has recognized siting issues as one of the largest impediments to building more transmission. In the Energy Policy Act of 2005, Congress tried to address this problem by directing DOE to establish Transmission Corridors in congested areas and providing the Federal Energy Regulatory Commission with limited back-stop siting authority. 'I'o date, however, not a single line of transmission has been sited pursuant to these EPAct authorities. Did Congress go far enough in the 2005 energy bill or is greater federal siting authority needed?

Answer. Our transmission and distribution system is aging and in need of investment and modernization. President-elect Obama has put forward a vision to stimulate major investment in our national utility grid, including smart metering, distributed storage and other advanced technologies to accommodate 21st century energy requirement. Done right, upgrading the grid will create jobs and result in greatly improved electric grid reliability and security, increased renewable generation and greater customer choice and energy affordability.

Siting new transmission lines is a key component of this effort, and striking the right balance between local, state and federal authorities and interests is paramount. I am aware that many miles of transmission facilities have been sited successfully in the U.S. without having to resort to the EPAct authorities you reference in the question. That said, there are also examples of facilities that appear to be needed but that are not moving forward due to siting barriers. At this point, I do not have a view on the balance struck in EPAct, but if confirmed, I look forward to thoroughly reviewing this critical issue and working with you on it.

Question 2. One of the most promising developments that can improve the efficiency and performance of the electric grid is the so-called "Smart Grid" technology. In the 2007 Energy Independence and Security Act, Congress authorized funding to support Smart Grid technology research, development, and demonstration, along with other Smart Grid-related investment costs. To date, these programs have not been funded but they may receive federal dollars in the economic stimulus package now under development. Do you support funding for these programs, and do believe these and other Smart Grid programs should be a priority at the Department?

Answer. Yes. Our transmission and distribution system is aging and in need of investment and modernization. President-elect Obama has put forward a vision to stimulate major investment in our national utility grid, including smart metering, distributed storage and other advanced technologies to accommodate 21st century energy requirement. Done right, upgrading the grid will create jobs and result in greatly improved electric grid reliability and security, increased renewable generation and greater customer choice and energy affordability. If confirmed, I look forward to thoroughly reviewing all of DOE's efforts in this area and working with you on this important issue.

Question 3. In the 2007 energy bill, Congress tasked the National Institute of Standards and Technology (NIST) with developing a framework that includes protocols and model standards for information management to achieve the interoperability of smart grid devices and systems. In your opinion, is NlST the appropriate entity to undertake this work or should Congress direct the Energy Department or the Federal Energy Regulatory Commission to develop a Smart Grid interoperability framework?

Answer. Standards are critical to development of smart grid technology. If confirmed, I will be proactive in pushing industry to come together to accelerate development of standards, and will examine the question of roles for NIST and other entities in that process.

Question 4. There are a number of regional transmission planning efforts currently underway. Should we instead focus on a national model for transmission plans?

Answer. I am not familiar with the details of the regional transmission planning efforts you describe, but appreciate that there are distinct differences in the needs

and planning processes that exist around the country, particularly in the East versus the West. Nonetheless, I believe it is important that we develop a national model with input from all stakeholders.

Question 5. What role do you see for the Energy Department in addressing cyber security threats to the electricity industry? Is additional federal authority in this area needed?

Answer. I understand that DOE has a public-private partnership that has been working to improve cyber security in the electronic systems that control the flow of electric energy in the United States. I do not have a view at this time about whether additional authority is needed, but if confirmed I would be pleased to work with you and other Members of the Committee on this important issue.

PROJECT FINANCING

Question 1. Alternative energy companies have an incredibly difficult time securing the financing necessary to become viable and productive. DOE'S Loan Guarantee program, established by the 2005 Energy Policy Act, has proven woefully inadequate for addressing this problem thus far. How would you improve the administration of this program?

Answer. I share your concern that we have no time to lose in making these programs work as Congress intended, and, if confirmed, I will certainly take a close look at how they are working. In light of the current tough economic climate and credit crunch, we know that these loan guarantees are critical. I understand that DOE currently has before it several proposals for renewable projects and other types of technologies and is expecting to receive another set of proposals in the near future. If I am confirmed, I will work with you to ensure that we make the program effective and prudent.

Question 2. Several pieces of legislation were introduced last Congress to create a self-funding federal hank to assist start-up, clean energy companies. As envisioned by those bills, such an entity would be able to issue not only loan guarantees, but direct loans and insurance products as well. Additionally, this federal bank would, in some instances, be allowed to assume a financial stake in clean energy technology firms and issue publicly-traded stock. Do you believe it is appropriate for the federal government to back start-up, clean energy technology firms in this manner?

Answer. I believe that we need a range of approaches to stimulate research, development and deployment of clean energy technologies. I am not familiar with the legislation that you cite, but if confirmed, I look forward to discussing this and other ideas for encouraging greater investment in new energy technology and infrastructure.

CLIMATE CHANGE

Question 1. How do you see a cap and trade market being designed? Do you support a cost containment mechanism? Do you support the inclusion of off-sets and, if so, what eligibility criteria do you believe should apply to those projects? Should property rights be extended to the holder of permits-to-emit under a cap and trade program?

Answer. President-elect Obama has proposed a cap-and-trade program to reduce greenhouse gas emissions, but the details of that program will not be developed until after the new Administration takes office. At that time, the issues of environmental targets and timetables, cost containment, offsets, linkages to other nations' commitments, and the many other program elements and options will be fully examined. The President-elect has said that he plans to work with Congress to develop an effective, bi-partisan program.

Question 2. What role do you see the Department of Energy playing in the administration of a cap and trade program, if enacted?

Answer. President-elect Obama has proposed a cap-and-trade program to reduce greenhouse gas emissions, but the details of that program will not be developed until after the new Administration takes office. One of the most promising ways to meet both our climate change and energy goals without harming consumers is to develop the next generation of technologies that will enable us to transform the way we produce and use energy in America. If confirmed, I look forward to helping to lead that effort.

Question 3. Many areas of the United States, and the world, are already experiencing climatic change. How important do you believe adaptation will be, in terms of dealing with the issue of climate change in the very near future and going forward?

Answer. Mitigation actions to reduce greenhouse gas emissions are the most important steps that the United States must take. But most climate scientists believe

that additional warming is built into the system, and therefore adaptation will also be important, especially in the Arctic and other areas that are feeling dramatic effects sooner.

Question 4. At least week's hearing on energy security, we discussed the imposition of a carbon tax as a straight-forward and transparent option in our efforts to combat climate change. Last year, the now-nominee for the Office of Management and Budget testified as Director of the Congressional Budget Office that a carbon tax could be as much as five times more efficient than a stringent cap and trade program. What are your thoughts on a carbon tax in lieu of a cap and trade program?

Answer. President-elect Obama has stated his preference for a cap-and-trade system, which has several advantages over a carbon tax. Advantages of a cap-and-trade system include more certainty about achieving the desired level of greenhouse gas reductions, and the possibility of linkages between domestic and international cap-and-trade systems.

Question 5. A desire to transition away from our current energy mix and towards lower carbon energy sources, while incredibly important, is also very expensive. If confirmed, what level of coordination do you intend to pursue on climate change matters with the National Economic Council?

Answer. I expect that the National Economic Council will be a close partner of the Department of Energy and other agencies in the Administration's work on energy and climate change issues.

ENERGY EFFICIENCY

Question 1. In the 2007 Energy Independence and Security Act, Congress mandated the phase-out of traditional incandescent lights over the next few years. Are we on track to meet this requirement? Will consumers continue to have multiple product choices, including energy-saving halogen, energy efficiency incandescent, compact fluorescent, and Light Emitting Diodes?

Answer. The Energy Independence and Security Act was important bipartisan legislation and we must implement it aggressively. If confirmed I will make it a priority to review how the Department has been working to implement this important legislation and ensure that its mandates are met, including the phase-out of traditional incandescent lights over the next few years. At the same time, I believe that it's important for consumers to have a range of choices, and that's something that I will keep in mind if I am confirmed as Secretary and am charged with implementing this program.

Question 2. It would seem that more output from the same amount of fuel input is a win-win for the environment, the consumer, and the success of companies that operate electric power generation facilities across the country. And yet, these efficiency improvements are consistently not undertaken. What, specifically, gets in the way of incremental efficiency improvements at power generation plants in the existing fleet? What can this Congress do to remedy such a shortcoming?

Answer. Energy efficiency is the cheapest energy resource that we have. It will be a high priority for me if I am confirmed. I look forward to working with Congress to improve energy efficiency in existing power generation plants and throughout our whole economy.

Question 3. With so much energy-savings potential in Light Emitting Diodes (LEDs), what will you do as Energy Secretary to promote the use of LEDs in the market place?

Answer. Energy efficiency is the cheapest energy resource that we have. It will be a high priority for me if I am confirmed. We will start with the federal government, which is the world's largest single consumer of energy. The administration will make the federal government a leader in the green building market, including in the procurement of LED technology. By taking these and other steps, we can help restore federal leadership on energy efficiency and promote the use of more energy efficient lighting technology in the marketplace.

Question 4. What will you do to ensure that energy-efficiency product standards for appliance and commercial equipment are promulgated in a timely manner? Does the Department require additional resources in order to meet its statutory deadlines and requirements?

Answer. President-elect Obama has made strong commitments to improving the energy efficiency in the economy over the long term. Clearly one of the most important means for achieving these goals is through appliance efficiency standards, yet the Department of Energy has missed many deadlines. If confirmed, I will place a high priority on reviewing this program, including its budget, and ensuring that we keep on track in getting standards done on time.

RESEARCH AND DEVELOPMENT

Question 1. Many of us would like to see the development of a robust, domestic manufacturing base for batteries and other energy storage devices. Do you believe it is important that the raw materials needed for those batteries to come from within the United States as well? In what ways do you think the Energy Department's existing research and development programs related to battery research can be improved?

Answer. Electric energy storage and innovative battery technologies are keys to transforming the transportation sector, not only in the U.S., but also potentially worldwide. I believe that DOE should play a lead role in research and development, with the goal of restoring U.S. leadership in this critical technology. More broadly, the federal government can also play an important role by providing an early market for advanced batteries and plug-in hybrid vehicles. If confirmed, I look forward to working with you on this vital issue.

Question 2. Since the end of the Cold War, increased operational costs and changing national priorities have resulted in budget pressures and competition between the national laboratories for resources and programs. As Secretary of Energy, how would you promote the most efficient utilization of not just the Office of Science laboratories, but also the weapons and energy technology laboratories, to meet our evolving national and energy security needs? How would you re-engage the historical partnership between the laboratory system and university and private industry?

Answer. As director of Lawrence Berkeley National Laboratory I have been absolutely committed to challenging our best scientists there and in the private sector to work across the innovation spectrum from idea to application to product. If confirmed, as Secretary of Energy I will push all of the Department's 17 national laboratories to keep their eyes on the ball, to deliver solutions fast, and I will work diligently with members of this Committee and others in Congress to secure the funds these scientists need not only to pursue innovative science but also to support and train the graduate and post-doc students who represent our future prosperity and success.

Question 3. DOE has for years, frequently in partnership with the private sector, completed many successful and important demonstration projects that have often reached commercialization. In your opinion, what is the most effective way to coordinate demonstrate, deploy and commercialize in order to optimize the results of DOE'S RD&D activities?

Answer. As Director of the Lawrence Berkeley National Laboratory, I have challenged some of the best scientists to turn their attention to the energy and climate change problem and to bridge the gap between the mission-oriented science that the Office of Science does so well and the type of applied research the leads to energy innovation. I have also worked to partner with academia and industry. I am confident that these efforts are working, and I want to extend this approach to an even greater extent throughout DOE's network of national science laboratories.

Question 4. Given current technology, it is still extremely expensive to produce heavy oil such as the oil which is predominantly remaining in Prudhoe Bay in Alaska and other established fields in the Lower 48. Since DOE's forecasts suggest we will remain dependent on fossil fuels for 79% of our energy needs in 2030, do you support research funding to produce more of our domestic hydrocarbon resources?

Answer. At present, I am not well-acquainted with the oil and gas research and development activities at DOE. If I am confirmed, I will undertake a thorough review of the Department's budget, including an examination of these programs.

Question 5. The Energy Department describes current geothermal power generation as the "low hanging fruit" of geothermal energy potential, and yet the Bush Administration proposed only $30 million for existing geothermal technology for Fiscal Year 2009. Despite the tremendous potential of traditional geothermal resources, including in my home state of Alaska, more federal dollars are being directed at developing additional geothermal electricity through the new Enhanced Geothermal System (EGS). As Energy Secretary how will you seek to allocate federal dollars between EGS technology and the expansion of existing geothermal resources?

Answer. I believe that geothermal is an extremely promising renewable energy sources. I do not have a view about the current allocation between geothermal programs and technologies at DOE, but if I am confirmed, I will quickly undertake a thorough review of the Department's budget, including an examination of this issue.

Question 6. Much of DOE'S water resources research has been done within the Office of Science, which focuses on basis research. Do you support more research as it relates to water for energy production—especially research aimed at reducing energy consumption in the transportation of water?

Answer. If confirmed, I will quickly undertake a thorough review of the Department's budget, including an examination of this program.

Question 7. In Fiscal Year 2008, DOE's Waterpower Program received $10 million for both conventional hydropower and new marine technologies. As Energy Secretary, how will you allocate federal funding between conventional and non-conventional hydropower resources?

Answer. I have not to date been able to examine in detail the Department's budget at the subprogram level. But I recognize the importance of efficient utilization of conventional energy resources as well as rapid development and application of advanced systems. If confirmed, I will quickly undertake a thorough review of the Department's budget, including an examination of this program.

Question 8. Do you intend to support continued, or increased, methane hydrate research if confirmed as the Secretary of Energy?

Answer. Methane hydrates have become a growing source of domestic energy in recent years. If confirmed, I will quickly undertake a thorough review of the Department's budget, including an examination of this program.

ADVANCED VEHICLES

Question 1. Last week, at a hearing on the energy security challenges facing America, several of our witnesses commented on the importance of electrifying the domestic vehicle fleet. Do you agree? What steps would you take to speed the development and deployment of advanced vehicles?

Answer. Electric energy storage and innovative battery technologies are keys to transforming the transportation sector, not only in the U.S., but also potentially worldwide. I believe that DOE should play a lead role in research and development, with the goal of restoring U.S. leadership in this critical technology. More broadly, the federal government can also play an important role by providing an early market for advanced batteries and plug-in hybrid vehicles. If confirmed, I look forward to working with you on this vital issue.

RENEWABLE FUELS STANDARD

Question 2. The Renewable Fuels Standard mandated by Congress in the 2007 Energy Independence and Security Act will require more ethanol than can be used as an El 0 blend—the fastest and most efficient way to increase the use of ethanol since it uses the existing infrastructure and existing vehicle fleet—beginning as soon as 20 1 0. What are your thoughts on how to best overcome this shortfall? Also, should Congress address the "blendwall" issue that caps the amount of biofueIs that may be blended into gasoline at 10%?

Answer. The blendwall is an issue that we need to evaluate. As I understand it, the EPA is reviewing this issue, but it is something that I am willing to look at, if confirmed. In addition, President-elect Obama's energy plan includes a number of policies and measures to help develop next generation biofuels that can be produced in all regions of the country, including research funding for cellulosic and other advanced biofuels; incentives to expand ethanol infrastructure; incentives to encourage the commercialization of advanced biofuels technologies; and a national "low-carbon fuel standard" to spur low-carbon fuels. If confirmed, I will work to implement these policies, and will assist the President-elect in reviewing current biofuels policies across the board in order to ensure that we have an effective set of policies in place.

COMPETITIVENESS

Question 1. In the 110th Congress we passed the America COMPETES Act, which was based on a report that you contributed to. How well do you believe that law captures the recommendations included in the report? Do you plan to seek or support additional measures that would strengthen our nation's competitiveness?

Answer. The America COMPETES Act reflects many of the recommendations in the Gathering Storm report. If confirmed, I pledge to work with the Administration and Congress to implement this law, and am open to discussing other ways in which we can strengthen the foundations of our long term competitiveness.

Question 2. You have been a strong supporter of an Advanced Research Projects Agency for Energy. ARPA-E was authorized by America COMPETES, but has not yet been implemented. What is your vision for this agency and how you think it should be structured?

Answer. The scope and structure of ARPA-E are broadly defined in both the Gathering Storm report and the America COMPETES Act. If confirmed, I will examine funding and structure for ARPA-E in the context of a review of the Department's budget. I believe that we must find ways to move the results of scientific research into useful applications for the nation.

BUDGETING

Question 1. As we face unprecedented budgetary deficits, it is clear that funding for many programs will be hard to come by. With regard to the Department of Energy, how would your budgetary priorities differ from those of the current administration? Can you identify any areas where the government should increase investment, and any areas where you think it should be spending less money?

Answer. If confirmed, I will quickly undertake a thorough review of the Department's budget to answer the questions that you have posed.

ENERGY BILL

Question 1. Congress has passed two major energy bills in the past four years. As Secretary of Energy, one of your primary responsibilities would be to oversee the implementation of the programs authorized by those bills. But it is also expected that Congress will again consider comprehensive energy legislation in the next few months. What do you believe will be most important to include in that bill?

Answer. In the broadest sense, future energy legislation should focus on accelerating the development and deployment of renewable energy and energy efficiency, as well other policies and technologies that increase our energy security and reduce our greenhouse gas emissions. If confirmed I would look forward to actively participating with the members of the Committee and others in Congress on a wide range of specific issues as you develop energy legislation. We will also aggressively pursue implementation of the landmark energy bills signed into law in 2005 and 2007.

DOE ORGANIZATION

Question 1. The former head of Resources for the Future recently said that, "Contrary to what everyone thinks, there's very little the Department of Energy can do to affect the types of fuel the country uses or the amounts they use." Do you agree with this assessment? Do you intend to re-organize the Department and its agencies, or reorient their missions and focus?

Answer. The work that the Department of Energy has underway to advance the development of alternative fuels can have a very significant impact on the types of fuel that Americans use. I think that a good example of this can be found in wind technologies. The research supported in DOE's laboratories and through DOE financial assistance transactions is critically important. At this time I do not have specific plans to re-organize the Department, but if after confirmation I determine that is in the best interests of achieving our energy objectives, I would look forward to discussing this matter further with the Committee and others in Congress.

DOE ENVIRONMENTAL MANAGEMENT

It has been reported that Congress as a part of the Stimulus Package will provide immediate funding to EM for its weapons cleanup program. Estimates have ranged between $800 million to as high as $4 to $6 billion.

Question 1. With this in mind, I would like to know your views on this approach. In implementing such a program what are your priority projects and where would you expend any additional funds? Are you following the "shovel ready" approach? And how many jobs would you estimate are created on each priority project. In what time frame will these jobs be "on-line"?

Answer. I am not familiar with the details of the EM programs. However, based on what I do know, I believe that the EM program could put new funds to work quickly, creating new jobs.

ALASKA-SPECIFIC

Question 1. An issue of tremendous importance to my home state, Alaska, is the 1002 Area of the Arctic National Wildlife Refuge. If confirmed to be Secretary of Energy, would you support the development of this area, its permanent designation as wilderness, or leaving its status as it is today?

Answer. President-elect Obama supports increased domestic production in many places, but has gone on record as being opposed to drilling in ANWR. As you know, we have more than 68 million acres of offshore areas that are already under lease, and several years ago, Congress opened new areas in the Gulf of Mexico. President-elect Obama has said that he is open to a limited expansion of OCS drilling as part of a comprehensive energy proposal that includes plans to dramatically speed up the development of renewable energy and invest in efficiency and other clean energy sources. If confirmed, I pledge to work with Congress and other members of the Administration to enact comprehensive energy legislation along these lines.

Question 2. My home state of Alaska currently produces a great deal of energy. In 2001, DOE capitalized on the existence of large fossil fuel reserves in Alaska by creating a National Energy Technology Lab site there, which works in cooperation with the University of Alaska, the energy industry and state agencies. It is clear that additional opportunities exist in terms of Alaskan renewable energy production and our unique perspective on solving some of the problems associated with climate change. If confirmed, would you consider an expansion of the Arctic Energy Office's mission to allow for the advancement of a greater variety of energy resources in Alaska?

Answer. I enjoyed our discussion about the potential for far greater utilization of wind, geothermal, wave and other renewable energy resources to provide power to remote areas in Alaska. With respect to the Arctic Energy Office's mission, I am not sufficiently familiar with the issue to make a specific commitment at this time. However, if I am confirmed I will be glad to look examine this issue in more detail and discuss it with you.

RESPONSES OF STEVEN CHU TO QUESTIONS FROM SENATOR STABENOW

Question 1. I understand that DOE has struggled to implement loan guarantees in the past Administration, however it has started to implement direct loans for section 136 and the manufacturing of advanced autos. Similarly to section 136, I recently introduced legislation (S. 224) entitled The Green Jobs and Infrastructure Act of 2009 to address rising unemployment to try to retool our nation's economy towards a cleaner, greener future. Our bill would, among other things, call for the establishment a $50 billion loan program to help manufacturing plants retool and encourage the investment in manufacturing for clean tech products. Our estimates are that this program would create 250,000 direct manufacturing jobs in the U.S. and support an additional 725,000 indirect jobs. Do you think we can mimic this structure and policy of direct loans to help aid domestic manufactures to produce various clean tech products?

Answer. If confirmed, the development of clean energy technologies will be one of my highest priorities. I believe that we need a range of approaches to stimulate research, development and deployment of clean energy technologies. I am not familiar with the legislation that you cite, but if confirmed, I look forward to discussing this and other ideas about how best to encourage investment in domestic manufacturing of clean energy technology.

Question 2. I understand that DOE is currently reviewing applications for direct loans under section 136 for the production of advanced technology vehicles. While the Big 3 automakers are applicants, there are also numerous smaller suppliers who are leading the way in advanced technologies. These technologies will create the next generation of vehicles and green jobs. How will DOE dedicate resources to fully implement this program in order to expedite the next generation of vehicles made in the U.S.?

Answer. While I have not been briefed in detail on the current status of applications, it is my general understanding that the section 136 provision is intended to provide opportunities for a range of advanced automotive technology companies. If confirmed it will be a top priority of mine to ensure that the funds appropriated by Congress for DOE's auto loan guarantee program will be spent in the fashion intended and that the program is well managed. I recognize your strong interest in this program and I look forward to working together on it should I be confirmed.

Question 3. How ambitious should the federal government be in the electrification of our nation's transportation sector? What role will the Department of Energy play in achieving commercial scale vehicle electrification, and how will it help ensure that the technologies necessary are developed and produced in the United States?

Answer. Electric energy storage and innovative battery technologies are keys to transforming the transportation sector, not only in the U.S., but potentially worldwide. I believe that DOE should play a lead role in research and development, with the goal of restoring U.S. leadership in this critical technology. More broadly, the federal government can also play an important role by providing an early market for advanced batteries and plug-in hybrid vehicles, and by providing incentives for domestic manufacturing. If confirmed, I look forward to working with you on this vital issue.

Question 4. Given our country's need for increasing renewable energy generation to meet our national policy goals of CO_2 emissions reductions and becoming more energy independent, I would like to know your thoughts on supporting an increase in grant funding for non-profit, governmental utilities to develop renewable energy technologies and projects, especially for energy efficiency, biomass, solar, and geothermal generation projects?

Answer. As you suggest, we must step on the accelerator on renewable energy research, development, and deployment. That includes things like solar, wind, hydrogen, and biomass. DOE has a major role to play, and non-profit governmental utilities can play an important role as well. If confirmed, I would certainly work with you to explore ways to encourage and incentivize greater renewable energy generation in this sector.

Question 5. Some commentators have cautioned that we can't afford to aggressively address greenhouse gas reductions because there may be too much potential harm to the economy. Can you speak to the economic consequences of failing to address greenhouse gases? What are the economic opportunities, particularly in the manufacturing sector, within climate change policy?

Answer. President-elect Obama recognizes that the cost of failure to act on climate change will be large, and could be catastrophic. He also understands that many of the actions we can take to reduce our dependence on foreign oil and reduce greenhouse gas emissions will also create jobs. By promoting efficient use of our resources and embracing American ingenuity, President-elect Obama will get America back to work and make a down-payment on addressing climate change at the same time. In addition, President-elect Obama plans to make investments in energy efficiency, as well as research, development and deployment of low-carbon energy sources. Restoring leadership in clean energy technology holds great promise for revitalizing domestic manufacturing, which has been devastated in recent years. So while we need to ensure that we develop an equitable and effective climate strategy, I strongly believe that addressing the problem also presents an opportunity to retool American industry and manufacturing and establish a strong base for future economic prosperity.

Question 6. I am very pleased with your understanding of both basic and applied research. The DOE Office of Science plays a crucial role in the competitiveness of this nation and I urge you to continue to support the Office of Science at the highest level possible. I say this not only because the new Facility for Rae Isotope Beams (FRIB) has been awarded to Michigan State, but because 1 truly believe that the future economy of both my state and the Nation will be dependent upon the scientific breakthroughs created through fundamental research and I look forward to working with you in support of a robust Office of Science budgets. Can you tell me how you intend to balance the Department's science programs and implement the planning and construction of the FRIB?

Answer. As director of the Lawrence Berkeley National Laboratory I have challenged some of the best scientists there to address our Nation's energy and climate change problems by bridging the gap between the mission-oriented science that the Office of Science does so well and the applied research that leads to energy innovation and economic vitality. Michigan State University is to be commended for its successful proposal for the Facility for Rare Isotopes Beams. If confirmed, I will work with you and other members of Congress to strengthen the Office of Science as a whole, and to keep this important project moving forward.

Question 7. As you may remember, this chamber and the House passed legislation that the President signed into law entitled the America COMPETES Act to help sustain innovation and promote science and engineering. One of the provisions contained in this legislation was an authorization for the establishment of a high risk/high reward program entitled ARPA-E for energy breakthrough research, and inspired by the highly successful DARPA in the Department of Defense. Can you elaborate on your vision for ARPA-E and how there may be cooperation/coordination with other offices such as Science and Energy Efficiency and Renewable Energy at the DOE?

Answer. The scope and structure of ARPA-E are broadly defined in both the Gathering Storm report and the America COMPETES Act. If confirmed, I will examine funding for ARPA-E in the context of a review of the Department's budget. I am also open to looking at other ways to provide an environment for the kind of high-risk, high-reward research program envisioned in the ARPA-E concept.

Question 8. One of the most important and complex issues that we will be wrestling with relates to our electricity grid. While we have much discussion on Smart Grids and investments in "modernizing the grid" equally important is a discussion related to the transmission of renewable energy. While I how this is a complex question and there are many stakeholders, I am interested in learning more about your perspective. A comment was attributed to you stating that you supported the development of a truly "interstate electric transmission system." My understanding from a Wall Street Journal report is that you raised such an idea with Secretary Bodman and Secretary Paulson. Could you elaborate on this and tell us what policy steps, if any, would be needed to achieve such a system?

Answer. Our transmission and distribution system is aging and in need of investment and modernization. President-elect Obama has put forward a vision to stimulate major investment in our national utility grid, including smart metering, distributed storage and other advanced technologies to accommodate 21st century energy requirement. Done right, upgrading the grid will create jobs and result in greatly improved electric grid reliability and security, increased renewable generation and greater customer choice and energy affordability. If confirmed, I look forward to thoroughly reviewing all of DOE's efforts in this area and working with you on this important issue.

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