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Chairmen Upton and Whitfield, Ranking Members Waxman and Rush, and Members of the Committee, thank you for the opportunity to speak about the President's Climate Action Plan and the Department of Energy's role in its implementation.

The evidence is overwhelming, the science is clear, and the threat from climate change is real and urgent. This is my judgment and it is the almost universal judgment of the scientific community. The basic science behind climate change is simple: greenhouse gases make the earth warmer, and we are emitting more and more of them into the atmosphere.

The threat of a warming planet to our communities, our infrastructure and our way of life is also clear. Rising sea levels and increasingly severe droughts, heat waves, wildfires, and major storms are already costing our economy billions of dollars a year and these impacts are only going to grow more severe. Common sense demands that we take action.

This is the driving force behind the President's Climate Action Plan. Its three pillars are to cut carbon pollution domestically, to prepare for the worsening impacts of

climate change and to lead international efforts to combat climate change and prepare for its impacts. This will be done by leveraging the combined efforts of all relevant federal agencies from the Department of Energy and the Environmental Protection Agency, represented here, to the Departments of Defense, Homeland Security, State, Agriculture, Transportation, Interior, Commerce, Health and Human Services, and Treasury to mention just a few.

In addition, we will work internationally with other governments, and domestically with states, localities and, importantly, the private sector, to address the challenge of climate change, while creating new jobs, promoting new industries, saving lives and protecting the environment.

The Scientific Basis

I want to begin today by discussing the drivers of climate change. We have known for over one hundred years that certain trace gases in the atmosphere—most importantly water vapor, carbon dioxide, and methane— trap heat and warm the surface of the Earth. In fact, without greenhouse gases in the atmosphere, the Earth's surface temperature would be around zero degrees Fahrenheit, roughly sixty degrees Fahrenheit colder than it is today. That is well below the temperature needed for life as we know it to have evolved on the planet. It does not take much of a shift in this overall greenhouse effect to cause significant changes in the Earth's temperature. The increase in the quantities of greenhouse gases in the atmosphere as a result of human activity, above all the combustion of fossil fuels, has reached the

point that it is profoundly affecting the climate. How much more severe those impacts become going forward depends primarily on how rapidly and effectively the United States and other nations move to curtail greenhouse gas emissions.

While many greenhouse gases are produced by human action, carbon dioxide is particularly important because it is both long-lived – it can persist in the atmosphere for up to hundreds of years — and it is produced in large quantities by the combustion of fossil fuels. Right now, globally, we are putting around 35 billion metric tonnes of CO_2 into the atmosphere each year from fossil fuel combustion and land use change, with the majority coming from fossil fuels. Given the carbon cycle, the net effect is that the atmosphere retains about half of those emissions, with the rest absorbed by the oceans, forests and vegetation (although those natural sinks may become less efficient as CO_2 atmospheric concentrations rise). The arithmetic is that, without prudent action in the near term, we will approach a doubling of preindustrial carbon dioxide concentrations sometime around midcentury, a level that has been recognized by the scientific community as having major consequences. This means that if we don't start reducing emissions now, there is a very high likelihood that our children and grandchildren will face major climate disruptions.

Climate Impacts

We have an increasingly clear idea of what the consequences of such disruptions will look like. In the short term, while we cannot attribute any particular storm to climate change, we have all seen and experienced the devastation due to recent

extreme weather, such as the severe infrastructure and human impacts that Sandy inflicted on the Northeast. From that storm alone, economic damage has been estimated to be $65 billion. As sea levels rise, we can expect coastal flooding and the impacts of severe storms to worsen. We have also experienced protracted heat waves and droughts, which strain the power system and put some of our most vulnerable citizens at risk. Combined drought and higher temperatures have exacerbated the risk of forest fires and projections show wildfires will burn larger areas in the future and the season will last longer.

Climate change will have profound impacts on our energy system, which were recently detailed in a DOE report entitled "U.S. Energy Sector Vulnerabilities to Climate Change and Extreme Weather." Among the serious vulnerabilities of the energy system to climate change and extreme weather are:

- Rising sea levels and storm surges in the Gulf of Mexico, which produces 50% of U.S. crude oil and natural gas and contains nearly half of the total U.S. refining capacity, could cost the oil and gas production and refining industries $8 billion per year by 2030. In addition, unconventional oil and gas production is vulnerable to decreasing water availability.
- Power plants are at increased risk of having to undergo partial or full shutdowns due to lack of cooling water and higher temperatures. Last summer, several power plants in the Northeast and Midwest either shut down or sought special permission from federal and state regulatory

agencies to continue operating due to historically high cooling water temperatures.

- Electric transmission lines become less efficient as temperatures increase, and they begin to sag, increasing the risk of transmission interruptions. They are also vulnerable to wildfires, as we are seeing this summer in California.
- Higher temperatures lead to more air conditioning on the hottest days of the year, increasing the stress on the electric grid, requiring the construction of new peaking capacity and potentially increasing electricity bills for consumers.

The wide range of climate related impacts that we are seeing now is not a surprise to the climate science community. Although the specific climate impacts are difficult to predict at small geographic scales, the general trends and patterns were predicted by the science community decades ago.

There are common sense actions that we can take now to reduce our carbon emissions. These actions give us time to adapt, develop low-carbon technologies of the future and leave a better world for our children and grandchildren. That is the goal of the President's Climate Action Plan.

The President's Climate Action Plan

The President's plan has three parts. The first is to cut carbon pollution in America. Carbon dioxide is the dominant cause of climate change and, as already discussed, we must begin to reduce emissions now to mitigate its harmful effects.

The vulnerabilities of our energy infrastructure are only the beginning of the risks associated with climate change. As a policy issue, prudence suggests that we should take out an insurance policy, just like any family does on their home or automobile. In this plan, the President has put forward common sense steps that save money (e.g., through energy efficiency), reduce air pollution (e.g., through renewable, nuclear and low-carbon fossil energy deployment), and increase our national security (e.g., through reducing oil dependence).

We have made progress on reducing emissions over the past several years. In 2012, U.S. carbon emissions fell to their lowest level in nearly two decades and we must continue to build on our successes. We have seen unprecedented growth in clean energy and efficiency technology, and market driven substitution of natural gas for coal electricity generation has contributed to this reduction in CO_2 emissions, as have our energy efficiency programs.

However, even if we significantly reduce our emissions of carbon dioxide and other greenhouse gases, we will still experience the effects of our previous emissions. These impacts are "baked into the system." That is why the second part of the

President's plan is to prepare the United States for the worsening consequences of climate change. We are already experiencing climate changes, and we must identify our vulnerabilities and protect and improve our infrastructure so that we are ready for increasingly intense storms, droughts, and heat waves.

Finally, the United States cannot meet the challenge of climate change alone. We must lead international efforts to combat climate change and prepare for its impacts. That is the third part of the President's Plan. Climate change is a global problem, and America's leadership can galvanize international action.

The Department of Energy's role

The energy system produces over 85% of domestic greenhouse gas emissions. This includes the generation of electricity, the refining of fuels, and the energy used in residential, commercial, industrial and transportation end uses. In 2012, about 42% of our CO_2 emissions came from petroleum, 32% came from coal and 26% came from natural gas. This underscores the central role that the Department of Energy must play in reducing emissions as part of the President's Climate Action Plan.

In addition to the work performed by many other federal agencies, states and localities have often been leaders in renewable energy, energy efficiency and reducing carbon emissions. We will continue to learn from state and local experiences, and in turn, share our best information with state and local officials. We plan to work with them in implementing all aspects of the President's Plan from

identifying vulnerabilities to climate change to finding new ways of reducing carbon pollution.

Domestic Mitigation

My main focus today will be on what we in the U.S. can do domestically to reduce carbon pollution – and how we at DOE are helping. The first thing is to use our energy more intelligently. Right now, we waste enormous amounts of energy. That wasted energy is also wasted money. That is why I am committed to energy efficiency as a means to not only achieve near-term reductions in carbon emissions, but also to significantly reduce energy bills for American families and businesses.

As part of the President's Climate Action Plan, the Department of Energy is working to release a number of energy efficiency rules. We have now finalized a rule covering the standby power of microwave ovens, and we have issued proposals for three more rules covering metal halide lamp fixtures, commercial refrigerators and commercial walk-in coolers and freezers. We are also committed to issuing a proposed rule for electric motors by November with the goal of finalizing all these rules by May of next year.

The rules for commercial refrigerators and commercial walk-in coolers and freezers alone are expected to cut energy bills by up to $28 billion for consumers and cut emissions by over 350 million metric tons of CO_2 over 30 years. The Administration's goal is for efficiency standards for appliances and federal buildings

put in place in its first and second terms to reduce carbon pollution by at least 3 billion metric tons cumulatively by 2030 -- while continuing to cut families' energy bills. The latest efficiency rules also incorporate the most recent values for the economic benefits of reducing carbon pollution that rely on the most up-to-date peer-reviewed research.

As we work to increase the efficiency of our appliances and electronics, we are also working with industry and consumer organizations to find the fastest and most efficient way to get the job done. The Department encourages the development of market-based solutions that are a result of a consensus from all relevant parties, and has recently finalized several rules through consensus agreements.

Beyond energy efficiency, the Department of Energy also plays a central role in developing the technologies that will be part of a low-carbon future. We invest in advanced fossil energy, nuclear energy, renewable energy, advanced fuels, electric vehicles and other low-carbon technologies. This is part of the President's all-of-the-above approach to energy policy. Coal and natural gas generate almost 70% of the electricity in the United States, and they are projected to remain significant sources of domestic energy in the years to come. The public and private sectors must work together to ensure that all energy sources will be part of a low-carbon future.

That is why, as part of the President's Climate Action Plan, DOE has issued a draft solicitation for eight billion dollars in loan guarantees for advanced fossil energy

technologies. When issued, the solicitation will seek applications for projects and facilities that cover a range of technologies. These technologies could include any fossil technology that is new or significantly improved, as compared to commercial technologies in service in the U.S. Applicants must show that their proposed project avoids, reduces, or sequesters air pollutants or greenhouse gas emissions. We are currently engaging with the public and with industry, and we expect to issue a final solicitation this fall.

Since the beginning of the Administration, DOE has invested[1] around six billion dollars to advance clean coal technologies – particularly in carbon capture, utilization, and storage – that substantially reduce carbon emissions. Coal plays a key role in our energy mix, and the Administration is committed to advancing clean coal technologies to position the U.S. as a global leader in this technology and to help enable continued use of this important domestic energy resource in the low-carbon economy of the future.

This funding supports projects across the country that will inject millions of tons of CO_2 annually into geologic reservoirs over extended periods. We are also putting CO_2 to work in ways that can help offset the cost of capture – like enhanced oil recovery.

[1] DOE has obligated nearly $6 billion to advance CCS technologies. Consistent with sound project management practice, funding is outlayed as projects achieve milestones. Not all funds have been outlayed as many projects remain active.

Combined, these two programs represent $14 billion in loan guarantees and RD&D investments, all with the goal of enabling the use of coal and other fossil fuels in a carbon-constrained world. These programs are part of a real all-of-the-above clean energy strategy for a low carbon future where efficiency, coal, natural gas, nuclear and renewable sources all have an important role to play, and can successfully compete in a low carbon marketplace. The mix of solutions will vary by region. And since the President took office, we have seen domestic energy production surge. Oil imports are at a twenty year low and domestic oil and gas production are at the highest level in nearly two decades. And yet carbon dioxide emissions have gone down. We can grow our economy and reduce carbon pollution at the same time.

Some of the most impressive developments have been in clean and renewable energy technology. Department of Energy investments made over the past decades are now opening up entire new industries while bolstering existing ones, with dramatic reductions in price and skyrocketing deployment in important clean energy technologies over the last few years. Since the beginning of 2008, wind power capacity has more than tripled and solar power deployment has increased by a factor of ten. Today, photovoltaic modules cost one one-hundredth of what they did 35 years ago – and we are working to make them even cheaper. Since 2009, the number of super-efficient LED lights in the United States has grown 50-fold. And since 2008, the price of electric vehicle batteries has dropped by an estimated 50%.

We are also seeing important progress on nuclear energy. Here in the U.S., there are currently five nuclear reactors under construction. And the Department of Energy has provided a conditional loan guarantee to the Plant Vogtle project in Georgia, where the first reactors to be licensed in the United States with new passively safe features are being constructed. These activities are being closely watched by other utilities that are contemplating similar nuclear projects. And if the financial returns on operations are sufficient to justify the large upfront capital investment we will likely see other companies investing in nuclear energy in the near future. The Administration is also investing in research and development of small modular reactors that offer even more safety features, greater siting flexibility, and potentially lower costs than large reactors.

As part of the President's Climate Action Plan, I also want to mention that the Department of Energy will assist in the development and serve as the Executive Secretariat of the Quadrennial Energy Review, or QER. The goal of the QER will be to translate policy goals into a set of analytically based, clearly articulated actions over a four year planning horizon. It will engage the multiple executive branch agencies that have energy related economic, environmental, security, trade, innovation, and other equities. The process will be led by the Executive Office of the President and will seek input from many quarters. This first-ever review will focus on infrastructure challenges, and will identify the threats, risks, and opportunities for U.S. energy and climate security. It is due to be completed at the end of 2014.

Adaptation

As I said earlier, we must take action to reduce the carbon pollution that causes global warming. However, the science is telling us some climate change impacts are already here and more are on the way. A number of specific actions in the President's Plan will involve DOE in some way, including:

- Developing actionable climate science, through a climate data initiative and continuing to assess climate-change impacts in the United States
- Providing an information toolkit for climate preparedness and resilience
- Supporting a state, local, and tribal task force on climate preparedness and supporting communities as they prepare for climate impacts
- Supporting climate-resilient investment and boosting the resilience of buildings and infrastructure, particularly as we rebuild and learn from Sandy

In this context, let me say more about the recovery from Hurricane Sandy as it illustrates the role that DOE can play in promoting climate preparedness and resilience. With Sandy, the vulnerability of much of our infrastructure to severe storms and flooding was evident. Not only were there direct impacts such as the flooding of tunnels and the destruction of power transformers, the prolonged loss of electric power had impacts on critical infrastructures like water, fuel distribution and transportation systems. The President's Sandy Task force is helping citizens recover from Sandy's destruction, while also building resilience into the infrastructure rebuilding plan.

Recently, I was in Secaucus, New Jersey, to sign a memorandum of understanding with Governor Christie and the New Jersey Transit Corporation. The MOU kicks off the design phase of "NJ TransitGrid," a new project that will provide highly reliable power for a critical transportation corridor when the traditional grid is compromised. DOE's Sandia National Laboratory will provide initial design work, building on their extensive experience with microgrids for military installations. This "microgrid" will employ distributed generation technologies such as fuel cells, combined heat and power, and solar with storage so that the power system will be less fragile when infrastructure is taken offline. This is an important example of the sort of resilience we will need throughout the country, and this project can provide a first-of-a-kind example for the Nation, while creating jobs and a more competitive economy.

International

The third part of the President's Plan is leading international efforts to address climate change. Although we are still one of the largest emitters on a per person basis, U.S. emissions represent only about a fifth of the global total. As such, a global effort will be required if we are to avoid increasing climate damages in the future.

To this end, the Administration's policies include bilateral and multilateral engagement with other countries to reduce greenhouse gas emissions. The international community has come together before to address pressing

environmental problems. In the 1980s, scientists observed that the ozone layer was thinning over Antarctica, and, in 1987, world leaders, including President Ronald Reagan, signed the Montreal Protocol to address ozone depletion by phasing CFCs known to harm it. Beyond addressing the depletion of the ozone layer, the Montreal Protocol has been an effective tool in the effort to combat climate change. CFCs are a potent greenhouse gas, and phasing them out helped the world avoid a significant increase in global temperatures. However, certain substitutes for CFCs, particularly those known as hydrofluorocarbons (or HFCs), are also powerful greenhouse gases. As part of the President's Plan, the Administration is working to amend the Montreal Protocol to phase down HFCs, and we are beginning to make progress with other countries. In early September 2013, President Obama and Chinese President Xi reaffirmed commitments for the US and China, and the G-20 also expressed support for using the institutions and expertise of the Montreal Protocol to phase down the production and consumption of HFCs.

Here at DOE, we are focused on helping countries around the world expand clean energy use and energy efficiency and strengthen global preparedness and resilience to climate change. Initiatives in which DOE has a role include:

- The Major Economies Forum on Climate and Energy is a State Department led effort. DOE has been active in leading one of its spin-offs, the Clean Energy Ministerial, under which we have been promoting energy efficiency, renewable energy, and electric vehicle technology.

- Facilitated by the Clean Energy Ministerial's Super-Efficient Equipment and Appliance Deployment initiative, India became the first country in the world to adopt a comprehensive set of quality and performance standards for solid-state lighting (LEDs). The standards could save as much as 277 billion kilowatt hours of electricity and avoid 254 million metric tons of CO2 emissions cumulatively between 2015 –2030.
- Working with our international partners to phase out inefficient subsidies for fossil fuels
- Steering global sector public financing towards cleaner energy by limiting U.S. government support for public financing of new coal plants overseas to those facilities that capture and store carbon or those in the world's poorest countries where no alternative exists
- Working with the Carbon Sequestration Leadership Forum, spanning 23 other nations on six continents, to support research and development of cost-effective technologies for the separation and capture of CO2, as well as its transport and long-term safe storage.
- Sharing lessons and best practices for assessing climate change impacts and implementing effective climate preparedness and resilience strategies in the energy sector, and
- Engaging in an array of bilateral initiatives to increase efficiency and the deployment of clean energy technology with key countries around the world including China, India, Brazil, and Saudi Arabia to name just a few.

While the State Department has the lead on the international negotiations, it is very clear that our domestic effort will play a critical international role as well: one of leading by example. The world looks to the U.S. to demonstrate both the new low carbon technologies and the policies that drive those technologies into the market. Success in our domestic agenda will be an essential ingredient in a successful global effort to address this challenge, and will at the same time open up business opportunities for U.S. companies.

Conclusion

With new technologies, the recent growth in unconventional gas and oil production, the continued decrease in the costs of renewable energy and our reserves of traditional forms of energy, like coal, the United States may be entering into a period of unprecedented energy abundance. We believe in an all-of-the-above approach to ensure that this energy is used wisely and cleanly in a low carbon economy, and we are putting resources behind it: advanced fossil energy, nuclear power, renewable energy, energy efficiency and advanced transportation.

History has shown repeatedly that we can grow the economy while making tremendous strides in reducing pollution, including acid rain, ozone, lead and other hazardous emissions. I have no doubt that transforming our energy economy will be a challenge. And new technology will be key. We will need our smartest scientists, our brightest engineers, and visionary policy makers to get this done. The President has put forth a smart and prudent plan to slow the effects of climate

change, to prepare for worsening climate impacts and ensure a safer, healthier future for our children, and I am excited to be a part of it.

I look forward to your questions.