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ROAD TO PARIS: EXAMINING THE PRESIDENT'S INTERNATIONAL CLIMATE AGENDA AND IMPLICATIONS FOR DOMESTIC ENVIRONMENTAL POLICY

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

JULY 8, 2015

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ROAD TO PARIS: EXAMINING THE PRESIDENT'S INTERNATIONAL CLIMATE AGENDA AND IMPLICATIONS FOR DOMESTIC ENVIRONMENTAL POLICY

WEDNESDAY, JULY 8, 2015

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The Committee met, pursuant to notice, at 10:01 a.m. in room 406, Dirksen Senate Building, Hon. James M. Inhofe (chairman of the Committee) presiding.

Present: Senators Inhofe, Boxer, Capito, Crapo, Boozman, Sessions, Wicker, Fischer, Rounds, Sullivan, Cardin, Whitehouse, Merkley, Gillibrand, Booker, and Markey.

OPENING STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Now that Senator Sessions and Senator Wicker are here, our meeting will start. Senator Cardin, it is good to have you here, and I see Senator Sullivan in there.

Well, there has been a lot of coverage regarding the United Nations Twenty-First Annual Climate Conference at the end of the year. We have heard how the President has pledged the U.S. to reduce greenhouse gas emissions by 26 to 28 percent compared to the 2005 levels by 2025, and how he is going to lead other countries in openness, transparency and accountability.

You know, we have been here before. I remember so well, Copenhagen, I think it was about 5 years ago in Copenhagen, they all went over there, Obama, Clinton, Pelosi, John Kerry, Al Gore and they assured everybody that we were going to pass legislation over here that was going to control the emissions and all these good things were going to happen.

I went over as the one man truth squad, Barbara, to let them know that it wasn't going to happen and it didn't happen. So all of these statements sound good in a press release, but the slightest level of scrutiny reveals a significant lack of authenticity, substance and merit.

While the President is lecturing the rest of the world on the importance of credibility and transparency, he is going out of his way to write the U.S. Senate and the American people out of the final agreement. That is why we are here today, to take a closer look at the President's international climate agenda and what it actually means for the United States.

The President may have creative legal arguments to sign onto a legally non-binding international agreement but he does not have the backing of the U.S. Senate, which significantly limits such an agreement's domestic application. I carried that same message in 2009 when I attended the Copenhagen meeting, as I mentioned just now.

The President's Intended Nationally Determined Contribution—that is a new one, that is INDC—is not only unrealistic, but it also does not add up. Let's show the chart up there, that is the white area that does not add up. I am sure that our witnesses will be addressing this.

According to a recent analysis by the U.S. Chamber of the Presidents INDC, it is about 33 percent short of meeting stated targets. Mr. Bookbinder, who has done his own analysis, and I appreciate your being here, Mr. Bookbinder, I recall when you were our witness before. You were a witness for Senator Boxer, now you are one of our witnesses. He has done his own analysis and has found even a greater gap. I am looking forward to his thorough breakdown. Additional studies are forthcoming showing similar results.

The Administration has yet to describe how the 26 to 28 percent of greenhouse gas reductions would be achieved. In fact the Administration's own deputy director for climate policy remains unable and unwilling to answer this basic question.

Further concerning is that a large portion of the INDC stated targets depend on the successful implementation of the President's so-called Clean Power Plan. This proposal not only faces significant obstacles at the State level, there are 32 States now on record opposing it, but it would also increase the price of electricity, depress local economies and cost $479 billion and ship American jobs overseas. It is also on legal treacherous ground especially in the wake of the two recent Supreme Court decisions, UARG v. EPA and Michigan v. EPA, which was just decided last week.

The remaining portions of the INDC rely on an exaggerated stretch of current and future regulatory actions without consideration for inevitable legal challenges and delays, which I can assure you would take place. Even the very notion that the President's domestic and international climate agendas are about protecting the environment lack credibility. His EPA did not even bother to access the minuscule environmental benefits associated with the Clean Power Plan and its supposed core domestic climate policy. The international climate negotiators have already admitted that while they are not entirely clear on what actions will need to limit the temperature increases to 2 degrees Celsius, they are sure that the Paris agreement will not be enough.

The Paris agreement will be the 21st such agreement that is under the United Nations, and it is a pretty expensive one. They eat well and drink well but nothing ever happens. I thank the witnesses for being here and look forward to your testimony.

Senator Boxer.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA

There has been a lot of coverage regarding the UN's climate conference at the end of this year. We've heard how the President has pledged the U.S. to reduce green-

house gas emissions by 26 to 28 percent compared to the 2005 level by 2025 and how he is going to lead other countries in "openness, transparency and accountability."

All of these statements sound good in a press release, but the slightest level of scrutiny reveals a significant lack in authenticity, substance and merit. And while the President is lecturing the rest of the world on the importance of credibility and transparency, he is going out of his way to write the U.S. Senate and the American people out of a final agreement. That is why we are here today—to take a closer look at the President's international climate agenda and what it actually means for the U.S.

The President may have creative legal arguments to sign on to a "legally non-binding" international agreement, but he does not have the backing of the U.S. Senate, which significantly limits such an agreement's domestic application. I carried that same message in 2009 when I attended the UN's COP–15 in Copenhagen, and it remains true.

The President's Intended Nationally Determined Contribution (INDC) is not only unrealistic, but also does not add up. According to a recent analysis by the U.S. Chamber, the President's INDC is about 33 percent short of meeting the stated targets. Mr. Bookbinder, who has done his own analysis, has found an even greater gap, and I am looking forward to his thorough breakdown. Additional studies are forthcoming showing similar results.

The Administration has yet to describe how the 26–28 percent of greenhouse gas reductions would be achieved. In fact, the Administration's own Deputy Director for Climate Policy remains unable and unwilling to answer this basic question.

Further concerning is that a large portion of the INDC 's stated targets depend upon the successful implementation of the President's so-called Clean Power Plan. This proposal not only faces significant obstacles at the State level—32 States oppose the $479 billion Federal takeover that would increase the price of electricity, depress local economies and ship American jobs overseas—but is also on legally treacherous ground especially in the wake of two recent Supreme Court decisions—UARG v. EPA and Michigan v. EPA decided just last week. The remaining portions of the INDC rely on an exaggerated stretch of current and future regulatory actions without consideration for inevitable legal challenges and delays.

Even the very notion that the President's domestic and international climate agendas are about protecting the environment lack credibility. His EPA did not even bother to assess the minuscule environmental benefits associated with the Clean Power Plan—his supposed core domestic climate policy—and the international climate negotiators have already admitted that while they aren't entirely clear on what actions will be needed to limit temperature increases to 2 degrees Celsius, they are sure that the Paris agreement will not be enough.

I thank the witnesses for being here and look forward to their testimony.

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

Senator BOXER. Thanks, Mr. Chairman.

The impacts of dangerous climate change are all around us. Just ask the people living in Texas who have had to face extreme weather rainfall events, record flooding. Or Californians who have had to deal with the crippling drought or New Yorkers who have suffered through Superstorm Sandy. Or those in Hawaii who are having to choose between saving their beachfront condominiums or losing their beach and their coral reefs. I saw that with my own eyes.

Fortunately, the Obama administration has taken serious steps to address this growing crisis by reducing dangerous carbon pollution. The U.S. has committed to cutting our carbon pollution by 26 percent to 28 percent from 2005 levels by 2025. I believe this is achievable, because the President's Climate Action Plan contains the tools that are necessary to get the job done, even without Congress.

We have a decades-long record of success in our landmark environmental laws. We have withstood moves in this Committee and

on the Senate floor to disassemble those landmark laws, such as the Clean Air Act.

Now, my colleague was right: we failed to pass cap and trade. The highest level we got was 56 votes, we needed 60. The bottom line is we have the Clean Air Act. The opponents of doing anything under the Clean Air Act took the case to the Supreme Court. It took 8 years. The Supreme Court found very clearly that carbon pollution is covered under the Clean Air Act.

So the Obama administration has taken significant steps under the Clean Air Act. They have included establishing new fuel economy and carbon standards for cars and heavy duty trucks which has been embraced by Detroit. We have seen a rebirth of the automobile industry. We see that the power plant sector, we are moving toward cleaning that up. We have fights on our hands, I predict we will win those fights. The U.S. has always been a leader. We don't sit back and let other countries lead the way. And we are.

Climate change is a global problem. Two weeks ago, the G7 agreed to work with all countries to reduce carbon emissions by up to 70 percent by 2050. Action by the Obama administration prompted China to make its first-ever commitment to reduce carbon pollution. Already coal use is down in China by 8 percent just this year.

The EU has pledged to reduce carbon pollution, and developing countries such as Mexico and South Korea have come forward with their first-ever commitments to control their carbon pollution. Already, countries covering over 60 percent of global carbon emissions have agreed to take action to cut carbon, and other countries will join the effort.

There are huge benefits when we undertake cutting carbon. The recent study by the EPA shows us 57,000 fewer deaths per year from poor air quality, with economic benefits valued at $930 billion, 12,000 fewer deaths per year from extreme heat and temperature changes, $180 billion per year in avoided damages from water shortages, $3 billion per year avoided damages from poor water quality, $11 billion a year avoided losses in our ag sector, 40 to 59 percent fewer severe and extreme droughts and almost 8 million fewer acres burned each year from wildfires.

This is something we have to do. And it breaks my heart that the party in control of this Committee doesn't believe in any of this and is trying to fight it. But the American people see it clearly. So this Congress is out of step with the American people.

The economy today will be made stronger if we take these steps. We see as a result of the Obama Plan 470,000 additional green jobs compared to the status quo.

In California, I think I can speak to this. We are on a path to cut our carbon pollution by 80 percent by 2050. That is required under our law at home. Very strongly supported by the California people. We had oil companies try to overturn it and the people said, sorry, we are sticking with it. During the first year and a half of my State's cap and trade program we added 491,000 jobs, a growth of 3.3 percent which outpaces national growth.

I welcome the witnesses today. I feel stronger than ever the President is on the right path. This Committee is on the wrong path.

[The prepared statement of Senator Boxer follows:]

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

The impacts of dangerous climate change are a daily reality that we simply cannot ignore. Just ask people living in Texas, who have had to face extreme weather rainfall events and record flooding, or Californians who have had to deal with a crippling drought, or New Yorkers who suffered through Superstorm Sandy.

Fortunately, the Obama administration has taken serious steps to address this growing crisis by reducing dangerous carbon pollution. The U.S. has committed to cutting our carbon pollution by 26 percent to 28 percent from 2005 levels by 2025. This target level, known as an "intended nationally determined contribution" (INDC), is an achievable goal because the President's Climate Action Plan contains the tools necessary to get the job done. We have a decades-long record of success of our landmark environmental laws, such as the Clean Air Act which has been repeatedly upheld by the Supreme Court.

The Obama administration has already taken significant steps toward reaching this target, including establishing new fuel economy and carbon standards for cars and heavy duty trucks, proposing to cut carbon pollution 30 percent from our power sector, and reducing carbon pollution from Federal operations by 40 percent in 2025.

The U.S. has always been a leader among other nations, and we are leading the way to address dangerous climate change. We know that we must cut harmful air pollution to protect the health and welfare of the American people, and our resolve has brought other countries to the table to make their own domestic commitments to reduce carbon pollution.

Climate change is a global problem, and we are seeing progress on the international level. Two weeks ago, the G7 agreed to work with all countries to reduce carbon emissions by up to 70 percent by 2050.

Action by the Obama administration prompted China to make its first-ever commitment to reduce carbon pollution—and already, coal use is down by 8 percent in China this year.

The E.U. has also pledged to reduce carbon pollution significantly, and developing countries, such as Mexico and South Korea, have come forward with their first ever commitments to control their carbon pollution. Already, countries covering over 60 percent of global carbon emissions have agreed to take action to cut carbon pollution, and other countries will soon join this effort before heading to Paris later this year.

Taking action globally to address the threat of climate change will not only help us avoid the worst impacts, but it will provide enormous health and economic benefits to the U.S. A recent peer-reviewed study by the EPA analyzes in detail the benefits of global action on climate change. According to this study, by the end of the century there will be:

- 57,000 fewer deaths per year from poor air quality, with economic benefits valued at $930 billion;
- 12,000 fewer deaths per year from extreme heat and temperature changes;
- $180 billion per year in avoided damages from water shortages;
- $3 billion per year avoided damages from poor water quality;
- $11 billion per year avoided losses in our agricultural sector;
- 40–59 percent fewer severe and extreme droughts; and
- Almost 8 million fewer acres burned each year from wildfires.

While taking action to reduce our carbon pollution avoids these significant impacts in the future, it is also good for our economy today. A recent report by the New Climate Institute found that the policies in the U.S. INDC will result in the creation of 470,000 additional green jobs, compared to the status quo.

We have seen this type of success in my home State of California. California is on a path to cut its carbon pollution by 80 percent by 2050, as required under our greenhouse gas emissions law, A.B. 32. During the first year and half of my State's cap and trade program, California added 491,000 jobs—a growth of almost 3.3 percent, which outpaces the national growth rate of 2.5 percent.

I welcome the witnesses today and look forward to a discussion on how the Obama administration's actions to reduce dangerous carbon pollution are leading the world to address the climate crisis.

Senator INHOFE. Thank you, Senator Boxer.

We do have a very distinguished panel of Karl Hausker, Senior Fellow at the World Resource Institute; Sarah Ladislaw, Director

and Senior Fellow, Energy and National Security Program, Center for Strategic and International Studies; Jeffrey Holmstead, Partner, Bracewell and Giuliani; David Bookbinder, and I am real pleased, David Bookbinder was here before but he is here as a majority witness today. He has testified here before. And Jeremy Rabkin, Professor of Law, George Mason University School of Law.

We will start with you. Your entire statement will be part of the record, try to keep your remarks to right around 5 minutes. Mr. Hausker.

STATEMENT OF KARL HAUSKER, SENIOR FELLOW, WORLD RESOURCES INSTITUTE

Mr. HAUSKER. Thank you, Mr. Chairman. Good morning.

My name is Karl Hausker, and I am a Senior Fellow at the World Resources Institute. WRI is a nonprofit, nonpartisan environmental think tank that goes beyond research to provide practical solutions to the world's most urgent environmental and developmental challenges. Thank you for the opportunity to serve on this panel.

The main message in both my oral and written testimony is this: the U.S. can meet the Administration's 2025 emissions reduction target while maintaining economic growth and employment.

My testimony has four key themes. First, a growing body of evidence shows that economic growth can go hand in hand with efforts to reduce emissions and greenhouse gases. Recent experience at the national and State levels demonstrates that we can achieve both. What Senator Boxer referred to in California is a perfect example of that.

However, the policies often necessary to unlock these essential economic win-win opportunities have market barriers and hamper investment on what are otherwise beneficial activities. So good policies can unlock the win-win opportunities for the economy and the environment.

So we can achieve a prosperous low carbon future by harnessing key drivers of economic growth including more efficient use of energy and natural resources, smart infrastructure investments and technological innovation. These low-carbon solutions often create net economic benefits. For instance, we know that increased efficiency pays off.

Let me give three examples. With strengthened CAFE and GHG standards, drivers will save on average a net of $3,400 to $5,000 over the life of light duty vehicles made in 2025 compared to those made in 2016.

Another example: Federal appliance efficiency standards put in place over the past 25 years have resulted in $370 billion in cumulative utility bill savings. Finally, States with energy efficiency targets and programs in place are generally saving customers $2 for every $1 invested.

Let me turn to my second theme. The U.S. emissions reduction target announced in March is ambitious, but it is achievable. We can meet this target using existing Federal laws combined with actions by the States. Well designed policies can accelerate recent market and technology trends in renewable energy, energy effi-

ciency, alternative vehicles and in other areas, combining to reduce emissions 26 to 28 percent below 2005 levels.

WRI's recent report delivering on the U.S. climate commitment shows several pathways to get there. However, U.S. and global efforts to combat climate change can't stop in 2025. Deeper reductions will be needed in the decades ahead to avoid the worst impacts of climate change.

Therefore, it is incumbent on this Congress to play a constructive role in efforts to reduce emissions in the years ahead. This can and should be done in a cost effective manner such as by establishing an economy-wide price on carbon.

Third, we can achieve the U.S. 2025 target while generating multiple co-benefits and maintaining economic growth. The proposed Clean Power Plan, a key policy for meeting the target, will result in reduced exposure to particulates and to ozone pollution. EPA estimates these air pollution co-benefits alone are worth $25 billion to $62 billion per year.

And the economy is projected to keep on growing. The Energy Information Administration projects the macroeconomic impacts of the proposed Clean Power Plan will be very small, approximately a tenth of a percentage point decrease in GDP in 2030. This in the context of economy projected to grow from $17 trillion to $24 trillion in 2030. Similarly, the EIA is projected net employment impacts are essentially zero.

Fourth, U.S. leadership is essential to the global efforts to limit warming to 2 degrees Celsius above pre-industrial levels. Failure to meet that goal will increase economic, social and environmental risks for the United States and for all nations. We can't simply ask, how much does it cost to avoid climate change. We must also ask, what does it cost our country if we don't avoid climate change? If nations fail to combat climate change, the U.S. will suffer billions of dollars in damage to agriculture, forestry, fisheries, coastal inland flooding damages, along with heat-driven increases in electricity bills, among multiple other impacts.

So our country has a choice. It can show international leadership and bring the same spirit of competition, ingenuity and innovation to the climate challenge that it has brought to other problems. Or we can be left behind as other countries develop the solutions, capture the markets for the fuels, technologies and processes that reduce greenhouse gas emissions.

In closing, the target is ambitious and achievable, fully compatible with economic growth and employment. Thanks, and I look forward to your questions.

[The prepared statement of Mr. Hausker follows:]

TESTIMONY OF DR. KARL HAUSKER

SENIOR FELLOW, CLIMATE PROGRAM, WORLD RESOURCES INSTITUTE

HEARING BEFORE THE U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS:

"Road to Paris: Examining the President's International Climate Agenda and Implications for Domestic Environmental Policy"

JULY 8, 2015

My name is Karl Hausker, and I am a Senior Fellow in the Climate Program at the World Resources Institute. The World Resources Institute is a non-profit, non-partisan environmental think tank that goes beyond research to provide practical solutions to the world's most urgent environment and development challenges. We work in partnership with scientists, businesses, governments, and non-governmental organizations in more than seventy countries to provide information, tools and analysis to address problems like climate change, the degradation of ecosystems and their capacity to provide for human well-being.

My testimony has four key themes. First, a growing body of evidence shows that economic growth is not in conflict with efforts to reduce emissions of greenhouse gases. The United States has tackled many environmental problems over the past 50 years, and the historical record is clear: environmental protection is compatible with economic growth, and environmental policies have delivered huge benefits to Americans. Furthermore, recent experience at the state and national levels demonstrates that well-designed policies can reduce greenhouse gas emissions while providing overall net public benefits, for example, through improved public health, as well as direct financial benefits to businesses and consumers. Policies are often necessary to unlock these opportunities, however, because market barriers hamper investment in what are otherwise beneficial activities.

We can achieve a low-carbon future by harnessing key drivers of economic growth—including more efficient use of energy and natural resources, smart infrastructure investments, and technological innovation. Our efforts to address conventional air and water pollution have often relied on end-of-smokestack or end-of-pipe controls. However, in the case of carbon pollution, the solutions typically lie in improved efficiency in energy use, cleaner fuels, and new technologies and processes – and these solutions often create net economic benefits. For example, we know that increased efficiency pays off:

- With strengthened federal standards, drivers will save on average a net $3,400 to $5,000 over the life of light-duty vehicles built in 2025 compared with those made in 2016.
- Federal appliance efficiency standards put into place over the past twenty-five years resulted in $370 billion in cumulative utility bill savings.
- States with energy efficiency targets and programs in place are saving customers at least $2 for every $1 invested.

The United States has a choice: it can bring the same spirit of competition, ingenuity, and innovation to the climate challenge that it has brought to solving other problems, or it can be left behind as other countries develop the solutions and capture the markets for the fuels, technologies, and processes that reduce greenhouse emissions.

Second, the U.S. has set an ambitious but achievable emissions reduction target for 2025 in its Intended Nationally Determined Contribution (INDC). We can meet this target using existing federal laws combined with actions by the states. We can accelerate recent market and technology trends in renewable energy, energy efficiency, alternative vehicles, and many other areas to reduce emissions 26–28 percent below 2005 levels by 2025. However, U.S. and global efforts to combat climate change cannot stop in 2025. Even deeper greenhouse gas (GHG) emission reductions will be needed in the decades ahead to avoid the worst impacts of climate change. Congress can – and indeed should – play a constructive role in helping achieve long-term emission reductions in a cost-effect manner, for example by establishing an economy-wide price on carbon. In the meantime, however, the Administration is taking sensible steps to encourage recent market and technology trends that move us toward a low-carbon future.

Third, we can achieve the INDC target in concert with economic growth. Over the next decade, the proposed Clean Power Plan will play a key role in meeting the INDC target. The Energy Information Administration (EIA) projects the macroeconomic impacts of the proposed Clean Power Plan to be very small: approximately a 0.12% decrease in GDP in 2030, which can be considered "background noise" in the context of an economy likely to grow from $17 trillion currently to $24 trillion by 2030. EIA's projected employment impacts are essentially zero.[1] From a benefit-cost perspective, EPA estimates that the air pollution co-benefits alone are worth $25-$62 billion, far more than the estimated $7-9 billion in compliance costs.[2] Adding in global climate benefits increases total benefits to $55-$93 billion.

Fourth, no nation is immune to the impacts of climate change and no nation can meet the challenge alone. Every nation needs to work together, take ambitious action, and do its fair share. The United States has always provided leadership when the world faces big challenges, and climate change should be no exception. That leadership can ensure a livable planet for ourselves and future generations.

With global GHG emissions still on the rise, delaying action on climate change will only result in climate-change-related events becoming more frequent and severe, leading to mounting costs and harm to businesses, consumers, and public health. The new EPA report, *Climate Change in the United States: Benefits of Global Action*,[3] estimates billions of dollars of avoided damages in the U.S. that would result from global efforts to reduce greenhouse gas emissions, ranging from reduced damage to agriculture, forestry, and fisheries, to reductions in coastal and inland flooding, to fewer heat-driven increases in electricity bills.

We can't simply ask: What does it cost to avoid climate change? We must also ask: What does it cost if we **don't** avoid climate change? If nations fail to combat climate change, the U.S. will suffer billions of dollars of damages to agriculture, forestry, and fisheries, and to coastal and inland flooding, along with heat-driven increases in electricity bills, just to cite some of the impacts.

It is thus in our national interest to act at home so that we can work with other countries to achieve a universal international agreement where all countries act.

My testimony is organized as follows: Section I discusses why the United States can take meaningful climate actions while growing the economy overall. Section II reviews technology and market trends in some key sectors and demonstrates how accelerating these trends can reduce carbon emissions while generating positive economic impacts. Section III presents an overview of WRI analysis showing how the United States can meet or exceed its INDC target with a portfolio of policies across key sectors. Section IV makes the case for U.S. leadership in protecting the global climate. Section V offers some concluding comments on climate policy, looking beyond 2025.

This testimony draws principally from two recent World Resources Institute reports:

- *Delivering on the U.S. Climate Commitment: A 10-Point Plan Toward A Low-Carbon Future*[4]
- *Seeing Is Believing: Creating a New Climate Economy in the United States*[5]

I. Climate Protection and Economic Growth

Our country has tackled many environmental problems over the past 50 years. We have achieved major reductions in air and water pollution. We have reduced our exposure to toxics, and cleaned up and redeveloped industrial "brownfield" sites in our cities. In concert with other nations, we have taken steps to repair damage to the ozone layer. At every step along this road to protection of the environment and public health, opponents have raised the specter of excessive cost and economic disaster. Some opponents of President's emission reduction targets and the Clean Power Plan are raising this specter again now. However, the historical record is clear: environmental protection is compatible with economic growth, and U.S. environmental policies have delivered huge benefits to Americans. In 2010, The Office of Management and Budget reviewed 20 years of major Federal regulations (1999-2009) for which agencies estimated and monetized both benefits and costs, and found aggregate annual benefits of $128-$616 billion, while annual costs were estimated at $43-$55 billion. Research also shows that the actual cost of environmental regulations frequently ends up being less than *ex ante* predictions by industry, and even the EPA.[6]

Increasingly, research and real world experience shows that reducing greenhouse gas emissions need not hurt the economy, and in fact can present significant opportunities to save money, create jobs, and maintain robust economic growth. Many of the pessimistic economic models cited by opponents of climate action have serious shortcomings, as described in the 2014 report of the Global Commission on the Economy and Climate (*Better Growth, Better Climate*):

> The view that there is a rigid trade-off between low-carbon policy and growth is partly due to a misconception in many model-based assessments that economies are static, unchanging, and perfectly efficient.... Indeed, once market inefficiencies and the multiple benefits of reducing greenhouse gases, including the potential health benefits of reduced air pollution, are taken into consideration, the perceived net economic costs are reduced or eliminated.[7]

Better Growth, Better Climate also notes how these economic models generally do a poor job of capturing the potential transformational effects of technological innovation. Even with these shortcomings, under a scenario of aggressive climate action aimed at limiting warming to 2 degrees C, application of conventional models suggest a median loss of gross domestic product (GDP) of about 1.7 percent in 2030 for the global economy. The Global Commission concluded that this level of GDP impact is best viewed as "background noise" compared to the projected global economic growth of roughly 50 percent or more over the time period modeled.[8]

These results at the global level are similar to those of the Energy Modeling Forum (EMF) in its most recent broad look at the impacts of deep cuts in U.S. emissions in 2009 in a paper titled *Overview of EMF 22 U.S. Transition Scenarios*.[9] In scenarios aiming for an 83 percent reduction in GHG emissions below 2005 levels by 2050, four models projected a range of declines in household consumption from 0.9-2.6 percent relative to business as usual in 2020 and a range of 3.5-4.7 percent in 2050.

In the context of meeting the INDC target, the proposed Clean Power Plan will play a key role. The Energy Information Administration projects the macroeconomic impacts of the proposed plan to be very small: approximately a 0.12% decrease in GDP in 2030, which can be considered "background noise" in the context of a steadily growing $24 trillion economy. Employment impacts are essentially zero.[10] From a benefit-cost perspective, EPA estimates that the air pollution co-benefits alone are worth $25-$62 billion, far more than the estimated $7-9 billion in compliance costs.[11] Adding in global climate benefits increases total benefits to $55-$93 billion.

II. Technology Trends and Emission Reduction Potential in Key Sectors

Many of the key drivers of economic growth—including more efficient use of energy and natural resources, smart infrastructure investments, and technological innovation—can also drive the transition to a low-carbon future.[12] Early efforts to address conventional air and water pollution often relied on end-of-smokestack or end-of-pipe controls. However, in the case of carbon pollution, the solutions typically lie in improved efficiency in energy use, cleaner fuels, and new technologies and processes. Though upfront investments are often needed, these solutions often create net economic benefits rather than costs. The United States can bring the same spirit of competition, ingenuity, and innovation to the climate challenge that it has brought to solving other problems, or it can be left behind as other countries develop the solutions and capture the markets for the fuels, technologies, and processes that reduce emissions.

This movement toward a low-carbon economy is being demonstrated throughout the United States. Already between 2005 and 2012, greenhouse gas emissions dropped by 8 percent while real GDP grew by 8 percent.[13] Projections from the U.S. Energy Information Administration (EIA) estimate that the intensity of energy use in the economy will continue to decline through 2040, even in the absence of new policies. With reduced energy intensity in manufacturing, more efficient appliances and buildings, and more fuel-efficient vehicles coming to market, the overall economy is becoming more energy

efficient. EIA projects that GDP will grow at an average 2.4 percent per year through 2040, while energy use will grow at only 0.4 percent per year.

Opportunities for cost-effective emission reductions are arising across many sectors of the economy. For instance, the capital costs of wind and solar photovoltatic systems continue a rapid downward trend.[14] For example, Texas has seen wind generation multiply 12-fold since 2002, and solar generation in the state has more than doubled since 2011.[15] Over 102,000 people are directly employed in renewable energy sectors in Texas, with thousands more working in businesses linked to renewable energy. Well-crafted energy efficiency programs are lowering utility bills and reducing energy demand, which indirectly reduces GHG emissions.[16] Increased production of low-cost shale gas, while raising concerns about methane emissions and other environmental impacts, has spurred fuel switching away from coal in power generation, reducing carbon dioxide (CO_2) emissions.[17] Technological progress on many fronts promises to create further opportunities, from creating climate-friendly refrigerants to breakthroughs in electric and fuel cell vehicles.[18]

Nevertheless, market barriers still exist, hindering investment and implementation of strategies needed to transition the United States toward a prosperous low-carbon economy. These barriers take many forms and cut across many sectors. For example:

- Split incentives - The natural gas sector is not very well vertically integrated – many independent companies work along the supply chain without ever taking ownership of the natural gas itself. For this reason, the incentives to invest in control technologies to reduce methane emissions are often poorly aligned.
- Ownership transfer issues - In the residential sector, homeowners may not invest in energy efficient products or home upgrades, thinking they may move before reaping the cost savings.
- Network effects - Widespread penetration of alternative vehicles depends on availability of charging stations, but investment in charging stations may be limited while relatively few alternative vehicles are on the road.[19]

Overcoming these barriers will require targeted policies and measures, including GHG and efficiency standards, more research and development to stimulate innovation, and policies to stimulate market demand for new technologies.[20] The sections below explore opportunities in some key sectors.

A. Producing Cleaner Electricity

The U.S. power sector has already started to transition to a lower-carbon future.[21] In 2013, carbon dioxide (CO_2) emissions were 15 percent below 2005 levels because of a shift in fuel mix and slower demand growth. Coal's role appears to be diminishing while natural gas and zero-carbon alternatives are on the rise. The economics of all generation sources are shifting and if these trends continue, deep greenhouse gas reductions are possible from the power sector, with some parts of the country possibly achieving net savings. In many cases, the public health benefits outweigh the costs of replacing older, inefficient, and heavily polluting generation with newer, more efficient, cleaner generation.

The recent decline in the carbon intensity of the power sector has been caused in large part by the low price of natural gas.[22] Because of lower prices, gas-fired generation has surged and coal fired generation has declined. New coal plants accounted for only 5 percent of the new capacity built since 2000.[23] This trend could accelerate as many existing coal plants struggle to compete with electricity from natural gas and renewable energy sources and if more protective public health standards are put in place. Existing natural gas plants certainly have the capacity to increase output. In 2014, the fleet of combined-cycle natural gas plants ran at only about 48 percent capacity[24]—well below their design capacity of 85 percent. Less coal generation would bring not only reductions in CO_2 emissions, but also would likely bring reductions in a variety of harmful pollutants, including sulfur dioxide (SO_2), nitrogen oxides (NO_x), and mercury.

Despite its reputation as a clean fuel, natural gas production, processing, transmission, and distribution still leak methane emissions while its combustion results in substantial CO_2 emissions, presenting long-term challenges for the fuel, in absence of adoption of technologies that reduce methane leaks and cost-effective carbon capture and storage technology. However, natural gas is still essential in reducing power sector emissions. Replacing all existing coal generation with combined-cycle gas generation could reduce power-sector CO_2 emissions by 44 percent below 2012 levels.[25] In addition, as variable generation from resources such as wind and solar increases, grid operators will look to flexible resources such as natural gas to help ensure grid reliability. As a result, natural gas could play an important role even in an aggressive greenhouse gas abatement scenario.

Renewable generation has been on the rise in recent years, and evidence suggests that it could play an even more significant role in the future. Generation from renewable resources accounted for 12.S percent of total generation in 2013 – nearly half of which came from non-hydropower sources.[26] Wind and solar outcompete new coal generation in many markets, and are competitive with low-cost natural gas generation in a few markets. As a result, increased renewable energy generation has the potential to save American ratepayers tens of billions of dollars per year over the current mix of electric power options, according to studies by Synapse Energy Economics and the National Renewable Energy Laboratory.[27] These cost savings are illustrated by some recent actions at the state level:

- The Grand River Dam Authority, Oklahoma's state-owned utility, purchased 100MW of wind energy that is estimated to "save its customers about $50 million over the project's lifetime".[28]
- DTE Energy in Michigan announced that it would be lowering customers' electricity rates by 6.5 percent in 2014, citing low-cost wind energy (aided by technology improvements and tax credits) as a major factor.[29]
- Austin Energy in Texas finalized a power purchase agreement for 150 megawatts of solar energy, with a price just under 5 cents per kilowatt hour (estimated at 7 cents per kilowatt hour before federal tax credits).[30] By comparison, the company estimates that new natural-gas-fired generation would have cost 7 cents per kilowatt hour, coal would have cost 10 cents, and nuclear 13 cents.
  MidAmerican Energy in Iowa recently announced that it will invest $1.9 billion in new wind power, bringing wind generation up to 39 percent of their generation portfolio.[31] The company estimates that this will save $10 million annually when all the turbines are completed. This work

will create 460 construction jobs, 48 permanent jobs, and generate more than $360 million in new property tax revenue.

While the variability of renewable generation creates some challenges for grid balancing authorities, renewables have considerable room to expand on the grid. Several studies have shown that existing grids across the country can handle about 35 percent generation from variable renewable resources with minimal cost.[32] This is partly because of improvements in renewable energy forecasting and sub-hourly supply scheduling, as well as recent increases in transmission infrastructure.[33,34] Utilities may also see the value in using renewable energy (with zero fuel costs) as a hedge against the uncertainty surrounding future coal and natural gas prices.[35]

Over the longer term, however, as renewable penetration continues to increase with expected declines in equipment costs, the United States would benefit from expanded transmission[36] and increased system flexibility. This could be done, for example, through increased grid storage, distributed generation sources, and demand response.[37]

Nuclear power provides zero-carbon baseload generation. In 2013, it produced 20 percent of total U.S. electric generation[38] and as of mid-2014, three new nuclear plants were under construction, the first new plants since 1996.[39] However, several nuclear reactors closed in 2013[40] and some analysis suggests that some other plants are struggling to remain viable because of cheap natural gas, low renewable energy prices, lower demand for electricity, and rising costs for nuclear fuel, operations, and maintenance (particularly the smaller, older, standalone units).[41] Continued retirements could prompt an increase in fossil baseload generation and lead to an overall increase in CO_2 emissions from the power sector. Even if these pressures do not force nuclear capacity to retire prematurely, the nation will eventually need to replace some of these units as they reach the end of their useful lives. Well-designed policies that value low-carbon generation could help improve the economics of the existing fleet, and could spur the construction of new nuclear units, particularly if increasing international development of nuclear plants leads to reductions in construction costs. Any expansion, however, will likely depend on solving the challenges of public concerns about nuclear safety and long-term waste storage.

Looking forward, EPA's proposed Clean Power Plan (CPP) will build on and accelerate many of these positive trends noted above by establishing GHG emissions standards for existing power plants under section 111(d) of the Clean Air Act. These standards will incentivize the use of lower carbon sources of electricity generation, like natural gas, renewables, and nuclear, as well as incentivize programs that reduce the overall demand for electricity. EPA projects that the CPP will reduce power sector CO_2 emissions by about 27 percent below 2005 levels by 2020 and by 30 percent by 2030.[42] However, studies have shown that a more rapid decarbonization of the power sector in the post-2020 time period is technically possible as well as legally defensible.[43] For example, the Natural Resources Defense Council found that the renewable energy technology costs EPA relied on to develop their proposed state targets are 46 percent above current average costs for wind and solar energy. They found that when these current costs are taken into account, between 65 and 86 percent more renewable energy can technically and economically be developed than what was originally considered in the state targets under the proposed Clean Power Plan.[44] The CPP also offers huge health benefits at three to eight times the

amount of compliance costs. In total, the proposed standards are expected to result in $55 to $93 billion in health benefits and global climate benefits by 2030 at a cost of $7.3 to $8.8 billion. Given current technology trends in renewable power, these estimates may actually be overly conservative, and deeper reductions may be possible at a net public benefit. For example, when examining deep emission reductions in the power sector (approximately 61 percent below 2005 levels in 2030), the Union of Concerned Scientists found that on an annualized basis, benefits to Americans from reduced SO_2 and NOx emissions alone would total $56 billion in 2025, growing to $69 billion in 2030 (equal to 5 and 10 times the annual compliance cost to the power sector).[45]

B. Reducing Electricity Consumption

The U.S. economy is becoming more efficient as a result of development and deployment of new technologies supported by state and federal policies. This success is largely due to the fact that smart investments in efficiency save money. Federal appliance standards implemented since 2009 alone are expected to save consumers nearly $450 billion because of lower electricity bills through 2030. [46,47,48] State efficiency portfolios regularly save customers over $2 for every $1 invested, and in some cases up to $5.[49] And efficiency has been the cheapest resource option available to utilities for decades, with levelized costs one-half to one-third the cost of new electricity generation options. [50,51] Harnessing efficiency as a resource leads to high-quality jobs in manufacturing, installation of efficient appliances, home energy auditing, and more. In part due to the expansion of efficiency programs, energy consumption is expected to grow at less than 0.5% per year on average through 2040 even as GDP grows by nearly 2.5% per year. [52] But even greater opportunities to capture efficiency and associated savings can be captured by scaling up successful programs and implementing new initiatives.

The discussion below focuses specifically on homes and commercial buildings (with efficiency opportunities in transportation and industry discussed later). In buildings, electricity demand growth has fallen from about 8 percent per year in the early 1970s to about 1 percent per year today.[53] This is in part due to a robust and growing portfolio of both regulatory and voluntary energy efficiency initiatives including:

- ***Appliance and equipment standards, labeling, and research and development***
  Customers have saved over $370 billion (net) as a result of lower utility bills from 1987 through 2012 as a result of federal appliance and equipment standards that set minimum energy efficiency levels for more than 50 products commonly used in homes and businesses.[54] This success has been achieved in part because major appliances—including refrigerators, dishwashers and clothes washers—have become 50 to 80 percent more energy efficient over the past two decades. Appliance and equipment standards are complemented by other federal and state initiatives, including research and development, partnerships with industry, competitions (e.g., L-prize and ENERGY STAR awards), voluntary labeling programs (e.g., ENERGY STAR and the Federal Trade Commission's EnergyGuide), and rebates and incentives for efficient appliances. Together, these programs can drive innovation and commercialization of products that are more efficient than the minimum required by standards, as has been demonstrated in many product areas including

lighting, water heaters, and clothes dryers.[55] The Institute for Electric Innovation projects that pushing forward on new federal appliance and efficiency standards could reduce total electricity use by 6–10 percent below projections in 2035.[56]

- *State energy efficiency savings targets*
  Twenty-four states currently have mandatory electricity savings targets that require utilities and third-party administrators to offer energy-saving programs to their customers.[57] Most state targets require incremental electricity savings of 1 percent of projected electricity sales or more each year once programs are fully ramped up, with a few requiring savings in excess of 2 percent per year. Scaling up state energy efficiency savings targets so that each state achieves savings of 2 percent annually would reduce electricity consumption in the range of 400–500 terawatt hours in 2035 (9–11 percent of total projected electricity sales),[58] and save customers tens of billions of dollars in the process.

- *State building energy codes*
  Building codes help ensure that new construction and buildings undergoing major renovations and repairs meet minimum efficiency standards. According to the DOE, codes adopted between 1992 and 2012 have saved approximately 2 quads in cumulative total energy savings, about 20 percent of the total energy directly consumed by homes each year. The codes are expected to net more than $40 billion in energy cost savings over the lifetime of the buildings constructed during this time period.[59] To date, many states have adopted the 2007–09 codes for commercial and residential buildings. However, only about one-quarter of states have adopted the most up-to-date codes for residential and commercial buildings. The new codes reduce building energy use by 20 and 25 percent, respectively, compared with the 2007–09 standards—leaving the door open for greater savings by other states.[60]

The continued emergence of new technologies—enabled by partnerships between federal agencies, manufacturers, and businesses—will create ongoing opportunities for savings. For example, DOE recently reached an with agreement manufacturers and efficiency advocates on the terms of an updated efficiency standard for commercial rooftop air conditioners that will net $50 billion in utility bill savings for businesses over 30 years.[61,62]

DOE is also working with industry to advance adoption of next-generation intelligent energy information systems and controls that provide whole-building, web-accessible data in real time. These systems allow facility managers to identify wasted energy, with the potential of cutting building electricity use by as much as 30 percent.[63] Whole-building retrofits with the latest technologies have been shown to reduce building energy use in the range of 30 to 50 percent or greater, in some cases.[64] And the jobs needed to perform retrofits—including assessment, installation and maintenance of efficient appliances and systems—can't be sent overseas.

But opportunities to cut energy use and utility bills still exist. Studies suggest that electricity demand could be reduced 14 to 30 percent below projected levels over the next two decades, creating hundreds of billions of dollars in net savings for consumers while significantly reducing U.S. greenhouse gas

emissions.[65] These opportunities remain because of the persistence of a number of market barriers to investment in efficient technologies. For example, building owners frequently have little incentive to invest in efficiency if they do not pay the energy bills and therefore do not experience the financial benefits, another example of the "split incentives" problem noted earlier. Building occupants may not expect to capture the full lifetime benefits of an investment, thus creating "ownership transfer" issues. This is because residential energy efficiency measures have an average payback period of about 7 years, whereas about 40 percent of homeowners will have moved within that duration of time. Other market barriers, including capital constraints and lack of knowledge of the lifecycle costs and benefits of products, can also prevent the implementation of cost-effective efficiency measures. The United States can harness more of this potential and continue to save money for consumers and businesses in the near to medium term by scaling up existing programs and implementing new policies.

The EPA has an important role to play by making sure that the Clean Power Plan takes into account all cost-effective energy efficiency potential when developing state-specific standards. This would encourage more widespread deployment of state efficiency programs, leading to greater demand reductions and savings for consumers. The U.S. Department of Energy (DOE) and EPA also should continue to scale up their existing programs, which are already delivering benefits many times greater than their costs. This includes continuing to strengthen existing appliance standards (for example, for residential boilers, commercial unit heaters); setting appliance standards for equipment not currently covered (for example, for ovens, commercial ventilation equipment, general service lamps); increasing funding for research, development, and deployment of efficient technologies and processes; expanding partnerships with businesses and industry (for example, DOE's Better Buildings Challenge); and expanding efficiency labeling programs (for example, ENERGY STAR). New and strengthened appliance standards and less energy-intensive manufacturing together with the Clean Power Plan could lead to total electricity demand reductions of at least 9–10 percent below projected levels in 2025 and 11–13 percent in 2030.

These policies should include or be complemented by other state, federal, and local actions including: (1) updates to building codes and improvements to their enforcement, (2) measures to promote retrofits of existing buildings, and (3) expanded access to low-cost finance for efficiency projects.

C. Cleaner & More Fuel Efficient Transportation

The U.S. transportation sector is becoming less carbon intensive due in large part to the most recent federal GHG emission and fuel economy standards covering light-duty cars and trucks (model year 2012–25). A declining growth rate in vehicle miles traveled (VMT) by passenger vehicles also has contributed to declining emissions from light-duty vehicles over the past decade. Looking ahead, existing and proposed standards for medium- and heavy-duty vehicles and the development of CO2 standards for aircraft will continue to increase the efficiency of the U.S. transport system, leading to even more fuel savings for households and businesses.

1. Passenger Vehicles

The Administration started to take bold action in this sector in 2010 when EPA and DOT established GHG and fuel economy standards for MY 2012-2016 passenger vehicles, and again in 2012 when these standards were expanded again to roughly double the fuel economy of model year 2025 vehicles. In response to these rules, car manufacturers have been utilizing advanced technologies to increase the fuel economy of their fleets- the number of sport utility vehicle models with a fuel economy of at least 25 miles per gallon (mpg) has doubled over the last five years, while the number of car models with a fuel economy of at least 40 mpg has increased sevenfold.[66] Analysis shows that, because of this technology advancement, car manufacturers are actually outperforming the current standards and are on track to meet the model year 2025 standards.[67] As new vehicles become more efficient, they will also save consumers money, improve air quality, and increase energy security by lowering oil demand. Once fully implemented, owners are expected to save on average $3,400 to $5,000 (net) over the life of their vehicle, compared with model year 2016 vehicles. The automobile industry may even be on the brink of an even greater transition. Advances in electric vehicle battery technology, along with the anticipated roll out of fuel cell vehicles in the 2015–17 could transform automobile industry. Battery prices have fallen by more than 40 percent since 2010. Some industry analysts are predicting that by the early 2020s, long-distance electric vehicles will be cost-competitive with internal-combustion-engine vehicles, thanks to fuel price savings, even without federal incentives.[68]

2. Transportation and Land Use

Transportation policies can also reduce passenger vehicle travel demand, thus lowering fuel use and emissions from vehicles. Passenger vehicle travel demand is already growing more slowly now than in the past decades, from an average growth rate of 3 percent per year from the 1970s to mid-2000s to 0.9 percent per year between 2004 and 2012 (measured in vehicle miles traveled).[69] Multiple factors are likely in play in this slowdown: the economic recession, changing demographics, high costs of driving (including rising fuel prices until late 2014), changing consumer preferences, as well as policy initiatives. It is uncertain whether these trends will continue or whether travel demand growth will rebound due to continued recovery from the recession, population growth, changes in oil prices (such as the rapid declines that occurred in late 2014), or other factors.

State and local policies should aim to provide more safe, reliable transit options for citizens, for instance through compact development patterns coupled with improved public transportation and routes for walking and biking. DOT, EPA, DOE, the U.S. Department of Housing and Urban Development, and other federal agencies can encourage and support these efforts in a number of ways, including increased funding for public transit infrastructure, implementation of performance criteria for funding that incentivizes compact development and related strategies, research and development, tax policies that promote infill development (such as renewal of the Federal Brownfield Tax Incentive), and technical assistance.[70]

3. Medium- and Heavy-Duty Trucks

The medium- and heavy-duty truck sector also presents opportunities to reduce emissions while saving fuel costs. Current medium- and heavy-duty vehicle GHG and fuel consumption standards are estimated

to result in $49 billion in net benefits to society (from fuel savings, CO_2 reductions, reduced air pollution, improved energy security due to decreases in the impacts of oil price shocks, and other benefits) over the lifetime of model year 2014–18 vehicles.[71] On June 19th, EPA and DOT proposed a second round of standards for the post-2018 time frame that would increase the fuel efficiency of medium-and heavy-duty vehicles up to 40 percent by 2027 compared to 2010 levels.[72] This level of fuel savings can be achieved using technologies that are currently available—such as tractor and trailer aerodynamic enhancements, hybridization and electric drive, and weight reduction, among others—that are estimated to have an average payback period of less than two years.[73] EPA should finalize the second round of standards in a timely manner and take the full potential of these cost-effective technologies into account.

4. Aviation

The United States has also taken steps to address GHG emissions from airplanes through its emission reduction plan for aviation.[74] The Federal Aviation Administration has initiatives in place to improve fuel efficiency through operations, including establishing direct routes and reducing delays, under its Next Generation Air Transport Systems program. [75] And on June 10th, EPA took the first steps toward setting a carbon dioxide emissions standard for commercial airplane engines. In anticipation of an international aircraft CO_2 emissions standard, expected from the International Civil Aviation Organization in 2016, EPA released an advanced notice of proposed rulemaking establishing the groundwork and seeking public input on relevant issues like timing and stringency.[76] It's not yet clear what the international standards will deliver, but studies show that there's significant room for improvement in aircraft fuel efficiency, in the range of 20-30 percent or greater in the 2025-30 timeframe through use of improved engines, lower weight and reduced drag.[77] EPA should set standards that take full advantage of these technologies, aiming to improve the fuel efficiency of new aircraft in the range of 2-3 percent annually. FAA should also continue to expand its initiatives to enhance the management of air travel.

D. Cleaner Industry

Industry is a broad category that includes a wider range of economic activities than the residential, commercial, and transport sectors. The energy and emissions intensiveness of industrial activity varies among manufacturing, construction, agriculture, energy transformation, mining, and forestry subsectors.[78] Total U.S. industrial sector emissions peaked at 1.9 billion metric tons of CO_2 in 1979 and have intermittently declined since the late 1990s. Between 2010 and 2014, real U.S. industrial sector value-added grew by 7 percent while total industrial sector energy-related carbon dioxide emissions dropped by one percent.[79] Emissions reductions have been driven by a combination of efficiency improvements, cleaner energy use, changing product mix, and additional combined-heat-and-power (CHP) utilization.[80] While the U.S. industrial sector has become more efficient, studies suggest that it can move forward at an even faster pace, reducing energy consumption by 15 to 32 percent below 2025 forecast values.[81] In 2014, total U.S. industrial sector emissions amounted to 1.5 billion metric tons CO_2, which covered 27 percent of total U.S. energy-related CO_2 emissions.[82]

The industrial sector presents a large challenge and opportunity for moving the United States to a prosperous low-carbon economy. The Administration's commitment to reduce U.S. emissions can

improve industrial competitiveness by catalyzing innovation and investment. U.S. firms can leverage low-cost clean energy and efficiency improvements to expand production and market share.[83] Given that the vast majority of U.S. emissions increases to 2040 are expected to come from industry and manufacturing sector growth,[84] this sector has a unique opportunity to benefit from forward-thinking policies and new investments. Recent studies have clearly demonstrated the positive economic, employment, and competitiveness benefits of investing in U.S. industrial energy efficiency. In 2012 Congress passed the American Energy Manufacturing Technical Corrections Act, which mandated that the Secretary of Energy should produce a report on the deployment of industrial energy efficiency in the United States. One high-level finding of the report, which was published in June, was that a $5 billion Federal matching industrial energy efficiency grant program implemented over a 10-year period would help support up to 9,700 to 11,200 jobs per year for the life of the program and help manufacturers save $3.3 to $3.6 billion per year in energy costs by Year 5 of the grant program, and $6.7 to $7.1 billion per year by Year 10 of the grant program.[85] The Administration's Climate Action Plan and international commitments offer a framework for re-invigorating U.S. industry in a low-carbon economy.

Within the industrial end use of energy, energy efficiency improvements (including technical improvements, material efficiency, and waste reduction) and fuel-switching are the primary levers for industrial sector emissions reduction, in addition to reductions from combined heat and power usage. Industrial sector demand, as reflected in the value of shipments, is expected to grow by more than a third between 2015 and 2030.[86] This growth creates opportunities for investments in efficiency and for well-designed policy interventions.

Industrial energy efficiency is inhibited by persistent barriers, including financing (such as intra-company competition for capital, corporate tax structures that allow companies to treat energy expenditures as tax offsets, split incentives, and energy price trends), regulation (monopolistic utility business models and cost-recovery mechanisms, exclusion of efficiency from energy resource planning), and informational barriers (ignorance of incentives and risks, unavailable energy use data, and lack of technical expertise).[87] Industrial sector demand growth combine with barriers to energy efficiency improvements to create a range of opportunities and challenges that will influence the absolute level of total U.S. GHG emissions.

A 2010 National Academy of Sciences study estimated a cost-effective energy efficiency improvement potential of 14 to 22 percent for the U.S. industrial sector by 2020.[88] Numerous state and federal policies have been enacted to accelerate industrial sector efficiency improvements. These include regulations for equipment via emission performance standards under Boiler Maximum Achievable Control Technology (MACT); EPA's New Source Performance Standards; market and rate design that helps to reduce industry sector GHG emissions by promoting clean distributed generation; tax credits, exemptions and/or deductions; technical assistance from federal government agencies such as DOE's Better Buildings, Better Plants Program;[89] and research grants such as Advanced Research Projects Agency-Energy[90] and DOE's Advanced Manufacturing Office[91] programs.

Reducing industrial sector GHG emissions below current levels will require additional investment and policy action. Government can combine ambitious minimum performance standards for sources, along

with voluntary benchmarking and labeling programs to encourage further industrial efficiency improvements.

E. Improved Production, Processing and Transmission of Natural Gas

Methane is the primary component of natural gas, and is therefore a valuable commodity.[92] It is also a potent greenhouse gas, with at least 34 times the global warming power of carbon dioxide.[93] Emissions of methane and other air pollutants occur throughout the natural gas life cycle, creating unnecessary waste along with damage to the local environment and the global climate.[94] Without additional policies, methane emissions from natural gas systems are expected to grow 4.5 percent by 2018, and to continue to grow slowly over the coming decades.[95] But the right policies will encourage investment in cost-effective technologies and best practices that companies can use to reduce waste, save money, and cut harmful emissions of methane and other pollutants.[96]

Dozens of proven technologies that minimize leaks and vents of methane are currently available and deployed across the United States. However, their use remains uneven largely because of market barriers that impair the ability of drillers and other service providers to capture the increased revenue by changing equipment and practices. In addition to the "split incentives" noted above, these barriers include:

- *Imperfect Information:* Because emissions measurement technology is still expensive and not widely used, many companies do not have a complete picture of how much methane they are emitting, and from which sources. Most companies, therefore, are not aware how much money they can save by investing in technologies that reduce methane emissions.
- *Opportunity Costs:* Investing capital or engineering capacity in equipment to reduce or eliminate natural gas leaks represents an opportunity cost for owners and operators of natural gas systems as investments in projects that reduce wasted natural gas compete with other potential investments, primarily the drilling of new production wells or other measures to increase natural gas production. Even though most emissions-control technologies pay for themselves in three years or less, that may not compare favorably to other investment opportunities.

While some companies active throughout the natural gas supply chain—from production through distribution— have already recognized the economic advantages of investing in technologies that reduce methane emissions, many have not. Voluntary measures reduce about 20 percent of methane emissions from natural gas systems, according to EPA.[97] But existing voluntary measures merely skim the surface of available, cost-effective emissions reduction opportunities, according to recent studies from the Natural Resources Defense Council (NRDC) and ICF Consulting.[98] This suggests the states and the federal government have ample opportunity to implement additional standards requiring reductions in methane emissions to overcome these barriers.

EPA's 2012 standards to reduce emissions of hazardous air pollutants, and volatile organic compounds are expected to significantly reduce methane emissions, saving the industry approximately $10 million per year in 2015 because the value of the avoided emissions of natural gas is greater than the cost of

equipment to capture it (annual savings are estimated at $330 million versus $320 million in compliance costs). Importantly, these savings do not consider the benefit of reducing methane emissions and conventional air pollutants. EPA estimates that the standards will reduce emissions of volatile organic compounds by 172,000 metric tons in 2015 alone.[99] Some studies have found that the health benefits due to improved air quality could be as high as $2,640 per metric ton of volatile organic compounds nationwide, with even higher benefits in some localities.[100]

EPA rulemakings have taken the first steps by indirectly reducing methane emissions in this sector, and forthcoming methane standards for new oil and gas infrastructure are an important step in the right direction, but much remains to be done. One recent study estimated that 40 percent of emissions from onshore gas development can be eliminated at an average cost of a penny per thousand cubic feet.[101] EPA should propose and finalize standards on both new *and* existing natural gas systems by 2017, and phase in implementation through 2020, to reduce methane leakage by 67 percent below business-as-usual projections. This can be achieved using existing technologies, many of which pay for themselves in three years or less.

F. Reducing Emissions of High Global Warming Potential Gases

HFCs are used primarily for refrigeration, air conditioning, and the production of insulating foams. HFC emissions have been increasing because they are a replacement of ozone-depleting substances (chlorofluorocarbons and hydrochlorofluorocarbons) under the Montreal Protocol and Clean Air Act. Unfortunately, some HFCs have very high global warming potential (GWP). Fortunately, alternatives with low GWPs are increasingly available. Several companies have begun to use these alternatives, with many saving money and energy while they reduce GHG emissions.[102] For example:

- Coca-Cola uses CO_2 in 1 million HFC-free coolers and aims to purchase only CO_2-based equipment by 2015.[103] Because of its transition to CO_2-based technology for new equipment, Coca-Cola has improved its cooling equipment energy efficiency by 40 percent since 2000, and reduced its direct greenhouse gas emissions by 75 percent.[104]
- Coolers introduced by PepsiCo, Red Bull, Heineken, and Ben & Jerry's are based on hydrocarbons including propane (R-290) or isobutane (R-600a). These companies combined have more than 600,000 units in use today and have seen energy efficiency improvements from 10 to 20 percent or even greater.[105]
- Fifteen car companies, including General Motors, Ford, and Chrysler, are moving forward with HFO-1234yf,[106] a new low-GWP refrigerant for personal vehicle air conditioners that has a GWP 99.9 percent lower than the HFC it replaces.[107] An estimated 1 million cars on the road worldwide already use this low-GWP refrigerant.[108] This number is expected to grow to nearly 3 million by the end of 2014.[109]

However, some low-GWP replacements have relatively high upfront costs, require the replacement of old equipment, or require equipment redesign.[110] Thus, there is little reason to believe that the U.S. market will rapidly move to these alternatives without new rules or other incentives.

While the United States (with Canada and Mexico) has proposed an amendment to the Montreal Protocol for the past several years that would phase down the use of HFCs globally, it has yet to be passed. To help reduce the use of HFCs domestically pending such an agreement, EPA has started to implement measures that address high-GWP HFC use in personal vehicles and in pickups, vans, and combination tractors.[111] In February 2015, EPA finalized rules through the Significant New Alternatives Program (SNAP) program to approve low-GWP alternatives. Proposed rules[112] to move some higher-GWP HFCs out of the market for various applications are anticipated to be finalized this year.

Opportunities exist to make HFC reductions beyond those proposed by EPA to date. While a global phasedown, through the Montreal Protocol, would be much more effective than a few individual countries taking action alone, EPA can use the SNAP program to jump start the removal of high-GWP HFCs from the market when low-GWP alternatives become available.[113] However, it will be important for EPA to ensure that new alternatives are both safe and efficient. EPA should also extend the servicing and disposal of air conditioning and refrigeration equipment requirements for ozone-depleting substances to HFCs in order to increase HFC reclamation and recycling.[114]

III. How the United States Can Reach Its INDC Target

As demonstrated in the previous sections, opportunities are emerging across the economy in multiple sectors to harness fuels, technologies, and processes in moving toward a low-carbon economy. The actions taken to date by the Obama Administration under the Climate Action Plan seize many of those opportunities and set an important foundation for meeting its target of reducing emissions 26–28 percent below 2005 levels by 2025, as outlined in its Intended Nationally Determined Contribution (INDC).

In May 2015, WRI published *Delivering on the U.S. Climate Commitment: A 10-Point Plan Toward A Low-Carbon Future.* This study demonstrates that the United States can meet, and even exceed, its INDC target with a broad policy portfolio using existing federal laws combined with actions by states. This would include expanding and strengthening some current and proposed policies and standards and taking actions on emission sources that are not yet addressed. Since we completed our analysis, the Administration has already started to move on some of the additional actions we identified as necessary for the US to meet its INDC target, including taking steps toward improving the efficiency of medium- and heavy-duty trucks, aircraft, and rooftop air conditioning units.

Figure 1 presents emissions projections for three low-carbon pathways that could reduce U.S. emissions by 26–30 percent below 2005 levels by 2025 and 34–38 percent by 2030. *Delivering on the U.S. Climate Commitment* outlines specific steps federal agencies and state governments can take to achieve these reductions, recognizing that other pathways could reach those targets as well by applying different policy portfolios. Notably, our pathways do not include steps to reduce emissions and increase sequestration from the agriculture and forestry sectors. However, in April 2015, the Administration announced an initiative titled *Building Blocks for Climate Smart Agriculture & Forestry.*[115] USDA expects this comprehensive set of voluntary programs and initiatives to reduce net emissions and enhance carbon sequestration by over 120 million metric tons of CO2 equivalent per year by 2025. The

opportunities in agriculture and forestry reinforce the notion that there are multiple pathways to achieve the U.S. INDC target.

Figure 1. Net U.S. Greenhouse Emissions: Reference Case and Low-Carbon Pathways Using Existing Federal Authorities and Additional State Action

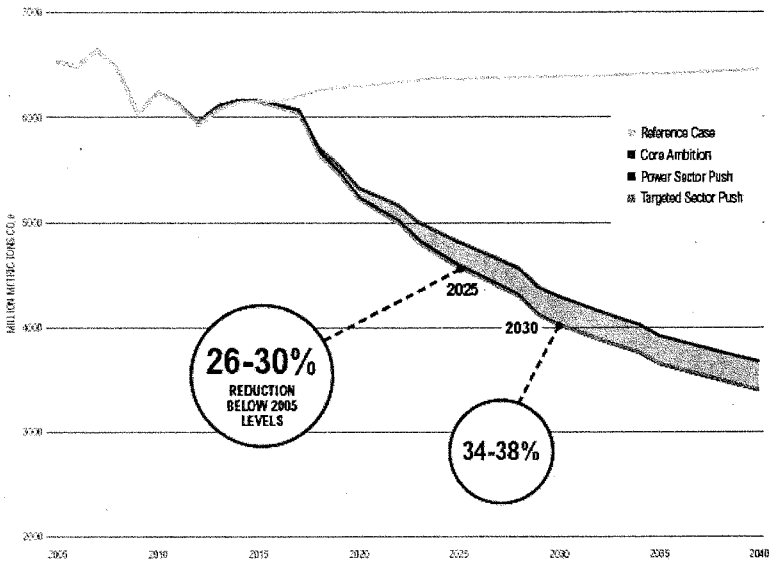

Figure 1 depicts net GHG emissions under three low-carbon pathways we modeled in our analysis that could be pursued using existing federal laws and additional state action. The "Core Ambition" pathway reflects the EPA's proposed Clean Power Plan (CPP), in addition to emission abatement opportunities across other sectors of the economy. "Power Sector Push" builds on Core Ambition by assuming that states and utilities go beyond the CPP as proposed, or that EPA strengthens the proposal, to take advantage of cost-effective energy efficiency resources and continued decreases in renewable energy costs. "Targeted Sector Push" assumes that the CPP is finalized as proposed, but pushes the envelope in a few key areas outside the power sector to achieve economy-wide reductions similar to "Power Sector Push". Both of these pathways were designed to achieve very similar levels of emission reductions, illustrating alternative ways to go beyond a 26 percent reduction across the economy, either through increased action in the power sector or outside the power sector. The shaded area between the pathways indicates that reductions anywhere in this range are possible given mixtures of policies that blend these three pathways. The full report contains all the details and assumptions underlying these pathways and the Reference Case projection, and the modeling approaches used.

IV. U.S. Leadership and Climate Protection

The United States and other parties to the UNFCCC have set a goal of limiting warming to 2 degrees Celsius above pre-industrial levels.[116] Failure to meet that goal will increase economic, social, and environmental risks for the United States and all nations.[117] With global GHG emissions still on the rise,[118] delaying action on climate change will only result in climate-change-related events becoming more frequent and severe, leading to mounting costs and harm to businesses, consumers, and public health. The new EPA report, *Climate Change in the United States: Benefits of Global Action*,[119] estimates billions of dollars of avoided damages in the U.S. that would result from global efforts to reduce greenhouse gas emissions, ranging from reduced damage to agriculture, forestry, and fisheries, to reductions in coastal and inland flooding, to fewer heat-driven increases in electricity bills.

We are already experiencing the effects of climate change. Last year the world experienced the hottest year on record in 2014[120]. Fourteen of the fifteen hottest years on record have occurred since 2000.[121] In the United States, some regions are experiencing a higher frequency of flooding, heavier precipitation events, and more frequent heat waves and wildfires.[122]

Extreme weather events are expensive. Between 1980 and 2014, the United States experienced 178 extreme weather and climate events that cost at least $1 billion each with total damages of more than $1 trillion.[123] The frequency and severity of these types of events have increased over the same period, with four of the six years with the most billion dollar disasters on record in the United States have occurred since 2010. A similar increase in these costly events is happening around the world[124] [125]. While many factors contribute to the cost of these events, such as growing population density and increased development in vulnerable areas more prone to extreme events, increasing global temperatures and climate variability are making certain types of these costly events more frequent and severe.

U.S. leadership is critical to the success of the global efforts necessary to avoid billions of dollars in damages to our country. That leadership is paying off as signs are emerging that nations can reach a new agreement in the international climate negotiations that culminate in Paris in December.

V. Conclusion

The United States has the opportunity in the coming years to lay the foundation for a path to economic growth that delivers significant climate benefits. The key drivers of economic growth—including more efficient use of energy and natural resources, smart infrastructure investments, and technological innovation—can also lead to a low-carbon future. By bringing a spirit of competition, ingenuity, and innovation to the climate challenge, the United States can be a leader in delivering the improvements in energy efficiency, the cleaner fuels, and the new technologies and processes that can lower emissions and create net economic benefits. With more than 50 years' experience in addressing environmental problems, the United States has demonstrated that environmental protection is compatible with economic growth, and environmental policies have delivered huge benefits to Americans.

The U.S. emissions reduction target of reducing emissions by 26 to 28 percent below 2005 levels by 2025 is both ambitious and achievable. Use of existing federal laws combined with actions by the states can help accelerate recent market and technology trends in renewable energy, energy efficiency, alternative vehicles, and many other areas in order to meet or beat that target.

However, looking beyond 2025, even deeper greenhouse gas (GHG) emission reductions will be needed to avoid the worst impacts of climate change. Congress can – and indeed should – play a constructive role. By establishing an economy-wide price on carbon, Congress could help achieve long-term emission reductions in a cost-effect manner, and could do so with an eye toward achieving other policy goals, such as reforming the tax code to be more efficient.[126] Because carbon pricing can aim at a variety of policy objectives, support for some form of pricing carbon comes from divergent points on the political spectrum. Though they disagree on the details, supporters include former Secretary of State George Schultz,[127] former Treasury Secretary Henry Paulson,[128] and former Republican Congressman Bob Inglis;[129] conservative economists such as Gregory Mankiw,[130] and Art Laffer;[131] scholars at the American Enterprise Institute,[132] Resources for the Future,[133] and the Brookings Institution;[134] and organizations such as the Center for American Progress,[135] the Citizens' Climate Lobby,[136] and the Niskanen Institute.[137]

In the meantime, however, the Administration is taking sensible steps to encourage recent market and technology trends that move us toward a low-carbon future. As recent experience at the state and national levels demonstrates, smart climate and energy policies can not only reduce greenhouse gas emissions, but also provide direct financial benefits to businesses and consumers as well as providing overall net public benefits, for example, through improved public health.

It is very much in the national interest of the United States to play a leading role in addressing climate change. All nations will need to take ambitious action and do their fair shares, since no nation is immune to the impacts of climate change and no nation can meet the challenge alone. The United States has always provided leadership when the world faces big challenges, and by acting at home, we can work with other countries to achieve an effective international agreement in which all countries act.

Let me return to my question at the beginning of this testimony: What does it cost if we **don't** avoid climate change? If nations fail to combat climate change, the U.S. will suffer billions of dollars of damages to agriculture, forestry, and fisheries, and from to coastal and inland flooding, along with heat-driven increases in electricity bills, just to cite some of the impacts. Delaying action on climate change will only increase the costs and harm to businesses, consumers, and public health

Thank you for the opportunity to testify before the Committee, and I look forward to answering any questions.

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[64] A New Buildings Institute review of nine projects across the country showed that deep commercial retrofits are capable of reducing energy use by 30 percent or more, cutting energy costs in half, and elevating building performance to 50 percent better than the national average. See New Buildings Institute, 2011, "A Search for Deep Energy Savings," August, accessible at http://newbuildings.org/sites/default/files/NEEA_Meta_Report_Deep_Savings_NBI_Final8152011.pdf. Residential retrofits through DOE's Building America program—which aims to reduce energy use in new and existing homes 50 percent by 2017 through cost-effective measures—demonstrate that it is possible to bring existing building performance up to the same standard as best-in-class new construction. Homes in the program demonstrated average energy savings of nearly 60 percent, with some homes reaching as high as 90 percent improvement. See http://apps1.eere.energy.gov/buildings/publications/pdfs/building_america/der_pilot_mass_rhodeisland.pdf.

[65] H. C. Granade, J. Creyts, A. Derkach, P. Farese, S. Nyquist, and K. Ostrowski, 2009, "Unlocking Energy Efficiency in the U.S. Economy," July 2009, McKinsey Global Energy and Materials, accessible at http://www.greenbuildinglawblog.com/uploads/file/mckinseyUS_energy_efficiency_full_report.pdf.
National Academy of Sciences, National Academy of Engineering, and National Research Council, 2010, "Real Prospects for Energy Efficiency in the United States," The National Academies Press, Washington, DC, accessible at http://www.nap.edu/openbook.php?record_id=12621.

[66] U.S. Environmental Protection Agency. 2013. "Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2013." Accessible at: <http://www.epa.gov/fueleconomy/fetrends/1975-2013/420r13011.pdf>.

[67] U.S. Environmental Protection Agency. 2015. "GHG Emission Standards for Light-Duty Vehicles: Manufacturer Performance Report for the 2013 Model Year." Accessible at: <http://www.epa.gov/otaq/climate/ghg-report.htm>. Nic Lutsey. 2015. "Do the automakers really need help with the U.S. efficiency standards?" The International Council on Clean Transportation. Accessible at: <http://theicct.org/blogs/staff/do-automakers-really-need-help-us-efficiency-standards>.

[68] The Department of Energy has a target of reducing the cost for long-range electric vehicle batteries from $500 per kilowatt hour in 2012 to $125 per kilowatt hour by 2022 (U.S. Department of Energy, 2013,"EV Everywhere Grand Challenge Blueprint," accessible at: http://energy.gov/sites/prod/files/2014/02/f8/eveverywhere_blueprint.pdf). At this price point, along with other

concomitant advancements, DOE expects long-range (280 miles) electric vehicles to be cost-competitive with internal combustion engines (on a levelized total cost of ownership basis over five years). DOE notes that shorter-range electric vehicles and plug-in hybrids would likely become cost-competitive before this price point for long-range electric vehicle batteries is met. Tesla Motors recently announced plans to build facilities by 2017 to produce large electric vehicle batteries that are 30 percent cheaper than today's batteries (around $190 per kilowatt hour, assuming current reported prices, see Chapter 3 for additional discussion).

[69] B. Davis and P. Baxandall. 2013. "Transportation in Transition: A Look at Changing Travel Patterns in America's Biggest Cities." U.S. PIRG Education Fund and Frontier Group. Accessible at: <http://www.uspirg.org/sites/pirg/files/reports/US_Transp_trans_scrn.pdf>.

[70] For a review of existing and potential new opportunities for federal action in these areas, see: <http://www.nrel.gov/docs/fy13osti/55634.pdf>.

[71] U.S. Environmental Protection Agency and Department of Transportation. 2011. "EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy Duty Vehicles." Accessible at: http://www.epa.gov/otaq/climate/documents/420f11031.pdf. U.S. Environmental Protection Agency and National Highway Traffic Safety Administration. 2011."Final Rulemaking to Establish Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles: Regulatory Impact Analysis." Accessible at: <http://www.epa.gov/otaq/climate/documents/420r11901.pdf>.

[72] U.S. Environmental Protection Agency and U.S. Department of Transportation, Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2, RIN 2060-AS16; RIN 2127-AL52, June 19, 2015, http://www.epa.gov/oms/climate/documents/hd-ghg-fr-notice.pdf.

[73] ACEEE et. al. (2014) found that many technologies could be used to achieve the highest level of reductions, including tractor aerodynamic enhancements and integration with the trailer, hybridization and electric drive, engine downsizing, dual-stage turbocharging, trailer aerodynamic enhancements, low rolling resistance tires, weight reduction, idle reduction, among other technologies that would improve engine, transmission and driveline, and vehicle and trailer performance. They also found that "a new truck that includes an advanced engine and transmission, new axle design, and improved aerodynamics to the tractor and trailer could save average tractor-trailer owners and drivers about $30,000 per year in fuel. In 2025, these new efficiency technologies would increase truck purchase costs by about $32,000, which is recovered by fuel savings in just 13 months." See: American Council for an Energy Efficient Economy, Environmental Defense Fund, Natural Resources Defense Council, Sierra Club, and Union of Concerned Scientists. 2014. "Big Fuel Savings Available in New Trucks." Accessible at: <http://aceee.org/files/pdf/fact-sheet/truck-savings-0614.pdf>.

[74] United States Aviation Greenhouse Gas Emissions Reduction Plan, June 2012, https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/media/Aviation_Greenhouse_Gas_Emissions_Reduction_Plan.pdf

[75] Federal Aviation Administration. 2012. *Next Gen Implementation Plan*. Accessible at: <http://www.faa.gov/nextgen/implementation/media/NextGen_Implementation_Plan_2012.pdf>.

[76] U.S. Environmental Protection Agency, 40 CFR Parts 87 and 1068, Proposed Finding that Greenhouse Gas Emissions from Aircraft Cause or Contribute to Air Pollution that May Reasonably Be Anticipated to Endanger Public Health and Welfare and Advance Notice of Proposed Rulemaking, RIN 2060-AS31, June 10, 2015, http://www.epa.gov/otaq/documents/aviation/aircraft-ghg-pr-anprm-2015-06-10.pdf

[77] U.S. Environmental Protection Agency, 2010, EPA Analysis of the Transportation Sector, http://www.epa.gov/oms/climate/GHGtransportation-analysis03-18-2010.pdf.

[78] Total national energy use and GHG emissions are commonly classified into four end-use sectors: residential, commercial, industrial, and transportation. From an end-use perspective, industry includes energy transformation activities such as electricity generation, petroleum refining, and natural gas production. This assessment also includes overlapping analysis of these energy transformation activities as key areas for reducing U.S. GHG emissions.

[79] See real (2009) value-added data at http://www.bea.gov/industry/gdpbyind_data.htm; emissions data from http://www.eia.gov/totalenergy/data/monthly/pdf/sec12_7.pdf.

[80] For examples from the U.S. pulp and paper sector, see Aden, et al. (2013) http://pdf.wri.org/energy-efficiency-in-us-manufacturing-midwest-pulp-and-paper.pdf

[81] DOE. 2015. *Barriers to Industrial Energy Efficiency.* http://energy.gov/eere/amo/articles/barriers-industrial-energy-efficiency-report-congress-released

[82] These emissions numbers include both direct emissions and indirect emissions attributable to electricity use. U.S. Energy Information Administration. "Table 12.4 Carbon Dioxide Emissions From Energy Consumption: Industrial Sector." *Electricity Power Monthly.* Accessible at: <http://www.eia.gov/totalenergy/data/monthly/>.

[83] For more information on emerging digital manufacturing technologies, see McKinsey's recent analysis at http://www.mckinsey.com/insights/manufacturing/manufacturings_next_act.

[84] http://www.eia.gov/forecasts/aeo/

[85] DOE. 2015. *Barriers to Industrial Energy Efficiency.* http://energy.gov/eere/amo/articles/barriers-industrial-energy-efficiency-report-congress-released

[86] U.S. Energy Information Administration. "AEO 2014 Reference Case." Accessible at: <http://www.eia.gov/forecasts/aeo/>.

[87] For extensive discussion of barriers to U.S. industrial energy efficiency, see DOE. 2015. *Barriers to Industrial Energy Efficiency.* http://energy.gov/eere/amo/articles/barriers-industrial-energy-efficiency-report-congress-released.

[88] National Academy of Sciences, National Academy of Engineering, and National Research Council. 2010. "Real Prospects for Energy Efficiency in the United States." Washington, DC: National Academies Press (NAP). Accessible at: <http://www.nap.edu/openbook.php?record_id=12621>.

[89] http://www1.eere.energy.gov/manufacturing/tech_assistance/betterplants/

[90] http://arpa-e.energy.gov/

[91] http://energy.gov/eere/amo/advanced-manufacturing-office

[92] Methane is the primary component of natural gas, but gas also has significant concentrations of volatile organic compounds--many of which are precursors to ground-level ozone formation. Hazardous air pollutants are present in unprocessed natural gas. For more information, see R. Lattanzio, "Air Quality Issues in Natural Gas Systems," Congressional Research Service, March 2013, accessible at http://www.civil.northwestern.edu/docs/Tight-Shale-Gas-2013/Air-Quality-Issues-Natural-Gas-Ratner-2013.pdf.

[93] According to the latest estimates from the Intergovernmental Panel on Climate Change, because it is a powerful but short-lived greenhouse gas, methane traps 34 times as much heat in the atmosphere as CO_2 over 100 years, and 86 times as much over 20 years. See G. Myhre and D.Shindell, "Anthropogenic and Natural Radiative Forcing," in *Climate Change 20013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change,* Cambridge, UK: Cambridge University Press, accessible at http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf.

[94] Here, "natural gas systems" refers to the production of natural gas from natural gas wells, as well as the processing, transmission, and distribution of that gas. Natural gas produced at oil wells is not included. Similarly, the end use of natural gas – for electricity generation, transportation, residential heating, or other purposes – is not included.

[95] ICF International, 2014, "Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries," March, Fairfax, VA, accessible at http://www.edf.org/sites/default/files/methane_cost_curve_report.pdf.

[96] For more information on these technologies and practices, see Obeiter, M. and C. Weber. 2015. "Reducing Methane Emissions From Natural Gas Development: Strategies for State-Level Policymakers." Working Paper. Washington, DC: World Resources Institute. Available online at www.wri.org/publication/reducing-methane-emissions.

[97] U.S. Environmental Protection Agency, 2014, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2012. Chapter 3: Energy," April, EPA, Washington DC, accessible at http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.

[98] S. Harvey, V. Gowrishankar, and T. Singer, 2012, "Leaking Profits: The U.S. Oil and Gas Industry Can Reduce Pollution, Conserve Resources, and Make Money by Preventing Methane Waste," March, Natural Resources

Defense Council, New York, NY, accessible at http://www.nrdc.org/energy/leaking-profits.asp; and ICF International, 2014, "Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries," March, Fairfax, VA, accessible at http://www.edf.org/sites/default/files/methane_cost_curve_report.pdf.

[99] U.S. Environmental Protection Agency, "Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews," accessible at http://www.epa.gov/airquality/oilandgas/pdfs/20120417finalrule.pdf.

[100] N. Fann, C.M. Fulcher, and B.J. Hubbell, "The Influence of Location, Source, and Emission Type in Estimates of Human Health Benefits of Reducing a Ton of Air Pollution," *Air Quality, Atmosphere, & Heath,* September 2009: 169-76, accessible at http://www.ncbi.nlm.nih.gov/pubmed/19890404.

[101] ICF International. 2014. "Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries." Accessible at: <http://www.edf.org/sites/default/files/methane_cost_curve_report.pdf>. For reference, the daily spot price for natural gas in 2014 ranged from $2.81 to $8.35 per thousand cubic feet, with an average price of $4.48. See: <http://www.eia.gov/dnav/ng/hist/rngwhhdD.htm>.

[102] N. Bianco, K. Meek, R. Gasper, M. Obeiter, S. Forbes, and N. Aden. 2014. "Seeing is Believing: Creating a New Climate Economy in the United States." Working Paper. Washington, DC: World Resources Institute. Accessible at: <http://www.wri.org/publication/new-climate-economy>.

[103] Coca-Cola Company, 2014, "Coca-Cola Installs 1 Millionth HFC-Free Cooler Globally, Preventing S.25MM Metric Tons of CO_2," Press Release, January 22, accessible at http://www.coca-colacompany.com/press-center/press-releases/coca-cola-installs-1-millionth-hfc-free-cooler-globally-preventing-525mm-metrics-tons-of-co2#TCCC.

[104] Ibid.

[105] PepsiCo, "PepsiCo Debuts Energy-Efficient, HFC-Free Cooler at Super Bowl," Press Release, February 2010, accessible at http://www.pepsico.com/Media/PressRelease/PepsiCo-Debuts-Energy-Efficient-HFC-Free-Cooler-at-Super-Bowl02022010.html; Red Bull, "Efficient Cooling through Ecofriendly Coolers," accessible at http://energydrink.redbull.com/coolers; Heineken, "2013 Sustainability Report," accessible at http://sustainabilityreport.heineken.com/The-big-picture/What-we-said-and-what-weve-done/index.htm; Hydrocarbons 21, "Heineken's Successful Rollout of HC Coolers- Exclusive Interview with Maarten ten Houten," December 2013, accessible at http://www.hydrocarbons21.com/news/viewprintable/4760; Ben & Jerry's, "Experience with Natural Refrigerants," accessible at http://www.atmo.org/presentations/files/124_3_Asch_Ben_n_Jerry.pdf.

[106] Honeywell, "Auto Industry Conversion Update," obtained from Thomas Morris, director of commercial development, Honeywell, July 25, 2014.

[107] HFO-1234yf has a GWP of 4 whereas the current refrigerant, HFC-134a, has a GWP of 1,430. See U.S. Environmental Protection Agency, "Final Rulemaking Protection of the Stratospheric Ozone: New Substitute in the Motor Vehicle Air Conditioning Sector under the Significant New Alternatives Policy (SNAP) Program," Fact Sheet, accessible at http://www.epa.gov/ozone/downloads/HFO-1234yf_Final_Fact_Sheet.pdf.

[108] Simon Warburton, "Honeywell Fights Back Against r1234yf Claims," Just Auto, May 2014, accessible at http://www.just-auto.com/news/honeywell-fights-back-against-r1234yf-claims_id145919.aspx.

[109] DuPont, "Rapid Growth Expected in Adoption of HFO-1234yf," accessible at http://us.vocuspr.com/Newsroom/MultiQuery.aspx?SiteName=DupontEMEA&Entity=PRAsset&SF_PRAsset_PRAssetID_EQ=128793&XSL=NewsRelease&IncludeChildren=True&Lang=English.

[110] Michael Parr, federal government affairs manager, DuPont, personal communication, July 24, 2014.

[111] U.S. Environmental Protection Agency. 2011. "EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles." Accessible at: <http://www.epa.gov/otaq/climate/documents/420f11031.pdf>.

[112] U.S. Environmental Protection Agency. 2014. "Protection of Stratospheric Ozone: Change of Listing Status for Certain Substitutes under the Significant New Alternatives Policy Program." 40 CFR, Part 82. Accessible at: <http://www.epa.gov/ozone/downloads/SAN_5750_SNAP_Status_Change_Rule_NPRM_signature_version-signed_7-9-2014.pdf>.

[113] U.S. Environmental Protection Agency. 2014. "Text of North American HFC phase-down amendment proposal." Accessible at: <http://www.epa.gov/ozone/downloads/HFC_Amendment_2014_Text.pdf>.

[114] Specifically, EPA should also extend the servicing and disposal of air conditioning and refrigeration equipment requirements for HCFCs and CFCs (under section 608 of the Clean Air Act) to HFCs, as well as increase initiatives for HFC reclamation and recycling to ensure that fewer virgin HFC compounds are used until they are able to be phased down. Alliance for Responsible Atmospheric Policy. 2014. "Petition to Extend the Requirements of 40 C.F.R. Part 82, Subpart F to HFCs." Accessible at: <http://www2.epa.gov/sites/production/files/2014-05/documents/alliance-petition-31jan2014-v2-2.pdf>.

[115] Available at: < http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=climate-smart.html>.

[116] See Copenhagen Accord. Available at: < http://unfccc.int/meetings/copenhagen_dec_2009/items/5262.php>.

[117] See Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Available at: < https://unfccc.int/science/workstreams/cooperation_with_the_ipcc/items/8732.php>.

[118] WRI. 2014. "CAIT 2.0, 2014, Climate Analysis Indicators Tool: WRI's Climate Data Explorer." Washington, DC: World Resources Institute. Accessible at: <http://cait2.wri.org>. International Energy Agency. 201S. "Global energy-related emissions of carbon dioxide stalled in 2014." Accessible at: <http://www.iea.org/newsroomandevents/news/2015/march/global-energy-related-emissions-of-carbon-dioxide-stalled-in-2014.html>. U.S. Environmental Protection Agency. 2012. "Global Anthropogenic Non-CO_2 Greenhouse Gas Emissions: 1990-2030." Accessible at: <http://www.epa.gov/climatechange/EPAactivities/economics/nonco2projections.html>. Between 2005 and 2011, global GHG emissions increased by roughly 13 percent and it is unclear what trend emissions will follow in the future. While preliminary data from the International Energy Agency suggests that energy-related CO_2 emissions stalled in 2014 (the first time in 40 years a halt or reduction in emissions was not tied to an economic downturn), non-CO_2 GHG emissions will continue to rise nearly 44 percent above 2005 levels by 2030, according to data from the U.S. Environmental Protection Agency. In 2011, non-CO_2 emissions accounted for about 27 percent of global GHG emissions.

[119] Available at: <http://www2.epa.gov/cira>.

[120] National Oceanic and Atmospheric Administration, National Climatic Data Center. 2014. "Global Analysis-Annual 2014." Accessible at: <http://www.ncdc.noaa.gov/sotc/global/>.

[121] Forbes Tompkins and Christina DeConcini. 2015. "2014: A Year of Temperature Records and Landmark Climate Findings." Accessible at: <http://www.wri.org/sites/default/files/2014_Temperature_Records_and_Landmark_Climate_Findings_fact_sheet.pdf>. N. Bianco, K. Meek, R. Gasper, M. Obeiter, S. Forbes, and N. Aden. 2014. "Seeing is Believing: Creating a New Climate Economy in the United States." Working Paper. Washington, DC: World Resources Institute. Accessible at: <http://www.wri.org/publication/new-climate-economy>.

[122] F. Tompkins and C. DeConcini. 2015. "2014: A Year of Temperature Records and Landmark Climate Findings." Accessible at: <http://www.wri.org/sites/default/files/2014_Temperature_Records_and_Landmark_Climate_Findings_fact_sheet.pdf>. N. Bianco, K. Meek, R. Gasper, M. Obeiter, S. Forbes, and N. Aden. 2014. "Seeing is Believing: Creating a New Climate Economy in the United States." Working Paper. Washington, DC: World Resources Institute. Accessible at: <http://www.wri.org/publication/new-climate-economy>.

[123] National Oceanic and Atmospheric Administration, National Climate Data Center. "Billion-Dollar Weather and Climate Disasters: Overview." Accessible at: <http://www.ncdc.noaa.gov/billions/>.

[124] Munich RE. 2014. "Loss Events Worldwide1980–2013." Accessible at: <http://www.munichre.com/site/wrap/get/documents_E-736590296/mram/assetpool.munichreamerica.wrap/PDF/2013/1980_2013_events.pdf>.

[125] A. Benfield. "2014 Annual Global Climate and Catastrophe Report: Impact Forecasting." Accessible at: <http://thoughtleadership.aonbenfield.com/Documents/20150113_ab_if_annual_climate_catastrophe_report.pdf>.

[126] For a discussion of the range of policy goals that can be addressed in the context of a carbon price, see Kennedy, Kevin, Obeiter, Michael, and Kaufman, Noah, *Putting a Price on Corbon: A Handbook for U.S. Policymakers, Putting a Price on Carbon: A Handbook for U.S. Policy Makers.* Washington DC, World Resources Institute, April 2015. Available at http://www.wri.org/publication/putting-price-carbon.

[127] Shultz, George P. March 13, 2015. "A Reagan Approach to Climate Change." *Washington Post.* Also available at: http://www.washingtonpost.com/opinions/a-reagan-model-on-climate-change/2015/03/13/4f4182e2-c6a8-11e4-b2a1-bed1aaea2816_story.html

[128] Paulson, Henry M. June 21, 2014. "The Coming Climate Crash: Lessons for Climate Change in the 2008 Recession." *The New York Times.* Also available at:

[129] See http://republicen.org/

[130] See, for example, Mankiw, N. Gregory. "Smart Taxes: An Open Invitation to Join the Pigou Club." *Eastern Economic Journal* 35, 14-23 (2009). Available at: http://scholar.harvard.edu/files/mankiw/files/smart_taxes.pdf

[131] See, for example, Wolf, Amy. February 20, 2012. "Economist Arthur Laffer Proposes Taxing Pollution Instead of Income." *Vanderbilt News.* Also available at: http://news.vanderbilt.edu/2012/02/economist-arthur-laffer-proposes-taxing-pollution/

[132] See, for example, Green, Kenneth P., Hayward, Steven F., and Kevin A. Hassett. "Climate Change: Caps vs. Taxes." *American Enterprise Institute for Public Policy Research Environmentol Policy Outlook* No. 2, June 2007. Available at: https://www.aei.org/wp-content/uploads/2011/10/20070601_EPOg.pdf

[133] See "Considering a U.S. Carbon Tax," Resources for the Future, accessed April 13, 2015, http://www.rff.org/centers/energy_and_climate_economics/Pages/Considering-a-US-Carbon-Tax.aspx

[134] See, for example, Morris, Adele C. and Aparna Mathur. May 2014. "A Carbon Tax in Broader U.5. Fiscal Reform: Design and Distributional Issues." Washington, DC: Center for Climate and Energy Solutions. Available at: http://www.brookings.edu/research/papers/2014/05/22-carbon-tax-in-broader-us-fiscal-reform-morris

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[136] "Carbon Fee and Dividend Explained," Citizens Climate Lobby, accessed April 13, 2015, https://citizensclimatelobby.org/carbon-fee-and-dividend/

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Senate Environment and Public Works Committee
Hearing entitled, "Road to Paris: Examining the President's International Climate Agenda and Implications for Domestic Environmental Policy"
July 8, 2015
Questions for the Record for Dr. Karl Hausker

Senator Booker:

1) **In your opinion, would it be a significant step to help the United States accelerate the reduction of carbon emissions from electricity generation and meet our intended nationally determined contributions (INDC) if Congress were to pass long term extensions of the PTC and ITC for solar, wind and other carbon free energy sources this year?**

   Yes, it would be a significant step. Long-term extensions of the PTC and ITC are critical to creating a more stable investment environment for solar, wind, and other renewable energy sources, and to encouraging the steady growth of carbon-free electricity generation. Short-term extensions of these tax credits can contribute to boom-and-bust cycles in the affected industries. As we recommended in our working paper, *Seeing is Believing: Creating a New Climate Economy in the United States*,[i] Congress should also eliminate inefficiency in their design—analysis by the Lawrence Berkeley National Laboratory and the Climate Policy Initiative found that the current structure of the production tax credit and investment tax credit could reduce their value to project developers by up to 36 and 64 percent, respectively.[ii] Renewable project developers frequently do not have sufficient tax liabilities to use the full value of the tax credit. As a result, developers often bring in a third party "tax equity" investor who invests in the project in exchange for being able to use most or all of the production tax credit benefits.[iii] However, according to Lawrence Berkeley National Laboratory, tax equity is the second most expensive form of capital that renewable projects often use.[iv] Reauthorizing the 1603 American Recovery and Reinvestment Tax Act grant program (which offered developers a cash payment of 30 percent of the project's cost),[v] or making tax incentives "refundable" (where the recipient applies as much of the credit to the tax liability as possible and is then refunded the balance in cash) could help ensure that more of the value of the credit flows to project developers and not financial intermediaries without increasing the cost to U.S. taxpayers.[vi]

2) **From the perspective of the timing of domestic carbon emissions reductions, do you see a significant difference between a scenario where the PTC and ITC for solar, wind and other carbon free energy sources are allowed to expire versus a scenario where instead long term extensions are granted?**

   Yes, a scenario in which long term extensions are granted will likely allow for earlier emission reductions due to carbon-free electricity generation being able to better outcompete fossil generation sources across more regions of the country. Long-term extensions will also encourage R&D that will result in further cost reductions over time.

We would expect such extensions to accelerate deployment of renewable energy, which would help reduce carbon emissions from the power sector.

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[i] N. Bianco, K. Meek, R. Gasper, M. Obeiter, S. Forbes, and N. Aden. 2014. "Seeing is Believing: Creating a New Climate Economy in the United States." Working Paper. Washington, DC: World Resources Institute. Accessible at: .

[ii] Specifically, Lawrence Berkeley National Laboratory found that wind developers can typically lose 36 percent of the production tax credit's value while solar developers can typically lose 64 percent of the investment tax credit's value. CPI found similar results, with wind developers typically losing 33 percent of the PTC's value while solar developers can typically lose 50 percent of the ITC's value. Mark Bolinger, 2014, "An Analysis of the Costs, Benefits, and Implications of Different Approaches to Capturing the Value of Renewable Energy Tax Incentives," May, Lawrence Berkeley National Laboratory, accessible at http://emp. lbl.gov/sites/all/files/lbnl-6610e.pdf; Uday Varadarajan, Brendan Pierpont, Andrew Hobbs, and Kath Rowley, 2012, "Supporting Renewables while Saving Taxpayers Money," Climate Policy Initiative, accessible at http://climatepolicyinitiative.org/wp-content/uploads/2012/09/Supporting-Renewables-while-Saving-Taxpayers-Money.pdf.

[iii] Bolinger, 2014, "An Analysis of the Costs, Benefits, and Implications of Different Approaches to Capturing the Value of Renewable Energy Tax Incentives."

[iv] Ibid

[v] U.S. Department of Treasury, "Overview of Status Update of the §1603 Program," accessible at http://www.treasury.gov/initiatives/recovery/ Documents/Status%20overview.pdf.

[vi] Bolinger, "An Analysis of the Costs, Benefits, and Implications of Different Approaches to Capturing the Value of Renewable Energy Tax Incentives."

Senator INHOFE. Thank you, Mr. Hausker. Ms. Ladislaw.

STATEMENT OF SARAH O. LADISLAW, DIRECTOR AND SENIOR FELLOW, ENERGY AND NATIONAL SECURITY PROGRAM, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES

Ms. LADISLAW. Good morning, members of the Committee. Thank you very much for the opportunity to testify today.

My name is Sarah Ladislaw, and I direct the Energy and National Security Program at the Center for Strategic and International Studies. CSIS is a bipartisan, nonprofit organization in Washington, DC. My remarks today represent my own personal views and not those of CSIS as an institution.

The Obama administration came into office in 2009 with a goal to reestablish the United States as leader in the fight against global climate change. Climate leadership under the Obama administration has two primary goals. One, lead by example through domestic action; and two, create a durable international framework that is able to mobilize and coordinate global efforts. These two goals are interdependent, because no single country acting alone can effectively deal with the challenges of global climate change and because the global community will not mobilize without leadership from major economies.

I plan to make three points about the Obama administration's actions to address climate change in the context of these ongoing international negotiations. One, U.S. actions are in line with the actions of other major economies. Two, ambition plays a key role in the negotiations, and it is important to understand that. Three, more action will be necessary to meet global targets.

First, some people have criticized the Obama administration for pursuing emissions reduction policies. They argue that other countries are not taking similar measures and that acting alone will hurt U.S. economic competitiveness. In reality, climate change policies and regulations are spreading around the world.

According to the U.N. Intergovernmental Panel's Fifth Assessment report, as of 2012, two-thirds of global greenhouse gas emissions are covered by some sort of national policy or strategy compared to 45 percent in 2007.

As of yesterday, 18 formal pledges, covering 46 countries, well over 55 percent of global emissions, were submitted in advance of the climate negotiations in Paris and more submissions are expected by October. In this regard the United States is acting in line with and not contrary to the global trend with regard to mitigation activity.

The question of whether the actions taken by the United States are comparable to the efforts of other countries is inherently difficult to assess. Take for example two of the major parties in the negotiations, China and the United States, two of the world's largest emitters with different economies, different political structures and different approaches to climate change.

The U.S. commitment to reduce emissions from 2005 levels is arguably more stringent than the Chinese goal to peak emissions. But the Chinese target to increase fossil fuel resources in the energy mix is arguably more ambitious than the corresponding U.S. goal. Exact comparability is difficult to assess, but both countries'

cumulative targets represent an increase in ambition from the business as usual future.

Second, several analyses have suggested that the United States will be unable to meet its 2025 emission reduction target under the actions announced thus far. While this point has been used to criticize the Administration's goal, it is not clear that having a stretched target is negative in the context of international negotiations.

All countries want to see that other countries are working hard to meet their emission reduction pledges. It signals a level of ambition that entices participation from certain countries as well as more ambitious action from others. For example, the idea that the United States and China are committed to emissions controls despite having a potentially hard time meeting those targets, whether that is true or not, can catalyze additional action by other countries.

Third, according to the International Energy Agency analysis, current pledges would be consistent with an average temperature increase of 2.6 degree Celsius by 2100 and 3.5 degree Celsius by 2200. Clearly, additional action will be required if the standing global target is to be achieved.

This begs the question, if the negotiations fail to yield emission reduction pledges on the order of the 2 degree target, how can they possibly be considered a success? As the IEA states in their report, the Paris outcome will be successful if it is viewed as the foundation upon which to build a future action.

According to the IEA, the new international negotiating process will be less about big deliverables and big agreements but instead about creating a virtuous cycle of strengthening mitigation ambition over time. From a U.S. domestic standpoint, if the goals of this negotiation are achieved, the United States and other major emitters will eventually have to take additional domestic action to reduce emission further.

The Obama administration has sought to take a leadership role in the realm of international climate action. The Administration's agenda has grounded in domestic action with an eye toward building long-term sustainable strategy for achieving deep emission reductions and preparing the United States and other countries to cope with the impacts of a change in climate.

The key question for this Congress, the next Administration and Congress as well as the partners at the State and local level in industry and in civil society is how to ensure that the policies being put into place today are the ones that most effectively address the challenge of global climate change and serve the long-term interest of the Country in light of this ongoing challenge.

Thank you.

[The prepared statement of Ms. Ladislaw follows:]

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Senate Committee on Environment and Public Works

"Road to Paris: Examining the President's International Climate Agenda and Implications for Domestic Environmental Policy"

A Statement by

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July 8, 2015

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Good afternoon Chairman Inhofe, Ranking Member Boxer, and members of the Committee. Thank you for the opportunity to testify today on the *President's International Climate Agenda and Implications for Domestic Environmental Policy*. My name is Sarah Ladislaw and I direct the Energy and National Security Program at the Center for Strategic and International Studies (CSIS). CSIS is a bipartisan, nonprofit organization headquartered in Washington, D.C. The CSIS Energy and National Security Program provides strategic insights and forward-thinking policy guidance that balances economic, environmental, and security priorities against market and geopolitical uncertainties. My remarks and testimony represent my views and not the views of my colleagues or CSIS as an institution.

My testimony focuses on the Obama administration's actions to address climate change in the context of the ongoing international climate negotiations and global climate action. In addition to describing the administration's Climate Action Plan and its recently announced Intended Nationally Determined Contributions (INDC), I will make three key points:

1) Actions being taken or pledged by the United States are in line with the actions of other major economies, though exact comparability is difficult to assess;
2) Establishing stretch goals is a key part of the international negotiation process and a key element of U.S. leadership in that process;
3) Given everything we know about the long-term international climate goals and the climate negotiation process underway more action on the part of the United States and other countries will be necessary.

Background

For over twenty years, the international community has sought an effective approach to prevent and prepare for the most serious impacts of a changing global climate. Over the last two decades scientific understanding of climate change has improved, low carbon and energy efficiency technologies have progressed, the impacts of a changing climate have become more evident, and activities designed to reduce emissions have proliferated—yet there is still no comprehensive global approach to reducing greenhouse gas emissions.

The Obama administration came to office in 2009 with a goal to re-establish the United States as leader in the fight against global climate change. Climate leadership under the Obama administration has two primary goals: (1) lead by example through domestic action and (2) create a durable international framework for climate action that is able to mobilize actions in the areas of mitigation (emissions reduction), adaptation, financing, technology advancement, and transparency and verification. These two goals are interdependent, both because no single country acting alone can effectively deal with the challenges of global climate change and because the global community will not mobilize and coordinate the mitigation action necessary to limit warming without leadership from major economies.

Before 2009, the international negotiations held under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC) were fundamentally a top-down process where negotiators sought to divide the overall amount of global emissions reduction needed to reach stabilization among the world's largest economies, and countries in turn would craft

policies to meet those targets. Over the last six years, the entire process has evolved to represent a more bottom-up dynamic, where a larger number of countries submit pledges that are in line with their domestic policies and all the pledges are added up to see how close the international community is to reaching the levels thought to be commensurate with keeping global average temperature rise to 2 degrees Celsius. The idea being negotiated currently is that these pledges would be reviewed and strengthened periodically to increase emissions reduction and adaptation activity. U.S. domestic policies are important to the success of this process.

Overview of the Climate Action Plan and Intended Nationally Determined Contribution
In many ways, climate change policy under the Obama administration has exemplified the spirit of the bottom-up process. In 2009, the Obama administration pledged to reduce greenhouse gas emissions 17 percent below 2005 levels by 2020. Its original intent was to deliver these reductions, as well as future year reductions, through the adoption of an economy-wide cap and trade program. When the cap and trade program failed to achieve congressional approval, the administration pursued other measures. In June 2013, the Obama administration released its Climate Action Plan (CAP), a comprehensive plan to cut the carbon emissions, prepare the United States for the impacts of climate change, and lead international efforts to combat global climate change. The CAP consists entirely of actions that can be taken using existing statutory authorities.

Under the CAP, the administration has set out 2020-2030 relevant goals to[1]:

(1) Reduce Emissions

- Establish carbon pollution standards for both new and existing electric power plants;
- Provide loan guarantees for advanced fossil energy and efficiency projects;
- Permit renewables projects on federal land, federally assisted housing, and deploy renewables on military installations;
- Help commercial, industrial, and multi-family buildings become more energy efficient;
- Establish more robust efficiency standards for appliances and federal buildings;
- Develop fuel economy standards for heavy-duty vehicles; and
- Reduce pollution of highly-potent greenhouse gases known as hydrofluorocarbons and methane.

(2) Prepare for the Impacts of Climate Change

- Support local climate-resilient investment;
- Update flood-risk reduction standards for all federally funded projects;
- Create sustainable and resilient hospitals;
- Help communities prepare for drought and expand restoration efforts to make areas less vulnerable to catastrophic fire; and

[1] White House Fact Sheet on President Obama's Climate Action Plan, June 25, 2013.

- Provides climate preparedness tools and information needed by state, local, and private-sector leaders through a centralized "toolkit" and a new Climate Data Initiative.

(3) Lead International Efforts to Address Global Climate Change

- Expand major new and existing international initiatives, including bilateral initiatives with China, India, and other major emitting countries;
- Lead global sector public financing towards cleaner energy by calling for the end of U.S. government support for public financing of new coal-fired powers plants overseas, except for the most efficient coal technology available in the world's poorest countries, or facilities deploying carbon capture and sequestration technologies; and
- Strengthen global resilience to climate change by expanding government and local community planning and response capacities.

The Climate Action Plan not only supports the administration's 2009 pledge to reduce greenhouse gas emissions 17 percent below 2005 levels by 2020 but it also lays the groundwork for its recent pledge to reduce emissions 26-28 percent below 2005 levels by 2025. This 2025 target is the basis of the U.S. pledge to the upcoming UNFCCC climate negotiations in Paris this December. Achieving the 2025 target will require further emission reductions of 9-11 percent beyond the 2020 target compared to the 2005 baseline.[2]Emissions reductions in the U.S. electricity sector are the most significant portion of the CAP, contributing emissions reductions on the order of 10 percent below 2005 levels by 2025.[3] In June 2014, the Environmental Protection Agency released its draft Clean Power Plan (CPP) to reduce emissions from existing power generation units. The CPP contribution is buttressed by other policies already included in the CAP and the INDC including heavy and light-duty vehicle emissions standards, building and appliance efficiency standards, regulation of HFCs and methane, among others (see text box on U.S. INDC).

These emission reductions represent the core, but certainly not the entirety of U.S. contributions to global efforts to combat climate change. The CAP makes clear that U.S. policy to deal with climate change encompasses both mitigation and adaptation activities that are promoted both domestically and internationally. Moreover, expectations that the United States will deliver or catalyze significant amounts of public and private sector financing is another important aspect of the ongoing negotiations, as is adaptation.

[2] U.S. Intended Nationally Determined Contribution, UNFCCC website, accessed July 6, 2015.
[3] U.S. Energy Information Administration. "Analysis of the Impacts of the Clean Power Plan" May 22, 2015.

Excerpt from U.S. INDC submitted March 31, 2015

Domestic laws, regulations, and measures relevant to implementation:

Several U.S. laws, as well as existing and proposed regulations thereunder, are relevant to the implementation of the U.S. target, including the Clean Air Act (42 U.S.C. §7401 et seq.), the Energy Policy Act (42 U.S.C. §13201 et seq.), and the Energy Independence and Security Act (42 U.S.C. § 17001 et seq.).

Since 2009, the United States has completed the following regulatory actions:
• Under the Clean Air Act, the United States Department of Transportation and the United States Environmental Protection Agency adopted fuel economy standards for light-duty vehicles for model years 2012-2025 and for heavy-duty vehicles for model years 2014-2018.
• Under the Energy Policy Act and the Energy Independence and Security Act, the United States Department of Energy has finalized multiple measures addressing buildings sector emissions including energy conservation standards for 29 categories of appliances and equipment as well as a building code determination for commercial buildings.
• Under the Clean Air Act, the United States Environmental Protection Agency has approved the use of specific alternatives to high-GWP HFCs in certain applications through the Significant New Alternatives Policy program.

At this time:
• Under the Clean Air Act, the United States Environmental Protection Agency is moving to finalize by summer 2015 regulations to cut carbon pollution from new and existing power plants.
• Under the Clean Air Act, the United States Department of Transportation and the United States Environmental Protection Agency are moving to promulgate post-2018 fuel economy standards for heavy-duty vehicles. • Under the Clean Air Act, the United States Environmental Protection Agency is developing standards to address methane emissions from landfills and the oil and gas sector.
• Under the Clean Air Act, the United States Environmental Protection Agency is moving to reduce the use and emissions of high-GWP HFCs through the Significant New Alternatives Policy program.
• Under the Energy Policy Act and the Energy Independence and Security Act, the United States Department of Energy is continuing to reduce buildings sector emissions including by promulgating energy conservation standards for a broad range of appliances and equipment, as well as a building code determination for residential buildings.

In addition, since 2008 the United States has reduced greenhouse gas emissions from Federal Government operations by 17 percent and, under Executive Order 13693 issued on March 25th 2015, has set a new target to reduce these emissions 40 percent below 2005 levels by 2025.

Source: http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx

Assessing the U.S. Action in an International Context

As of July 6, 2015, 17 INDCs covering 45 countries and representing nearly 55 percent of global emissions were submitted.[4] On one hand, this an impressive level of participation – equal to the emissions coverage required to bring the Kyoto Protocol into force – especially considering that the formal negotiations are still nearly six months out. On the other hand, it is a lower participation rate than negotiators' goal of having all INDCs submitted by end of June 2015. Countries will have until October 2015 at the latest to submit their pledges and these submissions will then be evaluated by the UN to determine the overall emissions reduction to be expected post-2020.

Some people have criticized the Obama administration for proposing and implementing emissions reduction policies, arguing that other major emitting countries are not taking action. Aside from fundamental questions of fairness, they argue that this hurts U.S. economic

[4] Percent of global GHG emissions excluding land-use change and forestry. According to the INDCs listed on the UNFCCC website and calculations of emission coverage provided by http://cait.wri.org/indc/

competitiveness. Yet this criticism is not borne out by the facts. On the contrary, climate change related policies and regulations are spreading around the world at a pace unimaginable only a few years ago. According to the UN Intergovernmental Panel's Fifth Assessment Report, as of 2012, two-thirds of global greenhouse gas emissions are covered by some sort of national policy or strategy, compared to 45 percent in 2007.[5] In this regard, the United States is acting in line with and not contrary to the global trend with regard to mitigation activity.

Whether the actions taken by the United States are more or less stringent or ambitious than other countries' efforts is another matter, typically referred to in the negotiations as comparability. It is inherently difficult to assess comparability of emission reduction effort among different countries in the global community. Comparability of effort can be measured in a variety of ways because (1) countries start from different places in terms of overall emission levels, (2) countries have different economic structures, (3) countries have different capabilities, and (4) countries use different types of policies to address emissions for a variety of legitimate reasons. In practice, there is no agreed-upon metric for ambition and comparability. Investment, gross emission reductions, share of emission reductions are all plausible ways to measure effort, although they may produce disparate outcomes. Even if all of these differences could be accounted for on an "apples to apples" basis, the goal of exact comparability has been questioned in the context of the international negotiations. The principle of common but differentiated standards and respective capabilities is a central part of a global agreement. It reflects the notion that (1) countries that pursued an emissions intensive development pathway received an advantage relative to countries that now wish to develop while simultaneously constraining emissions and (2) many less developed countries lack the capability to reduce emissions and adapt to a changing climate. This means that assessing the comparability of a global climate agreement inherently takes account of political realities in addition to economic ones.

Take for example two of the major parties in the negotiations: China and the United States. The U.S. commitment to reduce emissions from 2005 levels is arguably more stringent than the Chinese goals to reduce emissions intensity because one represents an absolute cap on emissions while the other represents an intensity improvement—although the Chinese target is accompanied by a peaking of emissions by 2030. Both represent an increase in ambition from a business as usual future. The U.S. target implies a large reduction in emissions whereas the Chinese target requires peaking and an improvement of CO_2 emissions intensity 60-65 percent below 2005 levels by 2030. The U.S. target doubles the pace of emissions reduction in the United States from 1.2 percent per year on average between 2005-2020 to 2.3-2.8 percent per year on average between 2020 and 2025. By contrast the Chinese emission intensity reduction target implies an extension of the rate of emissions intensity improvement achieved by 2020 from 2020-2030.[6]

Some of the particular measures underpinning the targets differ in level of ambition. For example, the Chinese INDC target to produce 20 percent of its primary energy supply from non-fossil based energy resources by 2020 appears quite ambitious. This will require them to deploy 800-1,000 GW of non-fossil energy capacity, close to the entire electricity capacity of the United

[5] Intergovernmental Panel on Climate Change, Fifth Assessment Report, Summary for Policymakers. P. 27.
[6] ClearView Energy Partners LLC, "Top Down Leadership in a Bottom Up Climate," July 1, 2015.

States.[7] Compared to the U.S. goal to increase the share of renewable energy in the electricity sector (beyond hydropower) to 20 percent by 2030 –the Chinese non-fossil based energy standard is arguably more ambitious.[8]

The Value of Stretch Goals

Several analyses have suggested that the United States will be unable to meet its 2025 emissions reduction target under actions announced thus far or covered by executive action. While this point has been used to criticize the administration's goal, it is not clear that it is a deal breaker for the international negotiations and in fact may be a helpful signal in support of conveying U.S. leadership.

Countries want to see that other countries are working hard to meet their emissions reduction pledges – signaling ambition is important in the negotiations and entices participation from others as well as greater ambition from some. The idea that the United States and China are committed to emission control despite potentially having a hard time meeting their target (whether true or not) can be reassuring to those with whom they are negotiating. Moreover, that both countries even introduced some flexibility into their targets to make them more ambitious if they are able (early emissions peaking by China and the 28 percent emissions reduction target from the United States) is meant to send a signal to other countries that effort matters.

Other countries are likely to defend their actions as ambitious in light of their national circumstances but may signal the same sort of message about ambition by providing stretch goals for themselves – though some of more ambitious efforts from developing countries will be tied to climate financing. Thus far Russia, Mexico, and Morocco all tied additional effort to either broad participation from other countries or access to climate related financing. Many people speculate that the Indian and Brazilian INDCs will have a certain base level emission intensity target but offer more stringent targets conditional upon financing from the international community.

Stretch goals walk a fine line between inspiring greater ambition from others and ultimately being achievable. The process of setting and achieving or surpassing targets in a verifiable manner will be a critical component of the international climate regime going forward.

More Action is Necessary

Despite all the progress being made by a proliferation of emissions reduction policies and pledges from countries representing over 55 percent of the world energy related emissions, more action will be necessary to meet the international emissions reduction targets. According to the International Energy Agency (IEA) analysis of pledges put forth to date, current INDCs would be consistent with an average temperature increase of around 2.6 degrees Celsius by 2100 and 3.5 degrees Celsius after 2200. In straight emissions reduction terms, the IEA states that the anticipated pledges lead to exhaustion of the global carbon budget by 2040 – only eight months

[7] Fransen, Taryn et al. A Closer Look at China's New Climate Plan (INDC), World Resources Institute, July 2, 2015.
[8] U.S.-Brazil Joint Statement on Climate Change, White House website, June 30, 2015.

later than is projected in the absence of the INDCs.[9] Clearly, additional action will be required if the standing global target is to be achieved.

This begs the question: if the negotiations fail to yield emissions reduction pledges on the order of reaching the 2 degree target, how can they possibly be considered a success? As the IEA states in their report, the Paris outcome will be successful if it is viewed as a foundation upon which to build future action. According to the IEA, the new international negotiating process will be less about big deliverables and big agreements but instead about creating a "virtuous cycle of strengthening mitigation ambition over time."[10]

From a U.S. domestic standpoint, if the goals of Paris are achieved and the system of pledge and review succeeds, the United States will take additional domestic actions to reduce emissions further, presumably along the lines of achieving 83 percent emissions reduction below 2005 levels by 2050, the long-term target suggested as part of the 2010 UNFCCC Cancun Accords. This means the Climate Action Plan is a down payment on the emissions reductions policies and incentives that will eventually need to be put in place to drive future reductions.

Summary

The Obama administration has sought to take a leadership role in the realm of international climate action. The administration's agenda has been grounded in domestic action with an eye toward building a long-term, sustainable strategy for achieving deep emissions reductions and preparing the United States and other countries to cope with the impacts of a changing climate.

Considering U.S. domestic action in the international climate context it seems as though actions being taken or pledged by the United States are in line with the actions of other major economies, though exact comparability is difficult to assess. Further, establishing stretch goals is a key part of the international negotiation process and an element of U.S. leadership in that process. Moreover, given everything we know about the long-term international climate goals and the climate negotiation process underway, more action on the part of the United States and other countries will be necessary in the years to come. The key question for this Congress, the next administration and Congress, as well as partners at the state and local level, in industry and in civil society, is how to ensure that the policies being put in place today are the ones that serve the long-term interest of the country in light of this ongoing challenge.

[9] International Energy Agency. Energy and Climate Change, World Energy Outlook Special Report. June 2015. P 12.

[10] International Energy Agency. Energy and Climate Change, World Energy Outlook Special Report. June 2015. P 134.

Country	**% of global GHG Emissions Excluding Land-Use Change and Forestry (MtCO2e)** *(WRI CAIT)*	**Copenhagen Pledge** *(IEA and CAIT)*	**INDC Target** *(UNFCCC)*
EU-28	9.8%	20%/30% below 1990 levels by 2020	40% reduction
Switzerland	11%	20%/30% below 1990 levels by 2020	50% reduction, a reduction of 35% between 2021and2030. By 2025, will reduce GHGs by 35%
Norway	10%	30%/40% below 1990 levels by 2020	40% reduction in GHG
Mexico	1.6%	Up to 30% below with respect to business as usual by 2020	25% reduction of GHGs and SLCPs below BAU This is broken down as 22% reduction in GHG and 51% reduction of black carbon. CONDITIONAL: 40% reduction of GHGs and SLCPs, dependent on an agreement on international carbon price, carbon border adjustments, technical cooperation, financing and technology transfer.
US	13.91%	Relative to 2005 levels: 17% below by 2020, 42% below by 2030 and 83% below by 2050.	26-28% GHG emissions reduction
Russia	5.18%	15-25% below 1990 levels by 2020	Reduce anthropogenic GHG emissions by 25-30% below 1990 levels by 2030
China	24.49%	Emission intensity 40-45% below 2005 levels by 2020.	Peak CO2 emissions by 2030. 60-65% emissions intensity below 2005 levels by 2030.
Korea	1.54%	Reduce GHG 30% below	37% from the business-

		business-as-usual emissions by 2020.	as-usual level by 2030 across all economic sectors
Singapore	.12%	Reduce emissions to 7% to 11% below its business-as-usual (BAU) level by 2020.	Reduce emissions Intensity by 36% from 2005 levels by 2030, and stabilize its emissions with the aim of peaking around 2030.
Canada	1.59%	17% emission reduction by 2020 compared with 2005 levels.	Reduce its greenhouse gas emissions by 30% below 2005 levels by 2030.
Morocco	.159%	NA	Reduce its GHG emissions by 32% by 2030 compared to "business as usual" projected emissions. This commitment is contingent upon gaining access to new sources of finance and enhanced support.

Senator INHOFE. Thank you Ms. Ladislaw. Mr. Holmstead.

STATEMENT OF JEFFREY R. HOLMSTEAD, PARTNER, BRACEWELL AND GIULIANI

Mr. HOLMSTEAD. Thanks to all of you for inviting me to participate this morning. My name is Jeff Holmstead. I am currently a partner at the law firm of Bracewell and Giuliani. But I spent much of my career in the Federal Government, in the White House during the deliberations over the 1990 amendments to the Clean Air Act and then as the Head of the EPA Air Office from 2001 to 2005.

I kind of feel like we are talking about different issues up here today. And I guess I have just a different view of what it means to make a commitment in the international community. I guess I am puzzled by the assertion that the President shows leadership by making promises that he has no way of keeping.

Last November, the Administration announced it had reached this landmark deal with China. They made a very specific commitment, 26 to 28 percent reduction. Then in March, the Administration made the same commitment to the rest of the international community in its official statement for the Paris Climate Change Conference. The Administration has said repeatedly that it will meet this commitment by taking actions under current law and that no action from Congress is needed.

As you may remember, when the Administration announced this agreement with China, senior officials took to the airwaves to tout it. Mostly, they talked about what a great achievement it was that they had persuaded China to agree to increase its emissions only for the next 15 years.

But they also explained how they had come with their very specific 26 to 28 percent pledge. EPA Administrator Gina McCarthy stated that "the entire target was based on a thorough interagency review of the available tools in each of the agencies. The ones that are outlined in the Climate Action Plan, but also other tools and initiatives that could be teed up and brought to fruition very quickly."

White House senior advisor John Podesta wrote on the official White House blog that the 26 to 28 percent numbers were "grounded in an intensive analysis of what actions can be taken under existing law."

Given these very specific targets, I assumed that there was a document that tallied up the emissions reductions that would be achieved by all the things that had been identified by this thorough interagency process and this intensive analysis. But many people, including a researcher from the Congressional Research Service, have asked the Administration for such a document or for any other evidence that this extensive analysis ever took place.

But the Administration has never provided anything like this. In fact they won't even say whether such a document exists. As you heard from others, a number of people have looked at this and said all the things they are talking about are not nearly enough to meet the 26 percent reduction that the Administration has promised to achieve.

Now, it is possible that the Administration does have a plan that includes additional actions they have not yet announced. Perhaps the agricultural sector, given it is the section with the largest emissions that have not yet been regulated. But it now seems more likely that the Administration simply does not have a plan for achieving even a 26 percent reduction by 2025.

In my view, this is troubling. When the President or the State Department makes a commitment on behalf of the United States, this is not something that should be taken lightly. I think most Americans would be concerned to learn that the President has made a commitment to the international community that he does not intend to meet.

Various officials in the Administration have said that climate change is a legacy issue for the President. Under our constitutional system, when a President wants this type of legacy he and his Administration normally work for legislation to accomplish it. But this Administration has never done this type of work. To be sure, the President has called on Congress to pass climate change legislation. But the Administration has never made a serious effort to engage Congress or stakeholders on the difficult issues involved.

It is useful to contrast the Obama administration's approach to climate change legislation to the approach taken by the first Bush administration when President George H.W. Bush called for a fundamental overhaul of the Clean Air Act. That approach led to the 1990 amendments, the last major environmental statute to be passed by Congress.

President Bush did not just call on Congress to pass legislation. His Administration developed a detailed legislative proposal and submitted it to Congress. Then, while the relevant congressional committees were working on the legislation, the Bush administration did not just stand back and hope for the best. At least five senior White House officials were involved in the legislative effort on almost a daily basis for more than a year, meeting with Members of Congress and congressional staffers and with industry and environmental groups and often hammering out specific compromises.

Even though the Obama administration has said it views climate change as a legacy issue, it is has never done any of these things.

I do not pretend that the 1990 amendments represent an ideal piece of legislation. There is much to criticize about those amendments. But the process that led to the amendments was instructive. It shows what an Administration can do even when Congress is controlled by the opposing party to get legislation through Congress when such legislation is actually a priority for the President.

In my view, it is a shame that the Obama administration has not made this type of effort when it comes to climate change and has instead pursued an ill-advised regulatory approach that simply will not meet the commitment that they have made to the international community.

Thank you.

[The prepared statement of Mr. Holmstead follows:]

Testimony of Jeffrey R. Holmstead before the Senate Committee on Environment and Public Works July 8, 2015

Thank you Chairman, Ranking Member, and distinguished members of the Committee for inviting me to participate in today's hearing.

My name is Jeff Holmstead. I am a partner in the law firm of Bracewell & Giuliani and have been the head of the firm's Environmental Strategies Group (ESG) since 2006. For almost 25 years, my professional career has been focused on policy, regulatory, and legal issues arising under the Clean Air Act. From 1989 to 1993, I served in the White House Counsel's Office as Associate Counsel to President George H.W. Bush. In that capacity I was involved in many of the discussions and debates that led to the passage of the 1990 Amendments to the Clean Air Act – and was then deeply involved in the initial efforts to implement the 1990 Amendments. From 2001 to 2005, I was the Assistant Administrator of EPA for Air and Radiation and headed the EPA Office in charge of implementing the Clean Air Act. I am well acquainted with the legal, policy, and practical issues associated with the Clean Air Act and efforts to regulate carbon and other greenhouse gases under the Act.

When not in the federal government, I have been an attorney in private practice, representing a wide variety of clients on Clean Air Act and other environmental issues. Since I joined Bracewell & Giuliani in 2006, I have worked primarily with companies and trade groups in the energy industry. My biggest clients are utilities, refineries, a coal producer, and several oil and gas companies.

In November of last year, the Obama Administration announced that it had reached a "landmark" climate change agreement with China, under which the U.S. would, by 2025, reduce its economy-wide greenhouse gas (GHG) emissions by 26% to 28% compared to a 2005 baseline. Then, in March of this year, the Administration made the same pledge to the international community in its so-called "Intended Nationally Determined Contribution (INDC)" as part of the upcoming Paris Conference. Secretary of State John Kerry, as well as other Administration officials, have referred to the 26% to 28% target as a "commitment" or a "pledge." March 31, 2015 press release from Secretary Kerry, http://www.state.gov/secretary/remarks/2015/03/240007.htm.

The Administration has said that it will meet this commitment by taking actions under current law and that no Congressional action will be needed. Surprisingly, the French Foreign Minister has said publicly that any agreement to be reached at the Paris Conference must be carefully crafted to avoid the need for any action by the U.S. Congress. *Climate deal must avoid US Congress approval, French minister says*, Associated Press, June 1st 2015, reprinted in the Guardian, http://www.theguardian.com/world/2015/jun/01/un-climate-talks-deal-us-congress. As of yet, however, it is unclear how the Administration could possibly fulfill its commitment to China and the rest of the international community without new legislation.

The Administration's Refusal to Explain How It Will Fulfil Its Commitment to Reduce U.S. GHG Emissions by At Least 26% by 2025

When the Administration announced its agreement with China last November, senior Administration took to the airwaves to tout the President's 26% to 28% commitment. EPA Administrator Gina McCarthy stated that the "entire target was based on a thorough interagency review of the available tools in each of the agencies -- the ones that are outlined in the Climate Action Plan, but also other tools and initiatives that could be teed up and brought to fruition quickly enough." *U.S.-China Climate Deal Will Create Some Stormy Political Weather,* Climate Wire (November 13, 2014). https://www.eenews.net/climatewire/stories/1060008834. White House Senior Advisors John Podesta and John Holdren wrote on the White House blog that the Administration's targets are "ambitious and achievable, grounded in an intensive analysis of what actions can be taken under existing law." https://www.whitehouse.gov/blog/2014/11/12/us-and-china-just-announced-important-new-actions-reduce-carbon-pollution. However, in the eight months since the U.S.-China announcement, the Administration has yet to release any documents that point to a "thorough interagency review" or any type of "intensive analysis." Despite requests from various outside observers, including a researcher from the Congressional Research Service, the Administration has refused to provide anything to disclose how it intends to meet its commitment – or even to show that a 26% reduction is plausible under existing law.

Independent analyses conducted by the Element VI Consulting, a consulting firm that works primarily on climate change issues, and World Resources Institute, a respected think tank, have analyzed the various actions that the Administration has taken or said it will take in the future to reduce emissions 26% to 28% and found that these actions fall far short of what is needed to meet this commitment. WRI's May 2015 report on the Administration's 26% target had the following to say: "To date…actions taken to implement the plan are not enough to get the United States to its 2020 or 2025 climate goals. To meet these goals, the country will need to strengthen and expand some of the actions already taken or proposed, *and* take action on additional sectors not yet addressed." (Emphasis added.) Clearly, there is disagreement over whether existing law will allow the U.S. to reach its goal. We know how Element VI Consulting and WRI reached their conclusions because their reports are publicly available. The same cannot be said of the Administration.

The Electric Reliability Coordinating Council (ERCC) has also commissioned a study of these same issues from Professor Bernard Weinstein, the Associate Director of the Maguire Energy Institute at Southern Methodist University (SMU) in Dallas, Texas. Professor Weinstein is an economist who served for almost 20 years as the Director of the Center for Economic Development and Research at the University of North Texas, where he is now an Emeritus Professor of Applied Economics. ERCC has asked Professor Weinstein to do an independent analysis of all the actions taken or proposed by the Obama Administration to evaluate the GHG emission reductions that they will achieve by 2025. It is expected that this study will be completed in the next several weeks, and I will submit it to this Committee as soon as it becomes available.

The Administration's lack of transparency is both surprising and troubling. In his remarks at the 2009 Copenhagen climate talks, President Obama said: "[W]e must have a mechanism to review whether we are keeping our commitments, and exchange this information

in a transparent manner." The White House Deputy Director for Climate Policy, Rick Dukes, spoke at a recent WRI climate change conference. During the public question and answer period, four different audience members asked Mr. Dukes when the Obama Administration was going to release the analysis showing how it developed its 26% to 28% pledge to China and the international community. There is obviously significant public interest in understanding how the Administration plans to achieve a 26% reduction by 2025. Mr. Dukes, amusingly, answered these questions by repeatedly saying that the Administration was committed to "transparency and accountability" but then refusing to say when – or even if – the Administration would release any type of document to show how the Administration came up with its 26% number. He would not even say whether such a document actually exists.

It is possible that the Administration does in fact have a plan that includes additional regulatory actions they have not yet announced. Given that the agricultural sector is responsible for significant greenhouse gas emissions that are not yet regulated, perhaps the Administration is planning to regulate this sector but does not want to announce this plan prematurely because it would be politically unpopular. If so, it is unfortunate that the Administration would refuse to disclose such a plan because such refusal prevents a thorough examination of the complex regulatory issues at hand. Stakeholders and the American public simply do not have the information they need to provide useful input or to raise concerns about the Administration's suggested approach.

Given what we now know, however, it seems more likely that the Administration simply does not have a plan for achieving even a 26% reduction in emissions by 2025. In my view, this is even more troubling, especially if other countries are counting on the U.S. commitment when they develop their own submissions for the upcoming Paris Conference. When a President makes a commitment on behalf of the United States, this is not something that should be taken lightly. I think most Americans would be concerned to learn that the President is making a commitment to the international community that he does not intend to meet. In international negotiations, a commitment by the President on behalf of the United States is different from a campaign promise, which is made in the heat of a campaign and which voters understand may not be fulfilled.

In my experience, when the President or the State Department enters into an agreement with other countries on an environmental issue, without seeking legislation to implement the agreement or the advice and consent of the Senate, this commitment is supported by a detailed analysis of how the commitment will be fulfilled under existing law. On the other hand, if other countries are taking the same approach as the Administration is apparently taking at the Paris Conference – and treating their INDCs as nothing more than aspirational goals – the Paris Conference will accomplish much less than meets the eye.

Serious Flaws with the Administration's Most Significant Climate Change Initiative

While major portions of the Administration's strategy remain unclear, we do know that the so-called "Clean Power Plan" (CPP) plays a central role. It appears that, of all the actions that the Administration has announced thus far, this is the one that is supposed to account for the largest emission reduction. This does not bode well for the Administration's 26% commitment because (1) the Clean Power Plan rests on shaky legal footing and is likely to be invalidated by

the courts; (2) it can easily be rescinded or modified by the next President; and (3) even if it passes legal muster and the next Administration chooses to implement it, many years of Clean Air Act history show that it simply cannot be implemented on the schedule proposed by the Administration. Thus, even in the unlikely event that the CPP is actually implemented, it will not achieve substantial emission reductions by 2025.

The Supreme Court has made it clear that EPA has authority to regulate carbon dioxide (CO2) and other greenhouse gases (GHGs) under the Clean Air Act (CAA). But the Supreme Court has not given EPA a roving mandate to do whatever it thinks best when it comes to regulating greenhouse gases. In the CAA, Congress created a number of different regulatory programs with carefully defined limits. Some of these programs can be used to regulate greenhouse gases, but EPA may only do so in a way that complies with the limits established by Congress.

A recent Supreme Court decision makes this point quite clearly. On June 23, 2014, the Court issued its decision in *Utility Air Regulatory Group v. Environmental Protection Agency* (UARG) In that case, the Court overruled EPA's determination that emissions of CO2 and other GHGs trigger certain CAA permitting requirements. Although the Court did allow EPA to require GHG permit limits for projects that must have permits for conventional pollutants, it reminded EPA that the Agency does not have unfettered authority to regulate carbon emissions in any way the Agency might want. Instead, the Court ruled that EPA must craft regulations that are consistent with the statutory language of the CAA.

Section 111 of the Clean Air Act

EPA has relied on Section 111 of the CAA as the basis for the Clean Power Plan. Section 111, in essentially its current form, has been in place since 1970, and anyone who works on CAA issues is familiar with it. Before issuing any type of regulation under Section 111, EPA must first identify specific types of facilities (which are generally known as "sources" under the CAA) that, in EPA's judgment, emit air pollution that endangers public health. As part of this process, EPA creates "source categories" and carefully defines the type of facilities that fall within these categories.

For power plants (and other types of sources as well), EPA has also created "subcategories" to reflect the fact that there are different types of power plants – traditional coal-fired plants, plants known as IGCC plants that burn gasified coal, combined-cycle natural gas plants, and simple-cycle natural gas plants. Sometimes there are different subcategories for different sizes of the same type of plant. These subcategories are important because the best system for controlling emissions can be quite different for different types of plants. More importantly, the emission rate that can be achieved with these systems can vary greatly for different types of plants. For ease of explanation, I will use "category" to refer to both categories and subcategories.

Once EPA has defined a category, it then develops, under Section 111(b), a "standard of performance" for a particular pollutant. Once such a standard is issued, any new facility that falls within the defined category must comply with it. These standards are often called "new source performance standards" or NSPS. The CAA includes two complementary definitions of

the term "standard of performance," and any EPA regulation issued under Section 111 must comply with both of them.

> Section 111(a): The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.
>
> Section 302(l): "The term "standard of performance" means a requirement of continuous emission reduction, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction."

As a shorthand, CAA practitioners often refer to the first definition as BSER, because a standard of performance must reflect the application of the "best system of emission reduction" (BSER) to sources that fall within the category being regulated.

Under Section 111(b), EPA has set dozens of different "standards of performance" by identifying the BSER that can be applied to the types of facilities included in the regulated category. As noted above, these standards are generally set as an emission rate that can be achieved by the use of BSER, and any new facility in the category must meet them. Last year, EPA used Section 111(b) to propose standards of performance for CO2 emissions from different types of new fossil fuel power plants. As proposed, these standards would establish an allowable emission rate in terms of CO2 emissions per MMBtu – in essence, an allowable amount of CO2 per unit of electricity produced. If these standards are finalized and upheld in court, then any new coal- or gas-fired power plant must meet the standard of performance that applies to that particular type of plant.

Section 111(d) comes into play only after EPA has set a standard of performance for new plants in a source category under Section 111(b) – and only for pollutants that are not regulated as either "criteria pollutants" or "hazardous air pollutants" under other parts of the CAA.[1] Because virtually all pollutants are regulated as either criteria or hazardous air pollutants, Section 111(d) has only been used five times before, but the key term in section 111(d) is the same as the key term in Section 111(b) -- and is a term that EPA has interpreted consistently (with one exception in a regulation that was vacated in court) for almost 40 years. Here is what it says:

> The Administrator [of EPA] shall prescribe regulations which shall establish a procedure . . . under which each state shall submit to the Administrator a plan which establishes standards of performance for any existing source . . . to which a

[1] Given that EPA has already regulated power plants under Section 112, there are significant legal questions as to whether EPA has authority to regulate power plants at all under Section 111(d). Attorneys General in many states, along with many other parties, have already raised this issue, and the courts may well decide that EPA is precluded from issuing any type of power plant regulation under Section 111(d). In today's testimony, however, I will assume that EPA does have authority to use 111(d) to regulate carbon emissions from power plants and will focus only on the type of regulation that is legally permissible under Section 111(d).

> section 111(b) standard of performance would apply if such existing source were a new source.

The statutory scheme is quite straightforward. Under Section 111(b), EPA is required to establish "standards of performance" for any new source within a listed category; and then, under Section 111(d), each state is required to submit a plan that establishes "standards of performance" for "any existing source" in the same category. In either case, it is quite clear from the statute that this standard applies to an individual source – to any new source in the country or to "any existing source" in the state.

This is also clear from another part of Section 111(d), which says that EPA's 111(d) regulations

> shall permit the State in applying a standard of performance *to any particular source* under a plan submitted under this paragraph to take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies.

Thus, the statute certainly contemplates that a standard of performance is something that each and every regulated source must meet. EPA agrees with this reading when it comes to new sources and, until recently, for existing sources as well. Over the years, the Agency has established dozens of different "standards of performance" for new sources, and all of them apply to any new source within the regulated category or subcategory. This is even true for carbon emissions. EPA recently proposed "standards of performance" to regulate carbon emissions from new fossil fuel power plants based on its view of the best system of emission reduction that can be applied to each type of plant. If these standards are finalized and upheld in court, each new plant must meet the applicable standard of performance.

But for existing sources, EPA now claims that a "standard of performance" can actually be much broader. Rather than requiring states to submit plans that establish standards for individual power plants, EPA is proposing to require states to submit plans to regulate the whole "electricity system" in the state – and anything connected to that system by either producing or using electricity. Rather than set an emission rate for each existing plant, each state must meet a statewide CO2 emission rate based on a rather complex formula that includes most, but not all, the power generating sources in the state and an estimate of the CO2 emissions avoided by energy efficiency programs designed to reduce electricity demand in the state. This legally binding CO2 emission rate varies substantially from state to state depending on EPA's view of how each state should change its current electricity system.

This whole program is based on a 45-year old provision in the CAA which says that, under certain circumstances, EPA may requires states to submit "a plan which establishes standards of performance for any existing source . . . to which a section 111(b) standard of performance would apply if such existing source were a new source." To support its expansive new reading of this provision, EPA points to one part of the statutory definition of the term "standard of performance," which says:

> The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

EPA focuses on the word "system" and argues that a "system" can involve many different things that all fit together, like the electricity system in a state. But the statute does not say that EPA can regulate a "system." It says that EPA and the states are to set standards for emissions of air pollutants based on the "application of the best system of emissions reduction." The question is not what a "system" may be. Rather, the question is the best system as "applied to what"? EPA says, "as applied to anything that produces or uses electricity." But the answer, according to the statute and more than 40 years of regulatory history, is "as applied to the individual sources within the source category being regulated." In the context of Section 111(d), this means to "any existing source," as long as, "in applying a standard of performance to any particular source," the state is able to "take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies.

The other part of the CAA definition of the term "standard of performance," in Section 302(l), also makes this clear:

> The term "standard of performance" means a requirement of continuous emission reduction, including any requirement relating to the operation or maintenance *of a source* to assure continuous emission reduction.

The only plausible reading of the statute is that a standard of performance must be based on "the best system of emission reduction" that can achieve a "continuous emission reduction" at "a source" being regulated, whether it is a new source or an existing source. However, although the term "standard of performance" is the same for both new and existing sources, EPA now claims that, when it comes to existing power plants (but not new ones), the term empowers it to require 49 states to change the way that electricity is produced and used within their borders. If so, this would be a breathtaking expansion in EPA's authority based on a novel reading of a statutory provision that has existed for almost 40 years. This is why a number of Supreme Court observers believe that, in its recent *UARG* decision (which was released just weeks after EPA announced its proposal to regulate existing power plants), the Court may have been sending a message to EPA:

> When an agency claims to discover in a long-extant statute an unheralded power to regulate 'a significant portion of the American economy,' Brown & Williamson, 529 U. S., at 159, we typically greet its announcement with a measure of skepticism. We expect Congress to speak clearly if it wishes to assign to an agency decisions of vast 'economic and political significance.'"

Likelihood that the Clean Power Plan Will Be Modified or Rescinded by the Next Administration

Given the implementation schedule that EPA has proposed for CPP, it will be implemented almost entirely by the next administration. And when the next administration takes office in January 2017, it is virtually certain that the litigation over the legality of the CPP will still be going on, so that the new administration will need to decide whether to defend and implement the CPP as finalized under the Obama Administration. In recognition of this fact, representatives from other countries have reportedly been asking Obama Administration officials about the chance that the next administration will modify or even revoke the CPP altogether.

In response to such questions, the Administration has expressed confidence that the Clean Power Plan will be immune to a change of course by future administrations. Todd Stern, the lead U.S. negotiator in global climate talks, has stated that, "Undoing the kind of regulation we're putting in place is very tough."

As someone who has worked on CAA issues for more than 25 years, and who has been involved in transitions between different administrations, I can say with some confidence that Mr. Stern is simply incorrect. It is certainly true that some regulations, for legal or practical reasons, are very difficult for a new administration to change or rescind, but the CPP is not one of those regulations. For legal, practical, and political reasons, it would be relatively easy for a new administration to modify or simply revoke the CPP altogether and start from scratch with a more legally defensive approach.

A Realistic Schedule for Implementing the Clean Power Plan

Because the CPP relies on Section 111(d) of the CAA, there are many steps that states and EPA must take before the CPP will achieve meaningful emission reductions. And more than 40 years of Clean Air Act history show that it will take many years to take all these steps. So even if the next administration chooses to defend the CPP and do its best to implement it, and even if the CPP passes muster in the courts, it simply cannot be implemented on the schedule proposed by the Obama Administration. Thus, even if the CPP ends up being implemented, it will not achieve substantial emission reductions by 2025.

Environmental law is littered with well-intentioned "requirements" that are not met because it is not feasible to meet them. So the fact that the CPP "requires" states and EPA itself to meet certain deadlines does not mean that these deadlines will be met. To start with, the CPP will require states to develop and submit plans to EPA to show how they will meet their individual state targets. Under the proposal, states would be required to submit these plans within 2 or 3 years, depending on whether they are working with other states to develop a regional compliance plan.

Many if not most states will need to go to their state legislature to obtain new authority to take all the steps that EPA envisions. If such legislation is adopted, and even where it is not needed, various state agencies will need to work with a whole variety of stakeholders – utilities, environmental advocacy groups, large energy consumers, and consumer groups, and others – to develop a detailed proposal that can be published for public comment. And in most states, this

plan is likely to be subject to significant controversy. After a comment period that will need to last at least 3 months – and longer in many states – the state will need to review and then draft written responses to all the comments it has received and then develop and publish a final plan that can be submitted to EPA. States actually have to develop similar but much simpler plans under another section of the CAA, and history has shown that it usually takes many years to develop, propose, and then finalize such plans. In most states, these plans can then be challenged in state court if someone believes they are arbitrary or otherwise inconsistent with state law.

As envisioned under the CPP, 49 different states will at some point submit their plans to EPA for review and approval. EPA's proposed rule "requires" that EPA review and then approve or disapprove all these plans within one year. But again, history has shown that this is simply not possible. EPA must analyze each of these plans and then develop a written proposal explaining why it believes the plan should be approved or disapproved. This may be difficult for many reasons – in part because of the difficulty of predicting how much electricity will be generated from intermittent wind and solar plants and how much electricity demand will be avoided by energy efficiency program. Once EPA does develop its proposal regarding the approval or disapproval of a state plan, it must be published for public comment and then subjected to a public hearing. EPA must then review and draft responses to all the comments it has received and then publish a final decision explaining its rationale for approving or disapproving a state plan. If anyone is unhappy with EPA's decision, it can be challenged in federal court. And remember, EPA may be required to do this for 49 different state plans.

If EPA disapproves a state plan, it must then develop and propose a federal plan for that state. Again, this proposal must be put out for public comment and subjected to a public hearing. And again, once this process is complete, EPA must respond to all the comments it has received and then develop and issue a final plan for that state. EPA does develop similar plans under other sections of the CAA, and history has shown that, even when EPA is only working on one or two such plans, it usually takes many years for the Agency to finalize them. Part of this delay is due to the fact that, while EPA is working on a federal plan for a state, the state may also be working on a revised state plan that addresses the concerns that EPA raised when it disapproved the original state plan. And because of the long-standing relationships between EPA and state environmental agencies, EPA will need to be involved in this process even while it is trying to develop a federal plan. And of course, once EPA finalizes a federal plan for a state, that plan can also be challenged in federal court.

This brief summary only captures the highlights when it comes to the administrative steps that EPA and states will need to take to implement the CPP. But it should provide some indication of why the CPP will not be implemented on the schedule that EPA has proposed. In my judgement (and the judgment of other CAA experts I have consulted about these issues), it is unlikely that the CPP will achieve much in the way of emission reductions until after 2025.

Disregard for Congress and Possible Legislative Approaches

Given all the legal and practical issues discussed above, one might be tempted to wonder whether it would be preferable for Congress to pass new legislation designed to deal with GHG emissions – legislation that could avoid all these problems. President Obama has said on several occasions that he would like comprehensive climate change legislation to be adopted, but his

Administration has not taken any steps to develop such legislation – even when his party was in control of both Houses of Congress. To be sure, the President has repeatedly called on Congress to pass climate change legislation, but the Administration has never made a serious effort to engage Congress or stakeholders on the difficult issues involved in passing this type of legislation.

In my view, it is useful to contrast the Obama Administration's approach to climate change legislation to the approach taken by the George H.W. Administration when President Bush called for a fundamental overhaul of the Clean Air Act. That approach led to the 1990 Clean Air Act Amendments – the last major environmental statute to be passed by Congress.

President Bush did not just call on Congress to pass legislation. His Administration worked with EPA staffers to develop a detailed legislative proposal that was submitted to Congress. Famously, Congressman John Dingell, the Democratic Chairman of the House Energy and Commerce Committee at the time, said that he did not like the Administration's proposed legislation but was very happy to get it – because it served as a starting point for all the debate and discussion and compromises that resulted in the 1990 Amendments.

As I mentioned above, I was a White House staffer at the time and had a front row seat for the drama behind the 1990 Amendments. I was able to witness the efforts that were needed to develop and pass legislation that was ultimately supported by a wide range of industry and environmental groups and significant majorities of both Republicans and Democrats in Congress.

While the relevant congressional committees were working on the legislation, the Bush Administration did not just stand back and hope for the best. By my count, at least five senior White House officials were involved in the legislative effort on almost a daily basis for more than a year – meeting with members of Congress and congressional staffers and with industry and environmental groups and often working on specific legislative compromises. Political officials at EPA and DOE were also involved, and the White House made career EPA officials available to congressional staffers and members of Congress to explain the nuances of the Clean Air Act and the competing legislative proposals.

Perhaps most importantly, the Bush Administration also worked with its supporters in the business community who may not have been enthusiastic about the proposed legislation. When senior Administration officials believed that industry groups were being unreasonable, it told them so and pushed them to support reasonable compromises.

I do not pretend that the 1990 Amendments represent an ideal piece of legislation. History has shown that parts of it are unnecessarily burdensome and expensive and that we could have achieved the same level of environmental protection at a much lower cost through more effective regulatory approaches. But the process that led to the 1990 Amendments is instructive. It shows what an administration can do – even when both Houses of Congress are controlled by the opposing party -- to get legislation through Congress when such legislation is a priority for the President.

In my view, it is a shame that the Obama Administration has not made this type of effort when it comes to climate change legislation and has instead pursued an ill-advised and almost

certainly illegal regulatory approach. It has created great uncertainty for everyone and will not achieve the emission reductions that the Obama Administration has promised to the international community.

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Again, I very much appreciate the opportunity to appear before the Committee and hope my testimony will be helpful to you as you review the Administration's pledge to reduce U.S. greenhouse gas emissions.

Senate Environment and Public Works Committee

Hearing entitled "Road to Paris: Examining the President's International Climate Agenda and Implications for Domestic Environmental Policy"

July 8, 2015

Answers from Jeff Holmstead to Senator Wicker's Questions for the Record

1. *It's been eight months since the Administration first announced the 26 to 28% emission reductions [pledge] and has repeatedly touted its "transparency" and "openness" in developing this pledge. Have we gained any insight into how this process was actually developed beyond a collection of vague press statements?*

The Administration still has not released any information to show how it developed its pledge to reduce U.S. greenhouse gas (GHG) emissions by 26% - 28% from 2005 levels by 2025. Nor have Administration officials ever explained how they intend to make good on this commitment.

Obviously, the 26% -28% range seems very precise, suggesting that there was a reason the Administration chose 26%- 28% rather than 25%. When the Administration announced this pledge as part of its agreement with China last November, senior Administration officials took to the airwaves to tout it. EPA Administrator Gina McCarthy stated that the "entire target was based on a thorough interagency review of the available tools in each of the agencies -- the ones that are outlined in the Climate Action Plan, but also other tools and initiatives that could be teed up and brought to fruition quickly enough." *U.S.-China Climate Deal Will Create Some Stormy Political Weather,* Climate Wire (November 13, 2014). https://www.eenews.net/climatewire/stories/1060008834. However, federal career officials with expertise in the various statutes that could be used to reduce GHG emissions have said, although not publicly, that they were not involved in any such interagency review and have not seen any evidence that such an interagency review ever occurred.

White House Senior Advisors John Podesta and John Holdren wrote on the White House blog that the Administration's targets are "ambitious and achievable, grounded in an intensive analysis of what actions can be taken under existing law." https://www.whitehouse.gov/blog/2014/11/12/us-and-china-just-announced-important-new-actions-reduce-carbon-pollution. However, the Administration has yet to release any documents that point to a "thorough interagency review" or any type of "intensive analysis." Despite requests from various outside observers,

including a researcher from the Congressional Research Service, the Administration has refused to provide anything to disclose how it intends to meet its commitment – or even to show that a 26% reduction is plausible under existing law.

2. *The Secretary of Agriculture Tom Vilsack announced in April a voluntary program for farmers and ranchers to reduce greenhouse gas emissions based on "10 Building Blocks." Secretary Vilsack also said that USDA will be using existing authorities in the already passed 2014 Farm Bill to implement these initiatives. Is this another area where the Obama Administration could rewrite existing law to fit within the President's global warming agenda? Do you believe the agriculture community should be concerned about possible future regulations regarding the reduction of greenhouse gases?*

Thus far, the Administration has only proposed voluntary programs to reduce GHG emissions from the agricultural community, and it's not clear that there is statutory authority that would allow the Administration to impose mandatory GHG regulations on farmers and ranchers. However, the Administration has been very creative in coming up with new interpretations of existing law in order to regulate GHG emissions. Until recently, for example, no one believed that EPA had statutory authority to order that coal-fired power plants throughout the country be shut down and replaced with wind and solar plants. But the Administration recently purported to discover this authority in an obscure 45-year-old provision of the Clean Air Act. Given the Administration's aggressive reinterpretations of existing statutes to regulate GHG emissions, and the fact that GHG emissions from farming and ranching are probably the largest single unregulated source of such emissions, the agriculture community could well be a target for future regulation.

3. *In your testimony, you cite a recent statement by the French Foreign Minister where he said the Paris agreement must be carefully crafted to avoid the need for any action by the U.S. Congress. Does it concern you that foreign governments would make such a statement? Is it clear to the rest of the international community that the President is acting without the support of the U.S. Congress and is therefore limited in related authority?*

It does appear that the Administration is working with foreign governments to craft an international agreement on GHG emissions that, in the Administration's view, will not need approval from Congress. As far as I know, this is the first time that foreign officials have publicly acknowledged that they are developing a major international agreement in a way that is intended to avoid the U.S. Congress.

Most foreign governments have officials in Washington DC who must understand that the President is acting without the support of Congress. However, press reports suggest that U.S. officials are trying to persuade foreign governments that the President is acting within his authority and that the Administration's climate change initiatives cannot be undone by a future Administration. I have been concerned, for example, by press reports about senior U.S. officials telling foreign governments that the so-called "Clean Power Plan" is now set in law and that it will be difficult or even impossible for a future Administration to change. This is simply not true. It was done through regulation, and would be relatively simple for the next Administration to change or even revoke this regulation by going through the normal notice-and-comment process.

4. *After the Supreme Court ruled that MATS was illegal, EPA Administrator McCarthy made clear that it was too late to turn back the regulation's policy implications saying, "there's very compelling reasons for the utilities to continue to treat this as a requirement." How is it that the Administration can impose its agenda through an illegal regulation? Is there something that can be done to prevent this from happening again?*

Under current law, when an agency issues a rule or regulation, it goes into effect and remains in effect even while it is being challenged in court. In the case of the MATS rule, the compliance deadline for most power plants was April 16, 2015, and the Supreme Court did not decide that the rule was based on an unlawful regulatory finding until June 29, 2015. As a result, most power plants had already incurred the cost of coming into compliance with MATS before the courts could decide whether it was lawful. Even more troubling is that dozens of power plants were forced to shut down because of the MATS rule and thousands of workers lost their jobs before the Supreme Court ruling.

It is possible for the courts to "stay" a rule – to put it on hold – until after they decide whether it is legal. Given current law, however, this happens very rarely. In the case of the Clean Power Plan, more than half the states have asked the DC Circuit to stay the rule during the litigation over the rule, but we will not know until early next year whether this stay will be granted. In the meantime, the clock is ticking on the rule's compliance deadlines, and states and companies are investing time and resources in making plans – and in some cases making costly decisions – before they know whether the rule is lawful.

It would be possible for Congress to change the process for judicial review of regulations. For example, Congress could amend the Administrative Procedure Act so that certain types of regulations could not go into effect until after the courts

decide whether they are legal. This would reduce the incentive for agencies to adopt aggressive regulations that are legally questionable in the hope that they will accomplish the agency's goals (such as closing many coal-fired power plants) regardless of whether they are upheld in court.

Senator INHOFE. Thank you, Mr. Holmstead.

Mr. Bookbinder. Welcome back.

STATEMENT OF DAVID BOOKBINDER, PARTNER, ELEMENT VI CONSULTING

Mr. BOOKBINDER. Thank you. Good morning, Mr. Chairman, Ranking Member Boxer.

Thank you for the opportunity to discuss the United States commitment to the Paris climate process. My name is David Bookbinder. I am a Partner in Element VI Consulting and adjunct fellow at the Niskanen Center here in Washington.

Chairman Inhofe, you mentioned that I have testified here previously as a witness, asked by Senator Boxer. I think it is a bit of sad commentary that we have to point out that someone can be a witness for both a Republican Chairman and a Democratic Chairman. I think that is a sad that this is seen as something extraordinary.

In order to make sure that I had the right format for my testimony, I actually looked at the testimony that I gave back in 2007. The first sentence in that testimony bears repeating today. It was, "Let me begin acknowledging that climate change, a problem that affects every aspect of our environment and whose solution will affect every aspect of our economy, is best addressed by tailor-made legislation." Seven years later, those words are even more true.

First, as predicted, we have seen enormous amounts of Federal and State regulation and subsidies dealing with the climate issue. That is a second best solution. Everyone, everyone agrees that regulation and subsidies are not the optimal way to deal with climate change.

Second, 7 years later, the effects of climate change are all the more apparent. The science is, if anything even more certain, and the effects are growing and are becoming worse every day. Action is something we need to take.

So custom made Federal climate legislation, preferably in the form of a carbon tax would be the most useful thing Congress can do in order to make an effective international agreement possible. That international agreement is the only way we are going to deal with climate change.

And now that I have lectured you as to your responsibilities, I am going to talk about what the Administration has proposed, which is the Paris commitment.

What is the fuss? This is arithmetic, it is nothing but arithmetic. The INDC submission lists a series of regulatory measures and says we can get 26 percent from below 2005 by 2025. All I did was take a look at each of those measures, take the maximum amount of emissions reductions from each of those measures as described either by EPA or by the Department of Energy or to the best of my ability and my partners' ability.

By the way, speaking of bipartisanship, I was the former Chief Climate Counsel of Sierra Club. My partner was the former Director of Climate Policy at ExxonMobil. And we have yet to have a policy disagreement.

So we went down this list of measures and we looked at the numbers. We added them up and we did the exact same thing that

Karl Hausker did at WRI, that I understand the Chamber did, that other groups have done. We all came up with the same result. We all say that these listed measures get us between 68, 70, 75 percent of what we need, depending on how you treat those numbers. The fact that all that all these different analyses come up with the same range tells you that you should have some confidence in that.

I want to emphasize that this should come as no surprise to you and what is more, this is no surprise to anybody. We are not the only ones who can do the numbers. I promise you the rest of the world can look at the same regulatory measures and can do the numbers just as well as we can. The Chinese, the EU, the Indians, the developing countries, they all have very sophisticated people who understand U.S. regulatory measures. They are all going to come up with the same answer.

No one has disagreed with these analysis. If I have left out any regulatory measures or my numbers are wrong, I would deeply appreciate somebody pointing that out to me, and I would be delighted to go back and work through them and see if we can get to a more accurate figure. So far no one has done that. But I welcome, I welcome anyone coming forward and saying, no, you are wrong about X, Y or Z, in which case I would absolutely, after discussing it with them, come up with a better number.

And that is all I have to say right now.

[The prepared statement of Mr. Bookbinder follows:]

Testimony of David Bookbinder
Senate Environment and Public Works Committee
July 8, 2015

Good morning Mr. Chairman, Ranking Member Boxer, and thank you for the opportunity to testify as to the U.S. commitment to the Paris climate conference. My name is David Bookbinder, and I am a partner in Element VI Consulting, and an Adjunct Scholar at the Niskanen Center.

In order to make sure I used the correct format for this testimony, I went and found my testimony from the last time I addressed this committee, at the invitation of then-Chair Boxer back in 2008. And I saw that the very first sentence of what I said then is worth repeating today: "Let me begin by acknowledging that climate change, a problem that affects every aspect of our environment and whose solution that will affect every aspect of our economy, is best addressed by tailor-made legislation." Seven years later, there are two reasons why the need for such federal legislation is even more true today.

First, as predicted, those seven years have seen significant federal and state greenhouse gas regulation, with far more to come. Everyone, and I mean everyone, agrees that such regulation is not the optimal way for the U.S. to reduce its emissions. Second, those seven years have made the current and future impacts of global warming all the more apparent, and thus the need for an international climate change agreement (the only way to deal with global warming) all the more imperative. Custom-made federal climate legislation – preferably in the form of a carbon tax -- would be the most useful thing Congress could do to make an effective agreement possible.

And so on to Paris. On March 31, the State Department issued the formal "Intended Nationally Determined Contribution" ("INDC") ahead of the United Nations Framework Convention on Climate Change meeting in Paris this December. In the INDC, the United States said that it "intends to achieve" 26-28% reductions in its net greenhouse gas emissions by 2025. The INDC listed the "Domestic laws, regulations, and measures relevant to implementation", followed by the relevant regulatory actions completed since 2009, and additional measures that the Administration is undertaking. Unfortunately, even when combined, I do not see how these measures will allow the U.S. to meet even the lower end – 26% -- of that goal.

Let's begin with what "26% below 2005 levels" means. Net U.S. emissions in 2005 were 6,455 million metric tons ("MMT") of CO2 equivalent, and 26% of that is **1,678 MMT**. (28% of 6,455 is 1807 MMT). By 2013, net U.S. emissions were 5,860 MMT, a reduction of 595 MMT since

2005. (All emissions data are from EPA's 2015 *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2013*, which is the most recent official U.S. report to the Paris process; I use 2013 figures because those are thus the starting point for what remains to be accomplished.)

So, to meet the 26% goal, at first glance it looks like we would need to cut another **1,083 MMT** by 2025. But, as the Energy Information Administration points out, even with all the regulatory measures that were already in place as of 2014 (EIA, *Annual Energy Outlook 2015*, p. ii), due to economic growth their "Reference Case" energy and industrial emissions (approximately 90% of US emissions; *2015 Inventory*, p. ES-4) will increase by **106 MMT** between 2013 and 2025 (*Annual Energy Outlook 2015*, p. A-35). Thus to meet the 26% reduction target, we need to eliminate **1,189 MMT** of annual emissions over the next ten years.

Regrettably, the measures listed in the INDC do not appear to get us there; in fact, using what I believe are very generous assumptions, the U.S. will be at least 29% (and probably more) short of the 2025 goal. Because the INDC describes only the category of emissions where reductions will take place, and not any details, as described I use relevant EPA and Department of Energy figures for the *maximum* emissions reductions we can expect from these measures. They are as follows:

1. Power plant emissions standards. According to EPA, the Clean Power Plan will reduce 2025 emissions by **506 MMT** (79 FR 34932), and I use that figure to give the Administration every benefit of the doubt. However, I believe that achieving these reductions by 2025 is enormously optimistic; assuming that the Clean Power Plan is upheld by the courts, not delayed by a subsequent Administration, and works as intended, the realities of the Clean Air Act process and state implementation make it unlikely that it will achieve these reductions until 2030 or later.

2. Landfill methane standards. According to EPA, standards applicable to new landfills will reduce 2025 emissions by **3 MMT** (79 FR 42825). EPA has not proposed standards for existing landfills, and thus reductions from eventual regulations are very hard to calculate. Given that current landfill regulations have reduced these emissions by 30% between 1990 and 2012 (79 FR 41775), we'll assume a further 50% reduction of the 2012 emissions (103 MMT; *id.*) for **52 MMT.**

3. Oil & Gas exploration and production methane standards. Despite an announcement 18 months ago, EPA has not yet proposed regulations, so we use the upper end of the White House goal of "40 – 45 percent from 2012 levels by 2025" (*Administration Takes Steps Forward on Climate Action Plan by Announcing Actions to Cut Methane Emissions*; White House Fact

Sheet, January 14, 2015, p. 1) to estimate expected reductions. 2012 emissions from existing natural gas systems and petroleum systems were, respectively, 130 MMT and 32 MMT (*EPA Inventory*, p. ES-6)), and 45% of 162 MMT = **73 MMT.** It is worth noting that EPA has said that it only has plans to promulgate standards that apply to *new* infrastructure, and these emissions are all from *existing* infrastructure; presumably at some point EPA will follow the new source standards with standards for existing sources (as the Clean Air Act obligates EPA to do).

4. DOE energy conservation standards. This one is not easy to quantify. DOE has already completed 29 sets of standards for various equipment, appliances and building codes, with dozens more coming, and so I used the difference in emissions between EIA's Reference and "Extended Policies" projections. The former includes the measures DOE has already completed, and the latter includes "additional rounds of efficiency standards for residential and commercial products, as well as new standards for products not yet covered; adds multiple rounds of national building codes by 2026". EIA, *Assumptions to the Annual Energy Outlook 2014*, p. 10.

EIA says that the cumulative emissions difference between the two cases from 2012 to 2040 is 2.6 billion metric tons (*2014 Annual Energy Outlook*, p. IF-7). I then subtracted the 11% of which is due to increased fuel economy and another 5% for the "relatively small" reduction attributable to increased renewable generation (*id.*), leaving a total of 2.2 billion metric tons reduced between 2012 and 2040, which works out to an average of **80 MMT**/year. I consider this a generous estimate, because annual savings will increase over that time as new standards are added.

5. HFC replacement program. According to EPA's proposed rule, the expected reductions from this program will be 31 to 42 MMT in 2020 (79 FR 46128); the final was signed last week, but the discussion of the rule's benefits is in a document that will not be made public until the rule is published in the Federal Register. According to a White House blog post on the final rule (https://www.whitehouse.gov/blog/2015/07/02/administration-takes-big-step-addressing-climate-damaging-hfcs) reductions in 2025 could be as high as 64 MMT and I used that number.

6. Reducing Federal Government emissions. Executive Order 13693, Section 1, calls for a 40% reduction from 2008 emissions by 2025. Those 2008 emissions were 70 MMT (*Federal Progress Toward Energy/Sustainability Goals: Presentation to Federal Interagency Energy Management Task Force*, May 22, 2014, pp. 14, 17). Forty percent of 70 MMT is 28 MMT; by 2012, those emissions were down 13 MMT (*id.*), leaving another **15 MMT** to go, and I assume that the federal government will achieve those reductions.

7. Vehicle emission standards. The INDC's list of measures also includes both the current light-duty and medium and heavy-duty vehicle fuel economy standards. While these will have respective reductions by 2025 of 140 MMT (77 FR 62892) and 76 MMT (by 2030; 76 FR 57294), including them would be double-counting, as EIA has already factored those reductions into its baseline 2025 projections (*Assumptions to the Annual Energy Outlook 2014*, pp. 71, 80). In addition, EPA has recently proposed post-2019 medium- and heavy-duty vehicle standards. Assuming that these will be implemented on schedule, I use the maximum projected 2025 reductions – including both tailpipe and upstream emissions -- of **47 MMT**. Draft Regulatory Impact Analysis, p. 5-4.

As noted above, we need **1,189 MMT** in annual reductions to meet the 26% commitment. Even assuming (1) that standards that have not yet been proposed (for existing landfills, oil & gas operations, and some DOE efficiency ones) become law and work as expected; (2) that those as-yet unknown standards produce exceptional results (*e.g.*, 50% reductions for landfills and 45% for oil & gas); (3) that those standards plus all the ones that have been proposed but are not yet finalized (power plants, new landfills, heavy-duty vehicle standards and other DOE efficiency measures) are completed in a timely manner, survive judicial review, and produce the expected reductions on schedule; and (4) that any future Administration does nothing to slow down or weaken any of them, then we're looking at maximum annual reductions in 2025 of **840 MMT,** leaving the U.S. **349 MMT short (about 29%) of even the lower end of our Paris commitment and 478 MMT short of the upper end of that commitment.**

Because the INDC states that, "The target reflects a planning process that examined opportunities under existing regulatory authorities to reduce emissions in 2025 of all greenhouse gases from all sources in every economic sector", it appears that the 26-28% target was based on emissions reductions attributable to regulatory measures other than the ones listed in the INDC. In order for the American people and their representatives to fully understand the basis for the INDC commitment, I have asked, and continue to ask, that the Administration share the results of that planning process.

Thank you again for this opportunity.

Senator INHOFE. Thank you, Mr. Bookbinder. Professor Rabkin.

STATEMENT OF JEREMY A. RABKIN, PROFESSOR OF LAW, GEORGE MASON UNIVERSITY SCHOOL OF LAW

Mr. RABKIN. I am Jeremy Rabkin. I teach at the George Mason Law School.

I should start by saying I am not an expert on climate science. I am not even a specialist in environmental law. I have written about international law and foreign relations law. The issue that I want to put in focus here is, can we undertake a response to the climate challenge through the President acting on his own.

A lot of people who are advocating for this say, oh, yes, we do this all the time. The President signs agreements on his own, it is true. But they are very specialized, very limited in their effect, or else they have been authorized by Congress. If this were a normal thing to do, you have to ask yourself, why didn't President Clinton think of this? Because President Clinton negotiated the Kyoto protocol, saw that he didn't have the votes in the Senate. He didn't say, never mind, I don't need the Senate, I will just do it because I am President and that is what matters.

Let us remind ourselves that Vice President Gore was right there, he was actually the one who went to Kyoto. Gore was very committed to this. He didn't say, no record of him even in private telling President Clinton, you can do this on your own, don't worry about it.

Now we have the successor protocol which seems to be basically the same thing but with more ambitious goals and we are told, last time we needed the Senate, we don't need the Senate, we don't need anyone, the President can do this on his own. That is a pretty astonishing thing and I think the Senate needs to look hard at that and ask itself, going forward, does it really want to let the President make these kinds of commitments.

So I briefly want to discuss two follow-on issues that arise. It is said, well, it is OK for the President to do this, because he has all kinds of domestic legislation which he can rely on. I think the answer to that is maybe or maybe not. We will see. But I think it is pretty likely going forward that the EPA and others will say, this domestic legislation has to be interpreted in the light of commitments that the President has made to foreign governments. That is also disturbing because what it means is, when you enact legislation, that is just the starting point. The President then gets to bargain with foreign governments about what that legislation is supposed to mean. I think that is very disturbing.

The final thing I want to talk about is what it means to have a political commitment. We are told it is not a treaty, it is not even really an agreement. Much of it would be a political commitment meaning the President has promised.

Why does that bind the United States? I think there are two possibilities. Either it is just talk and so it is meaningless, or actually the President thinks and other people think we are kind of on the line because we have made this promise. It is true and it is fair enough to remind ourselves that Presidents in the past have made political commitments. President Nixon went to China, and his first visit there in 1972 he issued with Chairman Mao the Shang-

hai Communique saying, going forward, we promise each other our relations are going to be governed by these principles. There are a number of examples of political commitments like that.

I believe without exception they dealt with diplomatic relations, things we would do out in the world. They were very vague and there was no kind of implementation machinery. What we are doing here is something that doesn't fit that pattern at all. What we are doing here is exactly what we did previously by treaty. We are saying let's have a very elaborate international agreement which is a very precise commitment about how much we will do in how many years. We will have implementing machinery. We will have regular conferences.

It is all the aspects of a treaty, not just a political statement, not just a political framework. All the aspects of a treaty except for the Senate.

If you think that, yes, the President can make that kind of political commitment and then the Congress is obliged to follow through, I have two questions for you. First, the President has been saying for years he wants to do something about immigration reform. Why can't he make a political commitment to the President of Mexico saying, we are going to change American immigration law in the following ways? I will draw on existing legislation to the extent that I think I can. And then the Congress has to follow through and do the rest because I have committed the United States. How do you feel about that? I don't see that it is different.

Or another example, Canada has much stricter gun control than we do. What if the President makes a political commitment to the Prime Minister of Canada, we both agree that there have to be tighter gun controls on both sides of the border, especially our side in America. So I am going to use existing authority to the extent I think I can and beyond that, Congress is obligated because I promised.

It is really worth asking yourselves, how that is different. I don't see how that is different. So I think going forward if the Senate shrugs its shoulders and says the President can commit us on this very complicated, costly, elaborate, ambitious climate agreement, maybe he can do it on many, many other things and is that really the way you want to be governed.

Thank you.

[The prepared statement of Mr. Rabkin follows:]

Testimony of Jeremy Rabkin
Professor of Law, George Mason University

"Road to Paris: President Obama's International Climate Agenda"
Hearing Before the Environment and Public Works Committee
United States Senate
July 8, 2015

I. Committing the U.S. in a New Way

In the first weeks of December 2015, parties to the UN Framework Convention on Climate Change (FCCC) will meet in Paris to establish a new "protocol," aimed at limiting atmospheric accumulations of gases thought to be driving global warming. The Paris Protocol would replace the Kyoto Protocol, negotiated in 1997 and designed to establish emission limits (principally on carbon dioxide) until the end of 2012.

The United States did ratify the FCCC but never became a party to the Kyoto Protocol. President Clinton signed the new treaty and acknowledged that, like the prior Framework Convention, it would require a two-thirds majority in the Senate to become a binding treaty. When it became obvious that the Senate would not approve the Kyoto treaty, President Clinton declined to submit it for ratification. President Bush subsequently announced that his administration would not be obligated to implement the Kyoto Protocol.

In 2008, environmental advocates hoped for a new approach in a subsequent administration. Worried about the difficulties of securing a two-thirds Senate majority to ratify a new treaty, some environmental advocates urged alternative approaches. A prominent Washington advocacy organization urged an approach modeled on trade negotiations: Let Congress authorize the President to negotiate new environmental agreements, which could then gain the force of law if endorsed by simple majorities in each house.[1] No one seemed to think a new climate treaty could be implemented without any role for Congress.

The new Obama administration did not seek such authority, however. It has taken an active role in international negotiations for a new climate treaty to supersede Kyoto. It has not asked Congress to authorize these negotiations or commit to voting on any resulting agreement under provisions analogous to those used in trade agreements. A Republican Congress has recently authorized trade promotion authority for the President but is most unlikely to authorize the

[1] Nigel Purvis, *Paving the Way for U.S. Climate Leadership, The Case for Executive Agreements and Climate Protection Authority* (Resources for the Future, April 2008)

president to commit the United States to an ambitious international agreement on climate change.

So the Obama administration has suggested that it will endorse the results of the scheduled Paris conference as a set of "commitments," requiring no role at all for Congress. Some parts might be implemented on the president's sole executive authority, some parts implemented through reinterpreting existing statutes or treaties. The remaining elements of the Paris Protocol would then be embraced by the President as a "political commitment." That characterization is supposed to impose moral or strategic obligations on Congress to implement in the future. But the President would not be required to seek any direct congressional authority to commit the United States to the program.[2]

This approach may sound too fanciful to be taken seriously. As a matter of fact, there are precedents for every element of this project. That makes it, in my view, more disturbing. Under the claim of extending a small number of specialized or exceptional precedents, it would establish a new precedent in which the general way we make international agreements would be fundamentally changed – not simply at the margin or on the edges of policy but on the largest and most complex international agreements we undertake.

II. Leaping Beyond Past Precedents

There is no doubt that the President has some authority to make agreements with foreign nations on his own. Certainly, presidents have done so with great frequency since the Nineteenth Century. In most instances, these agreements have no legal effects within the United States and usually have no practical effects within the United States. In a few famous incidents, presidents have signed agreements with foreign governments that did purport to have legal effect within the United States and even to supersede state laws.

When President Roosevelt recognized the Soviet Union in 1937, he simultaneously agreed to take ownership of assets held in American banks that were claimed by the Soviet government (as property of Czarist-era Russian companies, nationalized under Soviet law). A Supreme Court otherwise skeptical of administrative actions unanimously endorsed this agreement and held that it could

[2] Coral Davenport, "Obama Pursuing Climate Accord in Lieu of Treaty," THE NEW YORK TIMES, Aug. 27, 2014. While confiding its strategy to friendly reporters, the administration has not yet issued a formal statement of its plans. Two recent studies analyze legal options on the assumption that this strategy will be implemented: Daniel Bodansky, "Legal Options for U.S. Acceptance of A New Climate Change Agreement," Center for Climate and Energy Solutions, May 2015; David A. Wirth, "The International and Domestic Law of Climate Change: A Binding International Agreement Without the Senate or Congress?" HARVARD INT'l LAW REV (2015)

supersede state law.[3] When President Carter negotiated for the release of American hostages in Iran, he agreed that Iranian government assets would be released – even when claimed by American firms in ongoing contract disputes with the Iranian government. That agreement was also upheld by the Supreme Court.[4]

But in these cases, the presidential agreement was a relatively contained, one-time matter, resolving a particular dispute with an immediate, simultaneous set of transactions. And it could be argued that the president drew on a distinct grant of constitutional power – the power to "receive ambassadors" in Art II, which has been taken to mean the power to decide which governments to recognize, therefore to undertake agreements related to the act of recognition. Or else these agreements drew on the power to settle particular claims disputes (regarding monetary compensation for particular past damage to American rights or holdings), which had long been accepted by Congress (as by enacting subsequent appropriations).

If the President can commit the United States to a vast program of domestic environmental regulation by executive agreement, that would be a vast step beyond these precedents. The implementation will take decades, imposing hundreds of billions of dollars in costs on the American economy. As commander-in-chief, the President may have certain inherent powers to deploy the armed forces to protect Americans or discrete American interests abroad. If the President has inherent powers to commit to vast new environmental policies, he must be supposed to have some inherent constitutional authority to protect the earth's climate.

So even advocates suggest a sole-presidential agreement would have to be limited to procedural commitments – as in reporting to foreign governments or international institutions on U.S. progress in reaching its emission reduction commitments.[5] Beyond that, the President would fall back on existing law, now implemented to satisfy these international commitments.

Advocates point out that this is not unprecedented. The United States promised to implement trans-boundary pollution controls with Canada – without explicit congressional authorization or consent. It also promised, by presidential agreement, to abide by international agreement limiting mercury.[6] In both cases, it is claimed, the agreements were legally binding because the required implementation measures were already authorized – independently – by federal environmental legislation (principally the Clean Air Act). So President Obama – or his successors – could draw on existing legislation to implement global warming reductions. It has been argued, in a somewhat similar way, that Senate consent to

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[3] *U.S. v. Belmont*, 301 U.S. 324 (1937)
[4] *Dames & More v. Regan*, 453 U.S. 654 (1981)
[5] Bodansky, "Legal Options" at 16
[6] *Id.* at 14, citing 1991 Air Quality Agreement with Canada and Minamata Convention on Mercury (2013)

the 1992 Framework Convention on Climate Change might be read to imply advance consent to follow-on measures of implementation.[7]

These arguments are not altogether implausible. If executive agencies already have the authority to impose regulations under domestic law, they can continue to do what they might have done anyway, even if they have received some additional motive to do so from a presidential agreement with foreign nations. If international agreements add nothing to existing regulatory powers, they are not very interesting – at least not very relevant to an assessment of executive powers.

But in the background is the tempting argument that statutes should be interpreted to avoid conflict with international law. It is a doctrine that dates back to Chief Justice Marshall[8] and has been invoked by the Supreme Court even in the past decade.[9] But the doctrine has previously been invoked to restrict the scope of American statutes outside the United States (to avoid offending foreign states), not to extend the reach of American statutes domestically (to force American citizens or U.S. companies to implement the aspirations of foreign governments).

Moreover, this doctrine (interpreting statutes to avoid conflict with international law) developed at a time when the status of international law in the U.S. legal system was more unsettled than it is today. In 2007, the Supreme Court clarified that treaties (and presumably, other international agreements) do not have direct effect in U.S. law unless the treaty or the Senate ratification instrument gives very clear indication that they should. The Court specifically repudiated the idea that the President could give domestic effect to an international treaty (even one ratified by the Senate) on his own.[10]

In that case, the Supreme Court denied that the President could order a U.S. state to comply with a ruling of the International Court of Justice. If the President can't give domestic legal effect to a ratified treaty, it is hard to see how he can give domestic effect to an executive agreement that has not been endorsed by the Senate. Then it is equally hard to understand why, if an agreement has no direct effect in U.S. law, courts should still take that agreement into account when interpreting U.S. statutes.

Meanwhile, the Supreme Court has decided Michigan v. EPA, denying EPA's authority to impose costly controls on electric power plants to control mercury emissions.[11] The bare five-justice majority found EPA had neglected to give adequate attention to the cost-benefit analysis in its regulatory venture. The majority gave no notice to the international convention on mercury control. Not

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[7] Id. at 14, though acknowledging that the Bush administration promised in 1992 that amendments to the FCCC would be presented as new treaties, requiring separate Senate consent.
[8] *Murray v. Schooner Charming Betsy*, 6 U.S. 64 (1804)
[9] *Morrison v. National Australian Bank*, 561 U.S. 247(2010)
[10] *Medellin v. Texas*, 552 U.S. 491 (2008)
[11] *Michigan et al. v. Environmental Protection Agency* (No. 14-46, Decided June 29, 2015)

even Justice Kagan's dissent did so. The government does not seem to have stressed this argument. Perhaps it recognized that the argument would appear strained – or feared to see the argument expressly repudiated by the Supreme Court.

To get around such limitations, the final piece of the current strategy is to fall back on "political commitments." The argument is that constraints on sole-executive agreements do not apply to "political commitments" because they are not legally binding. And, the argument continues, past presidents have repeatedly offered commitments in this form. Commonly cited examples are the "Gentleman's Agreement" between Theodore Roosevelt and the Japanese government, restraining immigration from Japan or the "Yalta Agreement" by which Roosevelt, Churchill and Stalin set out plans for the last stages of the Second World War. So, the argument goes, if presidents can do such things on the subjects of traditional diplomacy or grand strategy, why not on international environmental regulation?

Or does the Constitution set some limits? The question has provoked at least one very thoughtful study, by legal scholars Duncan Hollis and Joshua Newcomer, published in 2009 in the *Virginia Journal of International Law*.[12] They argued that nations deliberately structure some agreements as "political commitments" to allow for greater flexibility in implementing what they have promised. Even though such commitments purport not to be legally binding (even under international law), they are negotiated and announced to the world because they are still expected to impose some sense of mutual obligation to their terms.

Hollis and Newcomer argue that such commitments should require more congressional support when they are more formal in the way they are presented, more detailed in substance, more elaborate in the provisions they make for organizing future compliance and when their implementation will be more entangled in (or require extensive changes in) domestic law. They argue that any one of these variables, if it is at the high end of the scale (regarding formality, intricacy, organizing of compliance, entanglement in domestic law) should be understood to trigger some constitutional obligation for congressional approval before the "commitment" is made.

When it comes to the climate change accords, all four of these variables argue in favor of some congressional participation before the United States is "committed" – even if the commitment is called merely "political." The Paris Protocol (or whatever it is called) will not be adopted as the outcome of quiet negotiations between a few diplomats (like the "Gentleman's Agreement" with Japan). It will be the culmination of a decade of intense, highly publicized UN-sponsored conferences. It will not be a vague statement of general principles (like those announced by Roosevelt and Churchill in 1941, trumpeted as "the Atlantic Charter" at the time and little remembered afterward). It will be hundreds of pages of very detailed

[12] Duncan B. Hollis and Joshua J. Newcomber, "'Political' Commitments and the Constitution," 49 VIRGINA J. INT'L L. 507 (2009)

provisions. It will not be a set of general principles for bilateral diplomatic relations (like the "Shanghai accord" that formalized U.S.-China relations after Nixon's visit to China in 1972). Instead, implementation of the Paris Protocol will be monitored by highly formal, regularly scheduled public conferences of the nations subscribing to this agreement, along with various international administrative organs, established in the treaty, perhaps even a new, specialized international tribunal. And the Paris Protocol will not just deal with troops stationed abroad or recognition of foreign governments – the traditional stuff of diplomacy –but with major aspects of energy production and transportation within the United States, engaging some of the most intrusive federal regulatory programs at home.

On the face of things, the Paris accords would be an unprecedented exertion of unilateral presidential power – committing the United States to what would otherwise require a formal treaty but doing so here on the sole say-so of the President. It may well fail in its intentions. Other nations may not trust an American commitment that is offered in such an informal way. The Paris conference may not reach any meaningful result in these circumstances. Or various nations may express approval but not feel genuinely bound. Whatever happens abroad, Congress may feel that it is not bound by commitments which it never approved. Where legislation is required to implement the Paris agreement – as by appropriations of money or changes in U.S. domestic law. Congress may respond grudgingly, sowing doubts about the reliability of the U.S. commitment and making it easier for other nations to deliver less than what they promised. Congress may refuse to cooperate at all, leaving the President exposed as a hollow boaster who cannot even secure needed support from his own national legislature. If the President relies on existing legislation to implement new commitments, we don't know to whether U.S. courts will permit statutes to be reinterpreted for this purpose.

Even if it does not work as intended, however, this end-run around a formal treaty may pose serious risks. It may push our international policies a long step away from traditional constitutional safeguards and political limits.

III. Risks to Constitutional Order

To see the stakes here, we should think first about why presidents have not resorted to this practice – at least on this scale and in these circumstances – in the past. President Clinton declined to submit the Kyoto Protocol to the Senate, when he realized he could not persuade two-thirds of the Senate to ratify it. Why didn't he recast it as a legislative-executive agreement, requiring only majority support in the House and the Senate (rather than 2/3 approval in the Senate)? Why did he not claim that the United States would make a "political commitment" to observe all its provisions and try to persuade Congress on that basis?

One can ask the same questions about other treaties urged by recent presidents. The United States has not become a party to the UN Convention on the Law of the Sea (urged by Presidents Clinton, Bush and Obama) nor to a number of human rights treaties (such as the Children's Rights Convention, urged by President Clinton and the Convention on the Rights of Persons with Disabilities, urged by President Obama). These conventions could not secure the two-thirds support in the Senate required for formal treaties. Why were they never presented to the Senate in any other form?

The central reason, I believe, is that such treaties had always been presented to the Senate as formal treaties in the past. It would have affronted the Senate to suddenly change course. Perhaps climate change is more urgent today than it was in the late 1990s, but Vice-President Gore built a second career warning about the extreme and urgent dangers posed by global warming – almost as soon as he lost the 2000 election for president.

If one accepts that there is urgent need to go forward with a new climate change convention – or assortment of executive agreements, statutory recasting and political commitments – one has to worry about checks and balances down the road. After all, this will be presented as one of the central foreign policy achievements of the Obama era (which has not been notable for foreign policy achievements). Bare majorities of the Supreme Court have held that doubts about the constitutional validity of the Affordable Care Act should be set aside, along with doubts about whether the law is now being implemented as its actual text would seem to require. Chief Justice Roberts voted with justices more routinely sympathetic to such programs. It is widely suspected that he wanted to avoid placing the Supreme Court in confrontation with the signature domestic achievement of the Obama administration.

If that dynamic operates even in domestic constitutional and statutory disputes, there may be a similar inhibiting effect on judges when it comes to implementing a celebrated international venture. Courts traditionally defer to executive leadership in international affairs. At any rate, there is an impassioned constituency for climate control ventures – as impassioned as any advocates for national health insurance, since environmentalists believe the stakes are so much higher when it comes to climate control.

The danger down the road is that this approach to committing the United States won't be seen as exceptional but as a general precedent for how our country coordinates its law with international standards in the era of global governance. That poses serious concerns.

The first is that we no longer make any meaningful or reliable distinctions between categories of international commitment. We used to think environmental treaties required formal consent by two-thirds of the Senate. If we now acknowledge that the President can circumvent that practice for climate change,

why not for other pressing concerns? Why limit these concerns to the environment? Why not do the same for regulation of the oceans – or human rights or health standards ... or general agreements on treatment of refugees and non-lawful alien residents? Certainly, the response to climate change won't be a one-time measure. Even optimists (or especially optimists) envision a series of follow-on agreements which will impose further reductions in emission of greenhouse gases. No one thinks "climate" will "fixed" by anything done in the near term. So if we do this now, why not again? If here, why not in other fields? Environmental activists think climate is uniquely important. Activists for human rights protection, for arms control and a half other dozen causes will claim similar urgency for the international "commitments" they favor.

The Constitution itself is quite sparse in its actual provisions regarding international commitments. It is fair to question whether the Constitution itself actually indicates that trade agreements can be approved by legislative-executive agreements (with simple majorities in each house) while human rights treaties and arms control and environmental treaties require a two-thirds Senate approval. We can stipulate that customary practice in this area does not rest on unassailable logic and should not be regarded as immutable. But we face the real risk that by tossing aside customary practice regarding the form of international agreements – without any serious debate on how far or why we are changing it – we will be left with no structure at all. All future negotiations will then be governed by whatever tactical calculations move future presidents.

We should also be disturbed at the notion that presidents can harness executive agreements to drive existing American law in new directions. It is one thing to say – as current administrative law doctrine affirms – that Congress may delegate interpretative authority over the law to U.S. regulatory officials[13] (Chevron). At least U.S. officials are subject to Senate confirmation before they taken office and remain answerable thereafter to congressional oversight and congressional budget pressures in their regulatory decisions. It would be a great leap beyond such controlled administrative discretion to say that U.S. regulatory statutes should also be interpreted to accord with priorities established by foreign governments and by international bodies.

We cannot go very far down that road before the idea that we are governed by law starts to look like a fable for school children. Our own elected Congress will share its legislative powers and responsibilities with the world at large – as the president (or his officials) borrow the authority of congressional enactments for purposes not endorsed and perhaps not even clearly contemplated by the enacting Congress.

In 2006, an environmental advocacy group sued the Environmental Protection Agency, demanding that EPA tighten emissions standards on chemicals

[13] *Chevron U.S.A. v. Natural Resources Defense Council*, 467 U.S. 837 (1984)

thought to be threatening the earth's ozone layer. Environmentalists pointed out that the United States was a party to the Montreal Protocol on Ozone Depletion (duly ratified by the Senate) but the signatory states had agreed, at an international conference, that standards should be now be tightened. A panel of the D.C. Circuit rejected this claim, protesting that if the Clean Air Act were interpreted in light of subsequent international resolutions, Congress would be delegating its own legislative powers to foreign diplomats.[14]

The doctrine of that ruling has not been formally endorsed by the Supreme Court (though it has not been rejected, either), so its status as constitutional law is uncertain. But it illustrates a serious issue. To adopt the view favored by environmental advocates for implementing the Paris Protocol is, in effect, to say international conferences can be a third legislative chamber in our legislative process – as long as the President prefers that third chamber to the two established by our Constitution.

Finally, to the extent this process relies on "political commitments," we should be uneasy about the implications for foreign policy. It is one thing to cede great leeway to presidents in the conduct of foreign affairs – if we think of foreign affairs as largely concerned with what happens in foreign places, as with stationing of troops or delivery of supplies. It is one thing for the President announce a very general policy – like the Monroe Doctrine or the Truman doctrine – which identifies general American concerns without specifying particular responses in future circumstances. It is something else for the President to make a "political commitment" regarding a very elaborate and detailed program, which we would seem to be committed to pursue, whether all other "committed" nations actually do follow through on their own "commitments" or not.

If we think American international prestige is at stake in honoring the President's unilateral commitments, there is something very dangerous about letting the President make promises about how the American energy and transport sectors will operate over a period of two decades. If the reputation and "credibility" of the United States can be undermined because Congress refuses to follow the President's international pledges, Congress is placed in a very difficult position – and ultimately the American people.

The truth is that some "commitments" are hard to avoid. If the President sends troops to a foreign conflict zone, it is hard for Congress to refuse support to the troops and unavoidably damaging when it doesn't. That is why the War Powers Resolution tried to regulate such commitments. If that measure has not constrained presidents as some of its sponsors hoped, that merely confirms that it is hard to limit the consequences of presidential "commitments" in the midst of the immediate challenges of military responses.

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[14] *Natural Resources Defense Council v. Environmental Protection Agency,* 464 F.3d 1206 (D.C. Cir. 2006)

Whatever one thinks of climate change as a long term challenge, it surely will be an issue for decades to come. It is not like the challenge of armed aggression, where terrible consequences may follow from failing to respond within a period of weeks or months. To make a "political commitment" on controlling climate change is to make a generational commitment.

As it happens, the last round of dispute about "political" commitments arose at the end of the Bush administration, when it was trying to negotiate a status of forces agreement with Iraq. The Bush administration claimed the president could do so on his own authority as Commander-in-Chief, without any particular authorization from Congress – or could station U.S. troops in Iraq on the basis of a "political" commitment regarding their status. Critics in Congress were outraged and the Bush administration backed off that proposal. There was a lot at stake in the sense that a status of forces agreement seemed to imply a long-term U.S. commitment to Iraq.

The problem addressed by "political" commitments on climate change is not only less urgent but harder to assess, because the underlying policy is so abstract. We won't know within the period of this "commitment" whether it is succeeding in halting or slowing down climate change. So there is something entirely open-ended about the commitment – in contrast to the typical military commitment. The issue won't be whether the President's policy is "succeeding" but simply whether Congress has "supported" the President by giving him what he wants.

We don't normally assume that the President should get all or even most of what he proposes in a State of the Union speech. Should the President have more claim on Congress because he has made a "political commitment" to foreign governments, rather than political promises to American voters? It may be that foreign governments will lose confidence in American leadership if presidential commitments are not honored. It may be that the honor and credibility of the United States are at stake in the way Congress responds to "political commitments." That is all the more reason presidents should be constrained to seek some form of congressional acquiescence before they pledge the honor and credibility of the United States.

IV. A Reasonable Response

The general trend, over the past few decades, has been to let more and more governing authority fall to the hands of administrative officials. It is not reassuring to be told that in the future, U.S. officials will not be acting alone but in international networks. That will take us down the road which European countries have followed within the European Union, where power is delegated to bureaucrats who consult with other bureaucrats and ordinary voters are more and more confused about who actually is responsible for what happens in their own country.

No one piece of legislation can deal with the larger trend. But there is a simple remedy for the immediate challenge. In 1997, the Senate adopted a sense of the Senate resolution indicating that the Senate would not support a climate control convention which did not impose emission reduction targets on all nations. The Kyoto conference went ahead and adopted a treaty text which exempted developing nations (that is, the majority of nations) from its emission reduction targets. The world may have been disappointed that President Clinton declined to seek Senate ratification. No one can say the world was not warned.

The Senate, on its own, can pass a resolution in the next few months indicating that it will not feel bound to support any "political" commitment on climate change to which it has not been given the chance to express previous consent in some form. It can say in the same resolution that it does not support reinterpretation of U.S. law to satisfy unilateral promises made by the President to foreign leaders. A Senate resolution now can't bind a future Senate – which might, down the road, decide that it does want to help implement agreements made in Paris in 2015. Courts are not bound by post-enactment resolutions of legislative chambers, so in any future court case on the reach of existing legislation, the view of the Senate would not necessarily carry great weight. A resolution of the Senate is not binding law.

But even a non-binding resolution can have valuable effects. It can put the world on notice that unilateral "political" commitments of the President should not necessarily be taken as a fully reliable statement of future American policy. That may weaken the President's negotiating leverage with foreign countries and that may be regrettable. But a Senate resolution will also preempt later protests that we have taken other governments by surprise and betrayed their trust if Congress does not follow through on everything promised by the President. In effect, a resolution of this kind will strengthen the independence of Congress in deciding what it wants to do in the future, regarding amendments to the Clean Air Act and other matters.

Second, a resolution of this kind can at least provide some background balance for debates over the proper interpretation of existing statutes. A Senate resolution is not a legally binding gloss on a duly enacted statute, but neither is a unilateral presidential commitment, especially when it does not even purport to be a legally binding agreement but is merely a "political" commitment. The risks involved in disappointing foreign governments may have some claim to consideration in regulatory policy and statutory interpretation. Surely the risk of disappointing members of Congress – and the American citizens who elected them – has some claim as well.

Down the road, what may matter most about how we handle this round of global policy on climate change is not the details of the current agreement but the precedent it sets – on the question of how the United States makes international commitments involving vast costs to its own internal economy. Precedents can be

resounding – proving to people down the road that we do, indeed, operate this way. Or they can be muffled and confused, encouraging policy makers of the future to think carefully about how we should do things.

When the Supreme Court decides a controversial case, the outcome is determined by the majority, even if it is the barest majority of five justices. In such cases, dissenters still argue their opposing views, seeking to limit the precedential weight of the decision in future cases. A resolution of the Senate, even if it can't force a change in the Paris Protocol, can affect the weight it receives in later domestic disputes both in Congress and in the courts.

Finally, a Senate resolution here can serve as a caution to future presidents – a warning that they should not assume they can simply work around all constitutional constraints in making "political commitments" to change U.S. policy without seeking any prior commitment from Congress. I believe that is the best reason to pursue a Senate resolution in advance of the Paris conference on climate change.

Senator INHOFE. Thank you very much, Mr. Rabkin. Those are some new thoughts we haven't heard before.

We are going to have 5-minute rounds. We are going to ask our colleagues to adhere to the clock here because we have an excellent turnout and we want to get to everyone here. So let us start with you, Mr. Bookbinder.

While I do not agree with some of the conclusions you have, I do agree that you have put together a study—put that chart back up, will you, that 30 percent chart—that shows the way we are trying to do this now doesn't seem to work. Now, you are on the same side as the White House in terms of your philosophy on global warming and all this. I am sure you have talked to them about this chart, about the gap that is there, this approximately a 30 percent gap which I think everyone agrees is there.

Were you not able to get information that you needed?

Mr. BOOKBINDER. Chairman Inhofe, I have not talked to the White House about this. I have made public statements on blog posts, I have responded to e-mail inquiries, I have talked on the phone to people. I have had no communication with the Administration or any officials concerning this analysis.

Senator INHOFE. Let me ask you, then. Why would the President come out with INDC that doesn't work mathematically?

Mr. BOOKBINDER. I think you would have to ask the President or Secretary Kerry.

Senator INHOFE. Mr. Holmstead, on this same chart giving the 30 percent gap, what concerns me, and it concerns a lot of people from my State which is a rural State, which is an agricultural State. Where would you go to make up, what are the possibilities of where you would go to make up the gap?

Mr. HOLMSTEAD. Well, if you look at the major sectors that emit greenhouse gases, most of them are now regulated or soon will be under various regulatory programs that the Administration has either adopted or promised to adopt.

The biggest remaining sector that is not regulated is the agricultural sector. And they have a voluntary program. There is a history that sometimes voluntary programs become regulatory programs. And so if they are serious about filling in that 30 percent gap, you might anticipate that they would do such things as mandating changes in the way that conservation tillage is done, restricting nitrogen fertilizer, mandating different treatment of manure waste and other such things.

Senator INHOFE. Crop insurance to emissions or something like that?

Mr. HOLMSTEAD. Who knows? But if you are looking for where you might get those emission reductions, I think that is really where you would have to start.

Senator INHOFE. I appreciate that, because I look at this, we have studied in our Committee to see where would you go, were that to be desired. My farmers and ranchers in Oklahoma understand this. They understand that the greatest problem they are facing is nothing that we normally face in the Ag Bill but it is overregulation by the EPA. And they are afraid of that.

Professor Rabkin, if the President signs a unilateral political agreement, let's say he figured a way to do that in Paris. And I

know something about this, I mentioned the Copenhagen agreement, when I went over. Those 191 countries assumed since they had the Vice President, they had the whole group that I mentioned to you over there assuring them, including Obama, that once those people agreed, it doesn't take legislation. They probably still assume that today.

Now, if they were to figure out a way to do this without coming for ratification to Congress, and I might remind everyone here, I know you are aware of this, but it is worth bringing up again, the Clinton-Gore Administration never did bring this for ratification to Congress. Because they knew it would not be ratified.

Now, if they are able to do something without ratification, without Congress's input, wouldn't the next Administration be in the same position to undo anything that was done?

Mr. RABKIN. The next Administration could certainly say they made a political commitment, we repudiate it. That was their commitment, you shouldn't have trusted them. Of course, that is an awkward thing to do because it does undermine the credibility of American Presidents. So I think it is lamentable that President Obama is putting his successor in that position, either repudiate my extra-Constitutional commitment or else undermine American credibility.

But of course they will be tempted to say, maybe they will be under a lot of pressure to say, I as Obama's successor cannot be committed by his unilateral posturing.

Senator INHOFE. Very good. Senator Boxer.

Senator BOXER. Thanks.

Mr. Rabkin, are you aware that 94 percent of our treaties are executive, done by the executive? Are you aware of that?

Mr. RABKIN. I am very aware of that.

Senator BOXER. Good. Because you didn't seem to, you were so outraged. Now, are you aware that in 1992, Congress ratified the United Nations Framework Convention on Climate Change? Totally bipartisan. Are you aware of that?

Mr. RABKIN. Very aware of that.

Senator BOXER. Are you aware that these negotiations are based on that ratified treaty?

Mr. RABKIN. Yes.

Senator BOXER. So whoa, whoa, whoa. Then, your comments, sir, just make no sense at all. You speak as if this is a rogue President.

Now the fact of the matter is not only do we have that vote, but we also have the Clean Air Act. Do you know how many times the Supreme Court has upheld that Clean Air Act? And how many decisions there have been that said greenhouse gas emissions are covered? Do you know how many cases there have been?

Mr. RABKIN. About greenhouse gas emissions? Probably single digits.

Senator BOXER. There are three, that is right, and the Supreme Court has spoken. So the fact is the Clean Air Act governs here, you have the treaty that governs here, you have a President who is carrying out the Clean Air Act. And frankly, sir, if he didn't he would be hauled into court.

So I just have to say that your outrage doesn't match the law.

Mr. RABKIN. OK, so we agree on certain facts. That is what the initial colloquy was, do you know this, do you know this, yes, I know it, I know it, I know it. Now let me explain to you why I wouldn't say I am outraged, but I am very concerned and let me explain to you why.

Senator BOXER. But, sir, you already did in your——

Mr. RABKIN. Oh, no, no, no you are raising challenges and you have to let me answer.

Senator BOXER. I have the time if Senator Inhofe wants to give you more time. Your entire presentation was bashing this Administration without mentioning once that the Supreme Court upheld this law and that we have a convention that was ratified by Congress. So I am going to move on because I only have 3 minutes left. Mr. Bookbinder, I want to talk to you about something.

Senator WICKER. Mr. Chairman, I suggest that we extend Senator Boxer's time, so that the gentleman could answer the question and she could still have the remaining 2 minutes and 32 seconds to ask what she wants.

Senator INHOFE. A good suggestion, Senator Wicker from Mississippi, that is exactly what we are going to do. Because he wants to respond and we are going to give him time, if necessary my time on a second round. Go ahead, Senator Boxer.

Senator BOXER. OK, can I go back to 2:32 because I was interrupted?

Senator INHOFE. Sure.

Senator BOXER. Thank you.

Mr. Bookbinder, you have come a long way in my direction since the last time I saw you. You are calling for a carbon tax. And that is where I am at. I think it is the simplest way and it is a way to put a price on carbon that is fair.

And you point out that your partner, his background is with Exxon and I was going to ask you about that. You say you have never had a disagreement with him? Does he agree with you that a carbon tax is the right way to proceed here?

Mr. BOOKBINDER. Yes, he does.

Senator BOXER. Well, that is really newsworthy. Let's get that in the record, that ExxonMobil believes we should fight climate change with a carbon tax.

Mr. BOOKBINDER. Excuse me, Senator Boxer.

Senator BOXER. A former employee of Exxon.

Mr. BOOKBINDER. Yes. Please do not——

Senator BOXER. I am sorry. You are right. A former employee who spent how many years with Exxon?

Mr. BOOKBINDER. Decades.

Senator BOXER. Decades with Exxon. This is progress, folks, and I hope that would be the news coming out of here.

Now, Mr. Bookbinder, I also reread your testimony and I appreciate the fact that you are not backing off from what you said. So I am just going to read certain things.

You said severe heat waves are projected to intensify in magnitude and duration over the portions of the U.S. where these events are already occur, with likely increases in mortality and morbidity, especially among the elderly, young and frail. Do you still believe that?

Mr. BOOKBINDER. I assume you are reading from my previous testimony?

Senator BOXER. Correct.

Mr. BOOKBINDER. Yes, I still believe those things.

Senator BOXER. OK. Do you also agree now that climate change is also expected to facilitate the spread of invasive species and disrupt ecosystems?

Mr. BOOKBINDER. Yes, I do.

Senator BOXER. Do you also agree that climate change is expected to lead to increases in ozone pollution, with associated risks in respiratory infection and aggravation of asthma?

Mr. BOOKBINDER. Yes, I do.

Senator BOXER. Now, what you say in this in the very beginning is worth repeating. You point out that the best way to approach fighting climate change is through specific legislation. I couldn't agree with you more. I agree that the carbon tax, cap and trade, the things I have been fighting for.

But you said in the absence of such legislation the Clean Air Act will still enable us to get the job done. Do you still agree with that?

Mr. BOOKBINDER. It depends really on what you mean by the job.

Senator BOXER. They are your words, not mine.

Mr. BOOKBINDER. I understand that. Senator, aside from that first paragraph that I cribbed, I haven't looked at that testimony since I gave it.

The Clean Air Act will reduce carbon dioxide emissions, there is no doubt about it. That is why I advocated successfully to bring the Massachusetts case. It is simply not as efficient a means.

Senator BOXER. I agree.

Mr. Hausker, does your analysis indicate that the U.S. target of reducing carbon pollution in the range of 26 to 28 percent by 2025 is achievable?

Mr. HAUSKER. Yes, I want to emphasize very strongly that it is achievable and I want to say I disagree strongly with Mr. Bookbinder's characterization of the WRI report as consistent with what he did in showing that there is a gap or that there are missing tons. I am happy to expand on that if you like.

Senator BOXER. My time has run out. I so appreciate the time, Mr. Chairman.

Senator INHOFE. Yes. Now, I am going to take the Chair's prerogative and give Mr. Rabkin a chance to respond as he was so anxiously trying to do a just a moment ago.

Mr. RABKIN. Thank you.

So on the first point, 94 percent of our agreements are executive agreements, that is true. But almost all of them are either authorized by Congress like the trade agreements.

Senator BOXER. So is this one.

Mr. RABKIN. No, this——

Senator BOXER. Yes, in 1992.

Mr. RABKIN. So you want to say the Framework Convention on climate change authorized the President to do anything that he wanted later on. And my simple answer to that is, if that is true why didn't anyone tell President Clinton? Why didn't President Clinton say, oh, Kyoto doesn't have to be a treaty, I was authorized by the 1992 Framework Convention. Al Gore, so enthused about

the subject, why didn't he say, Mr. President, you don't need a treaty, don't bother with the Senate, you can do this inherently. So that seems to mean not at all convincing.

And I do want to go back and say apart from things that are implementing treaties, there are a number of executive agreements which are implementing treaties. Almost all of them are extremely narrow and technical, which is not what this is. This is a very big, ambitious thing.

The last point that you raised, which I think you were most substantive, don't we have the Clean Air Act and hasn't the Supreme Court said that is relevant to it? Yes, we do and yes, they have said it. It matters a lot when you get down to it. What is it that we think we are achieving in regard to climate change?

It is one thing to say we actually have a treaty which Congress has considered in some form. Maybe not two-thirds of the Senate but some congressional participation. That is one thing.

It is another thing to say, oh, you know, the President has made a deal so that Clean Air Act now needs to read this. And on particular issues there could be billions of dollars at stake. You are really making the Clean Air Act into a kind of blank check for the President and whatever people he happens to make agreements with. I think that is a real problem.

Just a last thing. We have this case, Michigan v. EPA. And it is about mercury and there is actually an international convention on mercury. Some amicus brief said, hey, what about the international convention on mercury. Neither the Government nor the Supreme Court brought it up. I think that is because on both sides they thought, that is really dicey, let's not go there. I do not think it is at all settled that as long as the President has made a promise you can reinterpret domestic statutes accordingly.

Senator INHOFE. Thank you, Professor, for that clarification. Senator Sessions.

Senator SESSIONS. Thank you, Mr. Chairman, and thank you panelists, for your testimony. We are dealing with some important issues.

I just would say this. The American people are getting frustrated, that we have individuals executing policies that affect their everyday life, driving up the cost of their whole existence based on legal theories that are so tenuous that it is almost breathtaking in its thinness.

For example, the Clean Air Act was passed with no thought whatsoever that we would be controlling CO_2, an odorless, tasteless gas that is a plant food. And now we have a 5 to 4 decision in the Supreme Court, five members of the Court now saying that EPA can regulate your backyard barbeque, your lawnmower or any other item that emits any CO_2. It is a breathtaking thing.

Congress has never voted for it, Congress will not vote for it. American people do not favor it. In a poll I saw recently of 18 important issues listed, global warming was 18th.

So here we are, a group of elitists in this country, through the thinnest of legal arguments, imposing huge costs on the American economy. I am worried about it. I don't think this is democracy in action, and we have to be careful about how this all occurs.

Mr. Rabkin, it seems to me that Congress, in resisting a President's overreach, could do something like Senator Cotton did with regard to Iran, write a letter and make sure that people who sign on with the United States know that is not binding on the United States. Is that a legitimate response?

Mr. RABKIN. I think it is a really good idea. Because one of the things that we are going to be told is, oh, you are undermining trust in America if you don't follow through on what the President has promised. What you are proposing is to warn people, don't rely on what the President is saying, he is speaking for himself.

Senator SESSIONS. That is exactly what is going to happen, colleagues, on the trade, the motion authority. If the President comes back with a bad treaty and somebody says, oh, we shouldn't adopt it, he is going to say, well, you authorized me to negotiate it. And now I negotiated it and you are going embarrass the United States before the whole world and we are going to be a renegade nation, et cetera.

Mr. RABKIN. Could I just say, it is bad to disappoint foreigners. It is also bad to disappoint Americans and if you are elected by Americans maybe you should take the American reaction more seriously.

Senator SESSIONS. Exactly. Well, as lawyers we know who we represent. Our duty is to our constituents who voted for us. Now, with regard to what the other action would be we could pass legislation. But as a practical matter, any legislation that were to be passed is subject to a Presidential veto, is that correct, Mr. Rabkin?

Mr. RABKIN. Yes, what happened with Kyoto was the Senate passed a nonbinding resolution. So it wasn't subject to a veto. But that was registering how much opposition there was to the impending Kyoto deal. I believe that is why President Clinton backed off from submitting it, because of the resolution.

Senator SESSIONS. Well, I believe it was 97 to nothing, that resolution rejecting the Kyoto requirements.

Mr. RABKIN. Right.

Senator SESSIONS. Yet now we have a President signing a new one that would go even further than Kyoto, and there is no public support or congressional support that would ratify that in any way.

Mr. RABKIN. I think you have described this exactly.

Senator SESSIONS. Senator Boxer talked to you about these treaties that we have signed. But if it is signed by the President and not ratified by Congress, it is not a treaty, is it?

Mr. RABKIN. The word treaty is usually reserved for things that are ratified by the Senate.

Senator SESSIONS. Now, with regard to another response the American people might have, what else could Congress do to represent their constituents if the President commits us to something that is not appropriate? It seems to me that the power of the purse remains maybe the only realistic option. Can Congress use the power of the purse to rein in a President who is spending to carry out programs that the people don't agree with?

Mr. RABKIN. That is why they have the power of the purse.

Senator SESSIONS. So the power of the purse is essentially, Congress has no duty, does it, to fund any program that it believes is inimical to the interest of the constituents they represent?

Mr. RABKIN. Well, this is what we will be arguing about. The President will say, I have made a political commitment and you have to support me because we will be embarrassed. And the Congress will have to consider that.

Senator SESSIONS. Well, I appreciate your testimony. This is a matter of real concern, and I have come to see more and more that the classical powers of Congress are being eroded. And it is not just the power of the Congress, it is the American people's power, their ability to control the people who control them. So now we are going to have somebody in some entity in some foreign country that is going to be directing us.

Mr. RABKIN. I would just like to add one word to what you said, which is Constitution. We have certain background assumptions about how our Government is supposed to work. That is why we have a Constitution and what this is fundamentally about is saying, ah, that is old-fashioned, forget that. That didn't work for Clinton. We are moving forward with something different in which the President gets to commit us. That is a real change in our Constitution.

Senator SESSIONS. A grave concern. Thank you, Mr. Chairman.

[The prepared statement of Senator Sessions follows:]

STATEMENT OF HON. JEFF SESSIONS,
U.S. SENATOR FROM THE STATE OF ALABAMA

Today's hearing, "Road to Paris: Examining the President's International Climate Agenda and Implications for Domestic Environmental Policy," highlights a disturbing trend: we are dealing with an Administration that seeks to impose its will by any means possible, whether through unauthorized administrative fiat or international negotiations which usurp the Senate's advice and consent role provided by the Constitution. In the case of climate regulations, President Obama has committed the United States to achieving 26 percent to 28 percent reduction in greenhouse gas emissions by 2025, compared to a 2005 baseline—this commitment was made through the submission of an "Intended Nationally Determined Contribution" to the United Nations Framework Convention on Climate Change. In other words, despite repeated instances in which Congress has blocked climate change legislation, this Administration has decided to willfully ignore the legislative branch and unilaterally pursue crippling emissions reductions in an international forum, at great cost to the American people and to our system of government.

The consequences of the President's international climate change agenda cannot be overstated. In his written testimony for today's hearing, Professor Jeremy Rabkin provides the following:

"The danger down the road is that this approach to committing the United States won't be seen as exceptional but as a general precedent for how our country coordinates its law with international standards in the era of global governance ... We cannot go very far down that road before the idea that we are governed by law starts to look like a fable for school children. Our own elected Congress will share its legislative powers and responsibilities with the world at large—as the President (or his officials) borrow the authority of congressional enactments for purposes not endorsed and perhaps not even clearly contemplated by the enacting Congress."

The President's international climate agenda represents yet another grave threat to American sovereignty and our constitutional republic. I am reminded of the numerous issues that have been expressed regarding the President's negotiations with Iran, and in particular Senator Cotton's concise open letter to Iranian leaders reminding them of the unique governmental structure contained in the Constitution. In that letter, I joined Senator Cotton and several of my colleagues in observing that the next President could revoke an executive agreement with Iran "with the stroke of a pen," and future Congresses could modify the terms of the agreement at any time.

In the context of current and future climate negotiations, international parties should likewise be aware that the President is not a king, and any agreement reached by the President is of limited effect without congressional approval. Moreover, just as a future President could revoke an executive agreement with Iran

"with the stroke of a pen," so too could a future President withdraw from any international climate deal lacking congressional approval.

Senator INHOFE. Thank you, Senator Sessions.

Senator Merkley.

Senator MERKLEY. Thank you very much, Mr. Chair. Interesting discussion, thank you all for your testimony.

Does anyone here disagree that climate change is a real challenge that we need to be engaged in addressing?

[No response.]

Senator MERKLEY. Anyone here disagree that human activity and burning of fossil fuels is a contributor to the challenge?

[No response.]

Senator MERKLEY. Well, thank you. I think that is the foundation for this discussion. I don't want us to get lost in losing our perspective on the forest, if you will, while we are looking at the individual trees.

I can certainly convey that in my home State of Oregon, climate change is very evident in a number of ways. Our fire season has increased by something close to 60 days over a few decades, far more forest being burned. We have a much bigger problem in the west with pine beetle, with warmer winters not killing the pine beetles as they have in the past.

We have a big challenge to our shellfish industry, specifically our oysters, because of the acidification of the Pacific Ocean, which is tied to the same carbon dioxide that is causing climate change. We have a significant problem with loss of snowpack in the Cascades, which is resulting in warmer streams.

My rural communities care a lot about their fishing. Streams are not as good when they are small and when they are warm as when they are cold and when they are deep. They care a lot about their forests and they care a lot about their farming. And we have a massive drought that is tied in as well.

So in terms of the impact of this on rural America, it is massive. And it is manifested in farming, in fishing and forestry, all in my home State. So I have been struck by how important this conversation is as one that has direct impacts on the ground right now. We don't have to look at 50 years out or 100 years out.

Now, it is important that this be an international conversation. Pollution of the air or seas is a tragedy of the commons, if you will. In that sense, China has committed to producing as much new renewable energy between now and 2030 that is equal to all the electricity produced in the United States today. In fact, currently the U.S. produces about 1,000 gigawatts of electricity, all forms, including fossil fuels. China has committed to produce about 1,400 gigawatts of renewable non-fossil fuel energy by 2030.

So we are not talking about measures that they are committed to doing after 2030. We are talking about things they are doing between now and 2030. That is a massive deployment of renewable effort.

India has been a little slower to come around. But they have committed to increasing their solar capacity by 100 gigawatts by 2022, just 7 years from now, and to work toward a more global HFC phase-down. Brazil has announced that it has a goal of 20 percent of its electricity from renewable sources, and pledging to

restore 12 million hectares of forest, about the size of England, by 2030. So many nations are working together to take this on.

The U.S. has often been in the forefront of bringing the world together to take on world challenges. Certainly that is true of disease and taking on the pandemics of AIDS and tuberculosis and malaria. It certainly should be the case here.

I do feel that this it is important to place this conversation into that context. The exact nature of agreements that occur later this year in terms of setting goals and pledging the U.S. to work toward those goals, you can argue as lawyers over the fine print. But let's not lose perspective on the fact that this is about a major challenge to the world that is having impact in our home States every single day on our rural resources and more to come.

Dr. Hausker, I wanted to, you touched briefly in your written testimony on the interaction between climate policies and international businesses. Why is it that we are seeing companies like Starbucks, eBay, Nike, Ikea, Sprint lobbying for action on climate change when, according to some of my colleagues, climate change will do harm to the economy?

Mr. HAUSKER. That is a very good question. You have pointed out the fact that more and more corporations, both U.S. and multinationals, are pressing for climate action by governments. They are also taking internal steps to reduce their own greenhouse gases.

I might add in that context, we talked about Exxon a short time ago. Exxon Corporation recognizes the problem of climate change and they have adopted an internal price on carbon to guide their investments. Many other companies have done that as well.

So the business community is taking this increasingly seriously and taking internal steps as well as advocating sound public policy.

Senator MERKLEY. I think it goes to the heart of demonstrating that businesses' boards that are committed to profits see that climate change can be enormously harmful to our future economy. Thank you, my time is up. Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Senator Merkley. Senator Sullivan.

Senator SULLIVAN. Thank you, Mr. Chairman. I appreciate the panelists' coming in and already having a very important discussion.

I always think it is important to begin these sessions by making it clear that we all care about clean air, clean water. I think sometimes my colleagues on the other side try to claim a little bit of the high ground, that they care more about it. They don't care more about it. My State probably has the cleanest air, cleanest water, certainly in the United States, maybe in the world. It is largely because of local actions, not the EPA, I guarantee you. Alaskans care more about the environment than officials here in the EPA in Washington do in our State.

But we also have significant concerns about what we call in Alaska Federal overreach. That is usually in the form of an agency taking regulatory action without statutory or constitutional authority. Big concerns. They usually take the action because it is not popular in the Congress, so they can't get it through, so they take it anyway. At least in Alaska, the EPA is considered the poster child of an agency that conducts Federal overreach on a very regular basis.

So legally, I think that the EPA is a rogue agency. But I think importantly, you don't have to take the word of members of the Senate or members of the public. We are seeing this more broadly.

The Supreme Court, we talked about Supreme Court opinions, in the last two terms, in terms of the UARG v. EPA, Michigan v. EPA, the Supreme Court has come out and said the EPA has violated the law or the Constitution. It is increasingly conservative and liberal commentators who are starting to hold this view that the EPA is out of control legally.

You may have seen Laurence Tribe, well respected liberal Harvard law professor who testified in front of Congress recently on the EPA's CO_2 regs, saying "The EPA possesses only the authority granted by Congress, and its rule is attempting to exercise lawmaking power that belongs to Congress. Burning the Constitution should not become part of our national energy policy." That is Laurence Tribe.

I think this should be a concern of every Member of Congress. And yet the EPA just kind of continues. This should be a concern of every member of this Committee when we have an agency that doesn't respect the law of the land. We were talking about outrage before. I am outraged. We should all be outraged, Democrats, Republicans, that an agency regularly violates the law.

My biggest concern is they just power through and keeping doing it. There was a Wall Street Journal editorial yesterday, Mr. Chairman, that I would like to submit for the record, called Stopping EPA Uber Alles. Essentially what the Wall Street Journal was saying is that the EPA, even when it gets struck down by the Supreme Court, it takes 5 or 6 years to have that happen, they just keep powering through anyway, ignoring the law.

Senator INHOFE. Without objection, that will be made a part of the record.

[The referenced information follows:]

OPINION: Stopping EPA Uber Alles

Even when states win in court, they lose. Here is one legal remedy.

The Supreme Court scolded the Environmental Protection Agency last week for bombing Dresden, albeit long after the bombs fell. In 2011, the year the EPA proposed the anticarbon mercury rule that the Court has now ruled illegal, some 1,500 fossil-fuel-fired electric units were in operation. Only about 100 have not already closed or complied at a cost of billions of dollars.

Oklahoma Attorney General Scott Pruitt is hoping to prevent a replay on the EPA's new Clean Power Plan, which will demand another 30% carbon reduction, on average, from the states. The rule was proposed by the EPA in June 2014 and is expected to be final by the end of this summer. The challenge Mr. Pruitt filed last week is a test of whether the snail's pace of the judicial process in response to new rules lends de facto immunity to whatever the EPA wants to do, even if the conclusion is another legal defeat that arrives too late to make a practical difference.

The EPA is counting on it. The agency knows that the Clean Power Plan's precarious legal footing will be litigated for years, but it is trying to rush the rule out to make it a policy fait accompli before President Obama's term expires. It also knows that the long lead time and investment decisions the plan compels—about power-plant retirements and upgrades, restructuring transmission lines, creating new green energy and efficiency subsidy programs—must begin today. Or better yet for the agency, yesterday.

Under traditional regulatory review, the appellate courts rarely put a stay on new EPA rules, even if states and utilities can show that they are causing irreparable and irreversible harm. The EPA is instructing Oklahoma to cut carbon emissions by 33% to meet an "interim goal" as soon as 2020, which means the state must begin spending despite the legal uncertainty.

So Mr. Pruitt is moving for a preliminary injunction against the Clean Power Plan. Under the 1958 Supreme Court precedent Leedom v. Kyne and a subsequent line of cases, the courts can use their powers to block federal-government actions "when an agency exceeds the scope of its delegated authority or violates a clear statutory mandate." Plaintiffs must show that they are injured by judicial delay and that they are likely to succeed on the merits.

Leedom actions have been used to stop abuses from the National Labor Relations Board and the Federal Trade Commission, and the EPA is a promising target. The agency's unprecedented measures to restructure the U.S. energy economy under an obscure provision of the 1970s-era Clean Air Act have zero grounding in the text of the statute, much less Congress's consent. Mr. Pruitt also argues that under the High Court's federalism jurisprudence the EPA is unconstitutionally commandeering the sovereign states.

If Mr. Pruitt does succeed and obtain an injunction, the Clean Power Plan would be put on ice for the rest of Mr. Obama's term, much as the Fifth Circuit blocked his executive immigration actions. More to the point, an injunction would rebuke an agency that thinks it is above the law.

Senator SULLIVAN. Thank you.

So I would just like to ask a few questions, Mr. Holmstead, Professor Rabkin, Mr. Bookbinder, others, do you believe, like the Supreme Court, like Laurence Tribe, that the EPA legally is a rogue agency?

Mr. RABKIN. Laurence Tribe was one of my teachers. I never disagree with him, especially when he is right.

Senator SULLIVAN. Thank you.

Mr. BOOKBINDER. That is an incredibly loaded question, Senator.

Senator SULLIVAN. Just a yes or no, or you can defer.

Mr. BOOKBINDER. I would say, and this is from someone who sued EPA frequently in the past, no, I don't believe it is a rogue agency.

Mr. HOLMSTEAD. I am quite confident that EPA does not let statutory intent get in the way of what it wants to do.

Senator SULLIVAN. I would take that as a yes.

Mr. HOLMSTEAD. We have seen that most prominently in the Clean Power Plan.

Senator SULLIVAN. Let me ask another question. With the executive agreement with China, does anyone on the panel believe that that somehow grants authority for the EPA, and I am not talking about the Clean Air Act, the President executes an executive agreement with China, does that give the EPA even the smallest legal authority to start implementing domestic legal commitments on U.S. companies? An executive agreement. And I am not referring to the Clean Air Act, just that agreement.

Do they have any authority to anything legally, domestically here in the United States based on that agreement?

Mr. RABKIN. It is a really good question. My answer would be no, I am not sure what their answer is.

Senator SULLIVAN. Any other panelists want to respond to that?

Ms. LADISLAW. No, but I am not entirely sure it is necessary for the Administration to accomplish what they want to.

Senator SULLIVAN. Thank you, Mr. Chairman, I see my time is up.

Senator INHOFE. Thank you. Senator Cardin.

Senator CARDIN. Thank you, Mr. Chairman. I very much appreciate your holding this hearing, The Road to Paris. Paris, to me, is going to be an important moment in our global commitment on the problems of climate change.

It is interesting, a good deal of the discussion here seems to be the role between the executive and legislative branch, rather than dealing with the underlying problem of how America needs to respond to the global climate change challenge. I don't see any disagreement that climate change is real, that we could do something to mitigate it, that there are health risks, that there are economic risks, there are security risks to the United States in regards to global climate change. If we don't take aggressive steps, the world depends upon U.S. leadership.

There seems to be more fight as to whether Congress needs to take action or the executive action. I would hope both would take action.

I serve as the senior Democrat on the Senate Foreign Relations Committee. I am frequently in international meetings when cli-

mate change comes up. And I must tell you, President Obama is getting good reviews internationally. The U.S. Congress is not.

I think the international community would welcome the ability of the United States to speak with a more united voice and would welcome Congress taking affirmative steps by legislation to deal with the climate change issue. We have tried, Mr. Chairman, we have tried. Senator Boxer has taken a real leadership role. I was here with she worked with Senator Warner of Virginia and Senator Lieberman, and we came close. Senator Markey, who is not here right now, took an incredible leadership role on the House side in past legislation.

The challenge is that we need to put a price on carbon. We have to put a price on pollution. It is unlikely that will happen. I think we all understand the realities of the politics of this Congress. But the United States has an opportunity and President Obama is taking advantage of that to show world leadership, to make a difference not only for the United States security and health and economy but for the global security, health and economy.

So Mr. Hausker, I want to ask you a question if I might. What action would you think Congress could take that could be most helpful to achieving the goal President Obama has laid out for us to meet as we go into the Paris meetings?

Mr. HAUSKER. I would certainly wish that Congress would be supportive of achieving the target that President Obama has set forth. It is an ambitious but achievable target. It can be done using existing Federal authority, supplemented by actions by the States.

And in the longer term, I would hope that Congress would do what you pointed to, which is put a price on carbon, which could be done in a variety of ways. There is WRI research and research by other think tanks and academics pointing to the multiple benefits of putting a price on carbon and the ways it could be constructed to promote economic growth.

So I think there is a short-term mission to advance the agreement that we hope will be concluded in Paris into 2025 and then the longer term agenda of putting the right press signals in place that can help this country as well as help the globe toward the decarbonization in the decades ahead necessary to solve this problem.

Senator CARDIN. Senator Whitehouse is here, who has been one of the real leaders on this issue on the price of carbon and dealing with energizing the private sector to develop ways in which we can meet our economic challenges, recognizing there is a price of carbon. We can show it directly in regards to what it does to our environment, what it does to our health. There is clearly a price.

By recognizing that, the private sector then comes up with ways in which we can reduce our carbon and help our economy and do it in the most cost effective way. That is what many of us have been trying to do. We thought that it is a sensible bridge between the Democrats and Republicans to energize the private sector.

What I really think the tragedy is here is that we don't have to get into a philosophical debate here. It seems to me the same solutions help our economy, help our security and help our environment. So all of us want to do all three. I am not sure why we are having this tough philosophical debate about recognizing the dan-

gers of carbon emissions and having our vibrant economy figure out ways that we can again lead the world in innovation and dealing with the underlying problems.

Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Senator. Senator Fischer.

Senator FISCHER. Thank you, Mr. Chairman.

It was mentioned before that maybe we shouldn't forget about the forest, and we are looking at the trees. Well, I would say the purpose of this hearing is to look at the trees. We are looking at the road to Paris. As Senator Cardin said, we tend to get into philosophical discussions here on climate change and where we are on that. But I would like to get back to where the hearing is focused.

My friend from Oregon was talking about rural America and the effects that climate change has on rural America. Well, I am a cattle rancher. I live in a county in Nebraska with less than one person per square mile. So I think I can speak about rural America. I think I can focus on maybe some of the effects that the road to Paris will have on rural America and have on agriculture.

I happen to know where my friend from South Dakota lives. He lives 2 hours north of me in Pierre, South Dakota. He can speak to rural America as well. Basically, we live in the middle of nowhere or the center of the cosmos, one or the other.

Mr. Holmstead, you had spoken earlier about the regulations that are out there, the known regulations, the issue that we would have with those and the effects that they would have on families and businesses. And you had kind of gotten started into where the unknown regulations would come from that you believe would need to be imposed on families in order to meet those targets of 26 to 28 percent in reductions.

You mentioned the agriculture sector. That is the economic engine of Nebraska. It is an economic engine for this country. This road to Paris would have an effect on families, on the economy and they are unknown. They are unknown regulations.

Can you let us know what you think some of those regulations would be and the impacts that they would have?

Mr. HOLMSTEAD. My point, as you know, was that the sector that, according to EPA, emits greenhouse gases that are not really regulated is agriculture. I am probably not the right person to predict exactly what those would be. But what I would say is, if you look at the things that the environmental community is calling for in terms of tighter controls on animal manure, in terms of changes in the way that we plant crops, in terms of changes in the way we do grazing and all these sorts of things, changes in the way that fertilizer is used, these are the things you can imagine.

Again, my point is, if they really are serious about meeting their commitment, they almost have to do those things. So it is either they are not serious about meeting their commitment or we can anticipate perhaps a greater regulatory burden on rural America.

Senator FISCHER. Mr. Bookbinder, you stated in your testimony that the reduction target submitted by the President would also be attributed to unknown regulatory measures. Those are going to add costs to families and businesses. Do you have any idea what some of those unknowns would be, what the Administration needs to be

looking at in order to meet those requirements that they have set out for the American people?

Mr. BOOKBINDER. Senator, let me make sure I understand your question. You are asking, am I aware of what the regulatory measures the Administration is contemplating to make up what I call the gap, I have no idea what the Administration is contemplating. None.

Senator FISCHER. Do you have suggestions or any ideas on where the Administration might be looking?

Mr. BOOKBINDER. No client has come to me to ask me to try and figure out where those missing tons have come from. If they did, I would be delighted to think about it. But my job so far was to say, hey, there is just a missing bunch of tons here.

Senator FISCHER. I guess I am not going to pay you then, to give me an answer. Is that correct?

Mr. BOOKBINDER. I certainly don't want to add to the deficit.

[Laughter.]

Senator FISCHER. Thank you.

Mr. Holmstead, do you think that existing U.S. law, particularly the Clean Air Act, authorizes the President to achieve the carbon reductions that are promised in this international carbon commitment?

Mr. HOLMSTEAD. No, I don't see how the Clean Air Act can be used to get the reductions that they have promised. Again, if I can just point out, the Clean Air Act hasn't changed really since 1990. So if the Clinton administration believed that it could have achieved these reductions under the Clean Air Act, you would think it would have done something.

So what we are seeing is an incredibly creative use of the Clean Air Act in ways that I think the courts are almost certainly going to strike down.

Senator FISCHER. So more lawsuits in the future. Thank you.

Senator INHOFE. Senator Markey.

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

This is a very important hearing. It kind of calls into question the can-do capacity of the United States in order to meet big challenges. Can we do it? We know the threat is there. Do we have the capacity to do it?

Well, back in 2005, the annual U.S. carbon pollution was the second highest level ever, just slightly lower than the peak of 2007. Back then in 2005, fuel economy standards for the United States were 27.5 miles per gallon.

We passed a new law. The President implemented the law. For model year 2016, the average is going to be 34 miles per gallon. No one had that on the books in 2007. But we passed a law. And that is dramatically reducing emissions, and it is going up to 54.5 miles per gallon by the year 2025. We can do it.

Same thing is true for the price of natural gas. It was $7.33 per 1,000 cubic feet in 2005. And that price has plummeted. No one had that on the books that through new fracking technology we would see such a dramatic reduction in natural gas prices that would substitute natural gas for coal, reducing right there by 50 percent the amount of emissions that were coming out.

No one had that on the books. Technology and innovation made the difference.

In 2005, we connected a mere 79 megawatts of solar for the whole year and about 2,400 megawatts of wind. That is 2005. In 2014, we added 7,000 megawatts of solar up from 79 megawatts in 2005. We expect to add 11,000 megawatts of wind just this year. That is not on the books in 2005.

This is innovation. This is America saying, there is a problem, we are going to solve it.

So if we can make those kinds of changes, then the sky is the limit if we have a sense of American can-do.

In New England, New York, Delaware, Maryland, we implemented a Regional Greenhouse Gas Initiative. From 2007 until today, we have reduced our greenhouse gases across those nine States by 40 percent. In Massachusetts, we saw an increase in our gross domestic product by 29 percent at the same time.

We can do it. We can do it. We have to believe in innovation.

So let me come to you, Dr. Hausker. From your perspective, what do these changes in the last 8, 9, 10 years mean in terms of what is possible in the future, from your perspective?

Mr. HAUSKER. Senator Markey, I think you offered some great examples of the power of innovation, the power of ingenuity and the way American business can rise to challenges and produce not only jobs and economic growth, but fewer greenhouse gas emissions.

The kind of things driving some of the changes that you cited is we are in the middle of a clean energy revolution. Over the last 5 years, we have seen the cost of wind power decrease by 58 percent. We have seen the cost of solar PV decrease by 78 percent. That is innovation, that is achieving economies of scale and those trends can continue also with supportive public policies and can lead to the kind of decarbonization of the economy as we continue to grow and provide jobs.

We have seen that across vehicles, power generation, HFC reduction technologies, across the board we are seeing the innovation that can deliver on the kinds of reduction targets the Obama administration is set.

Senator MARKEY. But again, we have to drive the innovation. When the Wright brothers were taking that first flight in 1903, at Kitty Hawk, even they would not have envisioned the role an airplane would play in World War I, just 14 years later. They could never have imagined. But because of the commitment of innovation, because of the American can-do, it revolutionized the rest of the world.

Dr. Hausker, your analysis found that the United States could meet the President's proposed targets with existing authority. Mr. Bookbinder's testimony finds an emissions gap. Can you tell us why your arithmetic adds up?

Mr. HAUSKER. Yes, thank you. Here is how, I have reviewed Mr. Bookbinder's analysis, and here is how I can explain why he has one set of conclusions and the WRI analysis has a different set of conclusions.

I think I understand what you did, Mr. Bookbinder. You have looked at rules that have been finalized or rules that are in near-

finalized state across some different end uses and sectors and added up their emissions reductions as projected for 2025 and compared that to the target.

What is final or near final doesn't add up yet. The WRI analysis, which I would be happy to put into the record, looks beyond what is just finalized and near-finalized. We look at the potential across the economy for the use of existing Federal authority to reduce emissions.

So that looks beyond some of the categories you looked at. We also looked at industry, at aviation, at some reductions in the trace greenhouse gases like PFC and SF6. We also looked at deeper gains from energy efficiency, deeper gains from the reductions.

Senator MARKEY. Mr. Hausker, I hear you are being gaveled. I thank you. I agree with you. I would just say this, Wright brothers, Elon Musk, that kind of innovation if we keep the rules in place. We will solve this problem. We just have to believe in ourselves.

Senator INHOFE. Thank you, Senator Markey. Senator Capito.

Senator CAPITO. Thank you, Mr. Chairman. I would like to thank the panelists, too. This is a very interesting discussion. I don't know if the panelists know, I come from West Virginia, which is heavily impacted by the Clean Power Plan. We have had heavy impacts to this point with the MATS ruling.

I would like to stick on the legal parameters to begin with, at an agreement that could be reached in Paris. My colleague from Massachusetts was touting the fact of more efficiencies in cars. One of the quotes he used was, we passed a law, we, being Congress, passed a law and forced that. So I think that is the crux of the argument, for me, especially after the decision of the Supreme Court last week.

So Mr. Holmstead, the Administration is relying on the Clean Power Plan to deliver a substantial share of 26 to 28 percent reduction. But we know that the Clean Power Plan is going to be on shaky legal ground. We don't know when this is going to be settled. It could be overturned in whole or in part just as the Supreme Court rejected EPA's Mercury Rule last week, by not considering economic impact. We keep trying to get the EPA to come to West Virginia to look at the economic impacts of their regulations, and we have yet to achieve that.

So what are the domestic legal implications of a Paris agreement that commits the U.S. to a level of emission requirements that the courts could later then determine were faulty EPA interpretations of the Clean Air Act? How would you see that?

Mr. HOLMSTEAD. I don't understand how the President's pledge can change domestic law. And Professor Rabkin may know more than I do about these issues, but I thought a lot about what would happen, what kind of a lawsuit would somebody bring. I think the answer is that there is nothing like that.

That is why, again, I think it is a problem to have the President, no matter what you think about climate change, why should the President be out making commitments on behalf of the country that he has no way of meeting? That is my real problem.

So I don't see how he can change domestic law by making that kind of a unilateral agreement.

Senator CAPITO. Would you agree, Professor Rabkin? You have pretty much addressed this issue.

Mr. RABKIN. So there is this canon of construction that you should avoid interpreting a statute in a way that puts it in conflict with international law. If there were a treaty that had been ratified by the Senate, I think it would be a plausible argument which might move some justices or some judges on an appellate panel to say, let's avoid the conflict with a treaty.

I think it is really a big stretch to say, let's avoid a conflict with a President's political commitment because he promised. That is really allowing the President to rewrite statutes, just because he has foreign friends. I don't think that can work.

Senator CAPITO. Mr. Bookbinder, let me ask you a question. The system of pledging review that Paris is based on seems to confer, gives a lot of flexibility on developing nations, but more hard commitments by industrial nations like the United States, both in terms of emission reductions and possible financial obligations.

I have already spoken about my State and what we see in terms of what kinds of impacts this could have, the Clean Power Plan and further agreements could have on a State such as ours. We are so heavily reliant on coal. We have a lot of it as a resource, we have a lot of natural gas. We are happy about that.

Are there any safeguards that are being considered to protect American industries, consumers, workers? We already know the cost of our power is going to go up and the cost of energy is going to go up. What kinds of parameters in an agreement are to be considered as you look at us as an industrialized nation in contract to the developing nations?

Mr. BOOKBINDER. Senator, you are going to hear words from me that you rarely hear in Washington, which is, I don't know. I know almost nothing about the Paris process. I will defer to people who do.

I simply looked at the U.S. commitment and added up the numbers. I think Dr. Hausker and I have a slight difference. He said I looked at measures. I looked at every one of the measures that Secretary of State Kerry put in the INDC. So I simply took the measures that the Secretary of State put in the INDC and added them up. If there are others, then there are others. He didn't put them in the INDC.

Senator CAPITO. Mr. Holmstead, do you have any reaction to that? Or is that something, in terms of developing nations commitments and industrialized nations, are we looking at what kind of advantage or disadvantage that would play and how it might impact us?

Mr. HOLMSTEAD. I don't think there is any explicit consideration of that in Paris.

Senator CAPITO. It sounds like a Supreme Court decision to me. [Laughter.]

Senator CAPITO. Thank you.

Senator INHOFE. Senator Whitehouse.

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

First of all, let me thank Mr. Hausker for bringing up the value of the price on carbons, since I have a bill to exactly that effect, that appears to comport with at least the general principles that

most of the Republican study groups that have looked at this issue require, i.e., that the money go back to the American people and not be used to fund any growth in Government.

Let me just sort to set a baseline for the hearing ask each witness to answer the following question. That is, if you believe that climate change, man-made, through carbon emissions, is a serious problem that merits the sincere attention of Congress. Mr. Hausker.

Mr. HAUSKER. I completely agree with that statement.

Senator WHITEHOUSE. Ms. Ladislaw.

Ms. LADISLAW. I agree.

Senator WHITEHOUSE. Mr. Holmstead.

Mr. HOLMSTEAD. I agree.

Senator WHITEHOUSE. Mr. Bookbinder.

Mr. BOOKBINDER. I agree, and I want to add one thing.

Senator WHITEHOUSE. Let me finish what I have asked first. Mr. Rabkin.

Mr. RABKIN. Sure.

Senator WHITEHOUSE. I could hear through the hearing, and I have heard a lot of my colleagues talk about their concern that the gap would be an opening to regulate agriculture in different ways. I would simply urge my Republican colleagues who are concerned about that to talk to big American corporations like Cargill, which are heavily, heavily invested in agriculture. Big American companies like Mars that depend on agriculture for their product lines.

I think you will find that they are urging the agricultural sector to move in this direction on their own. This isn't some plan that just got hatched in the White House. Because they understand that climate change is real. We on a bipartisan basis have done things like approve funding for biodigesters in the Agriculture Bill to help reduce the methane. That is a pretty simple way of addressing the manure from ginormous feed lots that put out tons and tons of manure.

So it is not as if there are not ways that we can address this in a bipartisan fashion. There are ways we already are beginning to address this in a bipartisan fashion and ways in which the corporate community, particular big American corporations, are leading us on this.

I hope that we can address the question of regulatory burden in this Committee, but I don't think that we can address the question of regulatory burden in the context of a Committee that refuses to acknowledge that climate change is real. I am glad that all the witnesses get it. I doubt if we polled the Republican side of this Committee you get the same answers.

It is unfortunate, because I think it is hard to address a problem that people are busy denying is a real problem. I particularly note what I consider to be the baleful effect of the Citizens United decision. We actually had a lot of good, bipartisan work going on climate change until the Citizens United decision came along.

In this Committee, John Warner was the Republican co-author of Warner-Lieberman. Senator Cantwell and Senator Collins got together to do a very significant cap and dividend bill back in the cap and trade era. Senators like Senator Flake have written articles saying that a carbon tax would be the way to go as long as, again,

back to the original requirement, it is revenue neutral, the money goes back to the American people.

Senator Kirk, back in the day, voted for the Waxman-Markey bill. Senator McCain campaigned vigorously for President as the Republican nominee on doing something about climate change.

So there is a steady, steady heartbeat of Republican activity until Citizens United happened in January 2010. After that, it has been like the EKG flat-lined. I think there is a direct correlation between the fossil fuel industry taking advantage of the bullying and manipulating power that Citizens United gave it to perform exactly those tasks and trying to bring the Republican party in Congress to heel. Unfortunately, I think they succeeded in doing so.

Fortunately, the American people have a very different point of view. There is going to be a big accountability moment in November 2016, when the Republican party has to take what is presently its theory about carbon change, which is either it is not real or people don't have anything to do with it or I don't want to talk about it and vet that before the American voters. I don't think that is going to be a very healthy moment for that particular set of political theories.

So I hope we can continue to work together on this. But I do think that Citizens United has had a really, really unfortunate effect on this conversation. My time is over, so I will yield.

Senator INHOFE. Thank you. Senator Boozman, thank you for your patience.

Senator BOOZMAN. Not much choice on who to recognize.

Senator INHOFE. That is right.

[Laughter.]

Senator BOOZMAN. Thank you very much, and thank all of you for being here.

As Senator Markey said, we can and should be very proud of the innovations we have made and the ability of America's can-do spirit. The other side of that, though, is that we are a Nation of laws. We have checks and balances in place. There is a proper way to do things. So I guess the real question is, does the President have the authority to go overseas and strike an agreement that is very, very far reaching.

In listening to the panel today, and you have done an excellent job, really representing both sides, but anybody who has listened today, anybody who has read the literature, there is profound disagreement as to whether or not this 26 to 28 percent can be reached and what it would take to do that.

Mr. Holmstead, in the course of studying, being a part of the Clean Air Act for many, many years, how long under the current scenario that we are doing, how long would it actually take to get to a goal like that?

Mr. HOLMSTEAD. The single biggest thing that the Administration has promised to do is something called the Clean Power Plan. And their assertion is that that can achieve a significant reduction. It is maybe half of what the President would need to get to 26 percent.

I have been dealing with the Clean Air Act for 25 years. I just don't think the courts are going to uphold that. It is so far beyond what the statute says. So if you take that away, you are looking

at things that could improve the efficiency of a lot of different things, cars we already have, we could do other things. But I don't see how you get to 26 to 28 percent. And I can tell you we can't get there by 2025.

Senator BOOZMAN. But even with that, if the courts did uphold it, you still have a huge problem in doing something different even getting to the 26 to 28 percent.

Mr. HOLMSTEAD. Yes.

Senator BOOZMAN. That would take decades.

Mr. HOLMSTEAD. I want to point out there, is not such a disagreement between Mr. Bookbinder and Mr. Hausker. They both have said that what the Administration has announced is not enough to get you there. Mr. Hausker believes there are many other things that they and States can do.

Senator BOOZMAN. Exactly.

Mr. HOLMSTEAD. But the EPA doesn't have that authority, in my view.

Senator BOOZMAN. So in the case of the international climate agreement proposed by the President, does anyone disagree that it won't drive up the cost of food, fuel and electricity for American families and have an impact on domestic policies ranging from agriculture to energy to transportation if we were able to do this 26 to 28 percent reduction?

Mr. HAUSKER. The analysis that we have performed and the analysis of other groups that we have reviewed indicate that the U.S. can maintain economic growth, that it can maintain job creation.

Senator BOOZMAN. I don't mean to interrupt, but you don't disagree that it is going to drive up the cost of food, fuel, electricity for American families and have a significant impact on domestic policies to achieve the 26 to 28 percent?

Mr. HAUSKER. I can't make any broad, sweeping statements. The impacts are going to vary by sector. If we look at electricity, for instance, and we look at the impacts, the projected impacts of the Clean Power Plan, we find that although the price of electricity may go up, the efficiency programs that would accompany it would actually decrease demand and that average residential bills would be constant or could actually decline.

So things interplay in different ways.

Senator BOOZMAN. But you would acknowledge this is a big deal? To reach a 26 to 28 percent reduction, you are going to have far reaching things.

Mr. HAUSKER. We call it ambitious. It requires a lot of action. It requires a lot of operation.

Senator BOOZMAN. And the question is, does the President have the unilateral authority to do that? And that is really kind of where we are.

Yes, ma'am.

Ms. LADISLAW. I just wanted to say, it is kind of a strange conversation we are having about what authority the President needs to make that kind of a commitment, whether it is a domestic or an international authority. I think that it is important to keep in mind that the Administration has said if they come back with an agree-

ment that they believe legally requires State pass through Congress, they will take it that route.

So the idea here that we know what the agreement looks like and therefore can justify what kind of authority it requires, we won't really know until we get the outcome from Paris. There is some speculation about those things, but we don't really know the answer to that question.

Mr. BOOKBINDER. I would like to take a shot at answering that question. The Congress, your predecessors have created this system. Congress wrote a Clean Air Act that says EPA shall regulate a pollutant that is anticipated to endanger human health and welfare. EPA has determined, quite reasonably, that carbon dioxide and other greenhouse gases do endanger human health and welfare. At which point the Clean Air Act, as written by your predecessors, says EPA must regulate.

Now, the point I am making is that as a result of that, Congress has already put a price on carbon. The regulatory costs, which are mandated by the Clean Air Act, are a price on carbon. What some in the White House and other people who propose a carbon tax is a more economically efficient price. So you are either going to be stuck with an inefficient or regulatory price or an efficient carbon tax price. Those are your choices.

Senator BOOZMAN. Thank you, Mr. Chairman. The only thing I would say is if you can't sell it to the Congress, if you can't sell it to the American public, then again, it probably shouldn't be done in this manner. Thank you very much.

Senator INHOFE. Thank you, Senator Boozman. That is a very good point.

I am going to do something, and it is within the power of the chair to do it. Senator Boxer wants a full 5 minutes to respond to everything. While she was the chairman, I never made that request.

[Laughter.]

Senator INHOFE. However, I am going to allow her to do that, and no one else coming in, they have now had their chance to come down. So we are through hearing from other members.

We will acknowledge Senator Boxer for 5 minutes, then I will acknowledge myself for perhaps an equal amount of time. Then it is over, you guys.

[Laughter.]

Senator BOXER. Senator, thank you.

I am not going to ask any questions. I am just going to thank the panel. All of you were terrific. Mr. Bookbinder, you spoke for me in your last comments. You are so right, there is a price on carbon. It is not the most efficient way. If we could come together around a carbon tax. I also think the international oil companies would come into that place, we would be far better served.

What I want to do in these couple of minutes is just give kind of a closing argument about why I think the President has this authority. I agree with Senator Boozman. We are a Nation of laws. So I will take you back to 1992, October 7th, when the Senate, by unanimous consent, passed the U.N. Framework Convention on Climate, under which this President and the next one has the authority to move forward with executive agreements as long as they

don't violate our laws, such as the Clean Air Act and our fuel economy and all that. That is his intention.

I also wanted to speak to Senator Fischer's point, the point that she made as a rancher. You probably know I am not a rancher, I am not a farmer, I was born in Brooklyn, New York. There used to be farms in Brooklyn, but not when I was born. I am not that old.

I represent a State, along with Senator Feinstein, that has the largest ag production in terms of revenue. We are No. 1. If we move toward an agreement and toward doing what we have to do with very catastrophic climate change, we will save, in our Nation, $11 billion a year out through 2050, in avoiding these damages to the climate which is going to adversely impact agriculture.

So it is because I represent this State that I fervently believe California is on track and the President is on track. Frankly, the Congress is off track.

Then I think it is very important, Senator Sullivan mentioned Larry Tribe. I love Larry Tribe. But I think he sold out in this particular case. It is OK. He took a lot of money from Peabody Coal and he is presenting their arguments. He has lost so far. Let's be clear. The courts have ruled against him so far. I am sure he is doing a great job but that is where it is at this point.

I wanted to say to Mr. Holmstead, thank you for your Government service. You were there at EPA for a period of time. When you were asked if you felt the EPA was a rogue agency, you gave kind of an answer that I sensed was leaning yes at this point.

When I look back at your service and your time there, your refusal and the refusal of the Bush administration to admit that climate was covered in the Clean Air Act led us to Massachusetts v. EPA, in which your side lost and my side won. Now, the point there is, maybe EPA was a rogue agency at that time when you were there. Because clearly when you read the case, honest to God, it says, any pollutant that adversely impacts the climate.

I am not a lawyer. I am married to one, my father was one, my son is one. So maybe by osmosis I am one. But all you have to do is read the Clean Air Act. The Bush administration wasted 8 precious long years. It is really worth noting.

Now, Senator Sessions makes a really good point. He says, shouldn't we use the power of the purse. And the people here who agree with Senator Sessions, that this is the wrong way to go, say yes, use the power of the purse. And he made the point, we shouldn't have to go against our constituents.

Let me show you the recent poll, in January 2015. Eighty-three percent of Americans, including 61 percent of Republicans, say if nothing is done to reduce emissions, global warming will be a serious problem in the future. Seventy some percent of Americans say the Federal Government should be doing a substantial amount to combat climate change. That is a Stanford poll. There is also a Wall Street Journal poll that has similar findings.

So I am saying to my friends on the other side, you are on the wrong side of the people and you are on the wrong side of history because of the way this thing is going.

Finally, I will close with a comment that was made by Christie Todd Whitman, former EPA Administrator under George W. Bush.

She appeared here on June 18th, 2014: "I have to begin by expressing my frustration with the discussion about whether or not the EPA has the legal authority to regulate carbon emissions that is still taking place in some quarters. The issue has been settled." She is right. Thank you.

Senator INHOFE. Thank you, Senator Boxer.

First of all, this hearing today is not a science hearing. The questions that were asked of you, I am sure it was difficult to answer them. You didn't come here with that perspective. You came here for the what are we going to do about Paris and what about this 21st meeting that is coming up, what power does the President have to do these things that he seems to think he can do without any ratification by Congress.

I would suggest, I want to clarify a couple of things. Senator Boxer used the statement that 56 percent of the people in Congress would adopt something that would be any type of cap and trade or a similar kind of restriction. That is not exactly true, because that was on a majority, a vote on a motion to proceed. I have many times, and every Senator up here has many times voted to proceed to something to hear it without supporting it.

The specific votes, the highest one it ever got was 48 percent. And that was the Warner-Lieberman vote, and then 38 percent and 43 percent.

Now, no useful purpose would be used, because I hear the same things over and over again. I have stood on the floor. I was down there during the time that right after Tom Steyer put in his $75 million to elect people that wanted to revive the old global warming argument. I went down there and listened and I heard the same things that have been rebuked many times before. They keep coming up.

We heard it from three of the members over here today. They talked about, oh, the weather consequences, the serious consequences, droughts, and in fact that the severe drought, that 34 percent covered 80 percent of the country compared to 25 percent in 2011. We have all these statements that were made.

In fact, Professor Rabkin, your university, George Mason, did a study of all the meteorologists, not all of them, but a sampling of meteorologists. They reported that 63 percent of the weather forecasters, those are meteorologists on TV, believe that any global warming that occurs is a result of natural variation and not human activities.

Here is a good one here. Dr. Martin Hertzberg, he is one I knew personally, a very proud liberal Democrat, retired naval meteorologist with a Ph.D. in physical chemistry, also declared his dissent of warming fears. He said "As a scientists and a lifelong liberal Democrat, I find the constant regurgitation of the anecdotal fear-mongering claptrap about human-caused global warming to be a disservice to science." Continuing, he said "The global warming alarmists don't even bother with data. All they have are half-baked computer models." He goes on and on.

Then there is Richard Lindzen. I remember him very well, because he testified here before this Committee. He said that regulating carbon is a bureaucrat's dream. If you regulate carbon, you regulate life. I am sure some of you remember that.

He is one who has been with MIT. Same thing with sea level and some of the other arguments.

But I do want to mention this. The most recent poll that Gallup came out with, they sent a list, and these are the 25—I will make this a part of the record—national concerns of Americans. Dead last on that list is climate change.

I know people want to believe it, people want to believe the world is coming to an end. Quite frankly, confession is good for the soul. I recall when I first was exposed to this, and everyone said it was true, so I assumed it was until they came out, it was MIT and some other groups, came out and said how much it would cost if we were to pass the cap and trade type of legislation that came originally from McCain and Lieberman. The range has been between $300 billion and $400 billion a year. That has not really changed.

So I did the math in the State of Oklahoma. Each family in my State of Oklahoma that files a Federal tax return would end up paying about $3,000 a year.

By the admission of President Obama's first director, Lisa Jackson, of the EPA, when asked the question when she was sitting at the table right where you are sitting today, if we were to pass some type of a cap and trade legislation, either by legislation or regulation, would this have the effect of lowering CO_2 emissions nationwide, she said, no, it wouldn't. The reason was because this isn't where the problem is. It is in China and India and other places.

By the way, I know all this talk about what China is going to do, they haven't committed to anything. The President came back and he talked about this great achievement that he made. They didn't commit to anything at all.

Now they say, well, we are going to increase our emissions of CO_2 between now and 2025, then we are going to start decreasing it. That is a deal? It is really not.

So I only want to say that we have had the science hearing. It is a controversial subject. And I am glad that we are having this hearing today. I personally, as I said in my opening statement, went to Copenhagen and was at that time, this was after all the leadership, as perceived by the other 191 countries, were all on one side. I said no, what they are telling you isn't true. We are not going to be passing cap and trade as they told you. This was 2009. And of course, that didn't happen.

We will continue to look at this. We are concerned about any issue that comes before this Committee, and we are adjourned.

[Whereupon, at 11:55 a.m., the Committee was adjourned.]

[Additional material submitted for the record follows:]

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FRAMEWORK CONVENTION ON CLIMATE CHANGE (Senate - October 07, 1992)

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Mr. **McCONNELL.** Mr. President, as the Senate takes up the Framework Convention on Climate Change , I want to make a few observations on this important treaty.

This document is viewed by all as the most far-reaching environmental agreement ever negotiated and concluded by 156 countries. I think it is important to once again point out that President Bush's commitment to cost effective policies to prevent climate change will preserve jobs as they protect our environment. The President was farsighted in his regard for real long-term prosperity and environmental protection. This convention prepares the nations of the world to come up with a sober assessment of the climate change issue and calls for voluntary action plans to address the potential impacts of human activities.

I want to commend President Bush for his leadership at the U.N. Conference on Environment and Development [UNCED] in the face of outrageous criticism from those attempting to cloud our Nation's efforts to protect the environment. He braved a barrage of predictable rhetoric from the liberal media, the developing world, the developed world, and Congress.

Looking back at UNCED, there were several groups who delighted in bashing the administration, but whose true interests appear to be far from that of sustainable development.

Our European allies, appeasing their strong green lobbies back home, cynically cried alligator tears, with their pecuniary interests foremost in mind. Carbon dioxide targets and timetables would give these countries an enormous competitive advantage over the United States which relies on its natural endowment of coal. The representatives of Third World countries wanted more aid with fewer strings attached. The emotionally charged pleas of environmental groups trying to pump up their membership rolls make great direct mail, but poor environmental policy. And the politically driven diatribes of liberal politicians in the United States now appear to be their best bet at getting off the political endangered species list.

While most critics had agendas far removed from reasonable environmental protection, there were those critics with no hidden agendas: the apologists for U.S. policies who fail to recognize that no Nation has done more, or spent more, to protect the environment than the United States. A case in point was a news report that Fidel Castro received the largest round of applause of all the world leaders who spoke at the conference, while President Bush was only politely acknowledged. This reflects a world conference with a very warped view of our Nation's real, long-term commitment to the environment.

The President's firm stand against targets and timetables for greenhouse gases was not a fashionable position at UNCED. However, it was the only position supported by the facts. There is no conclusive evidence of significant long-term global warming. Our understanding of the Earth's climate is quite primitive and does not take into account the dynamic interaction of such factors as water vapor, sunspots, volcanic activity, variations in the Earth's orbit around the Sun, and the effect of oceans and ocean currents. While these forces have been at work for eons, some self-proclaimed environmental saviors can only cite the latest weather report, and prepare thirty second political ads.

According to a recent survey of the scientific community, 47 percent of scientists did not believe that current policies would lead to global warming. This is hardly a consensus on global climate change requiring us to limit economic growth for an amorphous fear that the sky is falling. Clearly, the potential for climate change is something that must be carefully watched. But based on our limited understanding of the atmosphere, we are not justified in pursuing drastic changes in our industrial policy.

I agree with many in the environmental community that measures must be taken to minimize the potential for climate change . But these measures should be the least cost alternatives in light of the many uncertainties. Many such alternatives have been incorporated into the President's national energy strategy.

The President led the way at UNCED by crafting a thoughtful, reasoned response in the face of shrill rhetoric. In the end, the President's initiative was adopted by the rest of the world. It requires Nations to submit action plans to monitor and limit greenhouse gas emissions. It provides for technology cooperation and commits funding.

The United States has pledged $50 million in contributions to the World Bank's global environmental facility to assist developing countries in reducing greenhouse emissions. President Bush has proposed over a billion dollars per year in funding for climate change research in fiscal year 1991 and 1992. And this year the President requested $1.37 billion.

Initially, I had reservations that the Framework Convention on Climate Change could be convoluted in a way that would devastate the U.S. economy and the economy of my State. I was concerned that it could be interpreted unilaterally by the executive branch to bind the United States to targets and timetables for greenhouse gas emissions. However, I am satisfied that we have clarified this issue in the Foreign Relations Committee.

In pressing for a unilateral interpretation to include targets and timetables, some draw a parallel to the experience we had with chlorofluorocarbons and the Montreal protocol: Once the United States signed the agreement, everyone else fell in line. However, there is no evidence, no experience, or no record to indicate that developing countries will be willing to similarly commit to meaningful and binding reductions in carbon dioxide emissions.

The negotiations leading up to the Rio summit demonstrated the reluctance of the developing world to join in a binding interpretation of this convention to limit carbon dioxide emissions without broad disclaimers that they not interfere with economic growth. The commitments of this convention simply to study and analyze greenhouse gas emissions are subject to overriding priorities of economic development. An interpretation by the executive branch that would recognize binding targets and timetables would not be reciprocated by the developing world, and would do little to reduce atmospheric carbon dioxide levels.

A unilateral commitment to targets and timetables would be a tragic mistake. It would have a negligible effect in mitigating the potential for climate change , leave unchecked the burgeoning emissions from

developing countries, and constrain our own economic growth.

Because of these concerns, I felt compelled to discuss the possibility of a unilateral interpretation with the chairman of the Foreign Relations Committee who has given me his public assurances that if this treaty is amended or interpreted by the executive branch to commit the United States to stabilize greenhouse gas emissions, that it would be subject to ratification by the Senate. The Foreign Relations Committee has included language to this effect in the committee report accompanying this treaty to make the record on this point absolutely clear.

The executive branch is precluded from interpreting this convention as a binding commitment to targets and timetables unless ratified by the Senate. Interpreting the aim of this convention in binding terms would amount to a material change in the treaty requiring the Senate's advice and consent.

With the chairman's assurances, I am pleased to support this fine agreement. I congratulate President Bush on his courageous leadership on the issue of global climate change .

In this year of sloganeering and poll watching, it may be an irresistible urge to gloss over the facts, and smear prudent policies in favor of environmental extremism. I am heartened that the one-sided coverage of the UNCED conference did not undermine the level-headed policies advanced by President Bush, and adopted by the rest of the world in this important treaty.

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Mr. LOTT. Mr. President I shall vote in favor of ratification by the Senate of the U.N. Framework Convention on Climate Change .

I believe that the approach to the issue of potential global climate change in the convention is responsible and realistic, considering the uncertainties of the science and the risk of tremendous adverse economic impacts from ill-advised policies. It is clear that the convention does not obligate the United States or any other country to achieve any particular target or timetable for limitation of greenhouse gas emissions. The convention's statement of objective does not detract in any way from the fact that the commitments section contains no such requirement. To me, that is the correct and responsible approach and is the result which President Bush and his administration wisely negotiated and achieved.

We have a responsible approach to limiting the growth of greenhouse gas emissions. The U.S. national action strategy, outlined in the environmental documentation furnished by the Department of State to the Committee on Foreign Relations, is a bold strategy that fully meets U.S. obligations concerning greenhouse gas emissions. It contains initiatives in the areas of energy efficiency, transportation, energy supply, agriculture and natural resources, and technology research and development. Its estimated effects are to reduce otherwise projected emissions by the equivalent of 125 to 200 million metric tons of carbon in the year 2000, a 7- to 11-percent reduction from anticipated emissions levels.

Those results would mean that U.S. net greenhouse gas emissions in the year 2000 would be only 1.4 to 6 percent above 1990 levels. Some may say that is not sufficient. I say that such a result would be remarkable, given that greenhouse gas emissions typically bear some relationship to economic growth, and we all desire economic recovery that enables our gross national product to be substantially higher--far more than just 1.4 to 6 percent higher--in the year 2000 than it was a decade earlier. Even a meager 2 percent average annual growth in GNP during the decade would mean that our economy would be 20 percent larger in 2000 than it was in 1990. That economic growth would be more than 3 to 14 times greater than the projected increase in greenhouse gas emissions under the U.S. national action strategy, a very impressive result.

Growth of GNP is only one of several factors affecting the level of greenhouse gas emissions. Others include population growth, the resource mix in the energy sector, the penetration of energy efficiency technologies, reforestation programs, and efforts to constrain methane emissions from landfills and natural gas pipelines. Those important variables are extremely difficult to predict with confidence.

The Climate Change Convention wisely takes all these factors into account. It rejects the artificiality of rigid emissions levels, which no nation could be assured of meeting by prescribed deadlines. This was articulated by Mr. Jean Ripert, the chairman of the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change . On May 4, 1992, in response to a reporter's question as to why the draft of the convention he supported did not contain targets and timetables, he replied: `No government is in the position to guarantee levels of emissions.'

Some have suggested that carbon taxes could achieve specified emissions levels. I disagree. Carbon taxes could not give us that assurance if for no other reason than that we cannot know with confidence what the price elasticities of different types of energy supply and demand would be at any particular tax level. Nor would carbon dioxide emissions caps on major sources of emissions give us the assurance. This is because, unlike the case of sulfur dioxide emissions, carbon dioxide, not to mention other greenhouse gases, comes from so many different sources--including millions of homes, automobiles, trucks, and small businesses.

The Department of Commerce engaged DRI/McGraw-Hill to conduct a study on the impacts of carbon taxes. That study forecast that carbon taxes necessary to keep carbon dioxide emissions in the year 2000 at 1988 levels would deprive American workers of more than 560,000 jobs and reduce our GNP by $92 billion from what we otherwise would expect.

A newer study by the same firm, `Potential U.S. Regional and State Impacts of International Carbon Taxes,' shows electricity prices in the year 2000 up 53 percent in the Pacific Northwest over the base case; and up more than 65 percent in the east north central region of Illinois, Indiana, Michigan, Ohio, and Wisconsin. As for manufacturing employment in the year 2000, almost 12,000 lost jobs in Missouri compared to the base case, more than 15,000 jobs lost in Florida, and more than 21,000 lost jobs in Texas. Nationally, this new study forecasts over 800,000 nonfarm jobs lost by the year 2000 as a result of carbon taxes.

As the new DRI study points out, `because manufacturing accounts for a high share of my own State of Mississippi's economic activity, the effects of the carbon tax on the State's

economy would be significant.' Personal income in the year 2000 would drop by 3 percent from the base-case forecast for that year; employment in electrical machinery manufacturing would decline by 4.6 percent from the base-case forecast; nonelectrical machinery manufacturing would suffer an employment loss of 5.2 percent; and lumber and wood products manufacturing would face a 3.7-percent job loss. The people of Mississippi cannot stand such impacts.

Some say that taxation or regulatory schemes to limit carbon dioxide emissions would not hurt the economy. This is based on some pretty amazing economic assumptions. For example, the assumption that there is perfect and instantaneous movement of both labor and capital from one industry to another. If that were true, policies could cause tens or even hundreds of thousands of coal miners and steelworkers to lose their jobs, but they instantly--without substantial retraining--could be reemployed as computer operators or insurance agents; and the huge investments in idled manufacturing plants would be turned overnight into investments in activities not as severely hurt by the taxes or regulations, such as video stores. As Raymond J. Kopp, senior fellow and director of the Quality of the Environment Division of Resources for the Future, an environmental group, noted this year, `while environmental

programs may be desirable, they are not free.'

Unless and until we can develop at least a general consensus among economists as to what the most probable results would be of Federal schemes to achieve specific levels of greenhouse gas emissions, my view is that we simply cannot gamble with the economic future of American workers and consumers. Not with information before us such as I have described.

The need for deliberateness has been underscored by the Intergovernmental Panel on Climate Change , whose findings and recommendations are quoted so often by others. In its formal report, it cautioned:

The consideration of climate change response strategies presents formidable difficulties for policymakers. *The information available to make sound policy analyses is inadequate* because of (a) uncertainty with respect to how effective specific response options or groups of options would be in actually averting potential climate change ; (b) uncertainty with respect to the costs, effects on economic growth, and other economic and social implications of specific options or groups of options. [Italic added].

We all should applaud those who understand how complex these issues are and who, therefore, negotiated a climate change convention that provides for flexibility, and rejects arbitrary rigidity, in light of the enormous economic, not to mention scientific, uncertainties that confront us.

I urge my colleagues to support ratification of this convention.

Mr. PELL. Mr. President, I am very pleased that the Senate is able to consider the U.N. Framework Convention on Climate Change , and I urge my colleagues to vote in favor of granting advice and consent to its ratification.

The Convention on Climate Change marks a significant advance in international efforts to address the threat of climate change caused by anthropogenic emissions of green house gases. However, it is only a first step, more is needed. In my view, the parties to the convention should begin now to negotiate a protocol to establish targets and timetables for reducing carbon dioxide emissions.

The administration has objected to the adoption of targets and timetables out of two principal concerns: First, that the uncertainty associated with projections of climate change precluded us from taking serious action; and second, that efforts to reduce greenhouse gas emissions will be extremely costly and harmful to the economy.

I disagree with both of these propositions, and will address each of them in turn. First, the issue of uncertainty. It is true that there is uncertainty about the timing, magnitude, and rate of climate change , and that this presents policymakers with difficult decisions, but uncertainty must not become an excuse for inaction. Indeed, Congress regularly makes decisions in the face of uncertainty.

The budget resolution, for instance, depends heavily on uncertain projections of GNP growth.

In light of some of the misleading statements that have been made about our state of knowledge about climate change , I think is it useful to summarize the current best available scientific projections of climate change . At the fifth round of INC negotiations, the administration submitted a document entitled `U.S. Views on Global Climate Change' which presented a consensus view of scientists on climate change :

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While scientists cannot yet establish that a human-induced warming has already occurred, best estimates indicate that increased concentrations of greenhouse gases are likely to increase atmospheric and ocean temperatures and alter their associated circulation and weather patterns. However, the magnitude, timing and regional details of these changes cannot be predicted with much certainty. Climate models predict changes in the average temperature of the globe's atmosphere as consequence of a doubling of atmospheric concentrations of carbon dioxide are unlikely to lie out the range of 1.5« to 4.5«C (2.7« to 8.1«F), with a best estimate, based on model results taking into account the observed climate record of 2.5«C (4.5«F). Associated sea-level rise has been estimated to range between a few tens of centimeters and approximately 1 meter (less than 1 foot to approximately three feet). In addition, observed warming in recent years is of the same magnitude as that predicted by the models but also of the same magnitude as natural variability. Thus, the observed increase could be due predominately to natural variability or could be part of a larger warming offset by other human factors.

Another way to look at the issue is that the current rates of increase in greenhouse gas concentrations are faster than at any time in the past 10,000 years and will result in a doubling of preindustrial atmospheric CO2 equivalent concentrations by the middle of the next century. The rate of increase in CO2 emissions is 30 to 100 times faster than the natural rate of fluctuation indicated by the climate record, the rate of increase of CH4 is roughly 400 times that of natural fluctuations.

In its report `Changing by Degrees: Steps to Reduce Greenhouse Gases,' the Office of Technology Assessment stated:

(W)e appear to be pushing the climate system beyond the limits of natural rates of change experienced by the Earth for hundreds of thousands and probably millions of years. The projected rate of climate change may outpace the ability of natural and human systems to adapt in some areas.

In my view, these facts suggest that we should begin now to examine limiting emissions of these greenhouse gases. My views are reinforced by the fact that, contrary to the claims of opponents of such measures, authoritative studies indicate that U.S. emissions of greenhouse gases could be stabilized at little or no cost or perhaps even a profit.

By the administration's own estimate, by adhering to existing measures, projected U.S. net emissions of greenhouse gases in the year 2000 will be 7 to 11 percent below emissions otherwise projected or 1 to 6 percent above 1990 levels. These

projections depend in part upon GNP and population growth, the energy intensity of economy, and the rate of diffusion of energy efficiency technologies. These measures nearly stabilize emissions and are voluntary as well as profitable.

It is notable that in statements up to the release of this estimate, the administration had asserted that there were no programs beyond those in the national energy strategy, that could reduce greenhouse emissions without additional costs. The new estimate suggests that the original estimates were inadequate, and that indeed there may be even more opportunities in this area.

This view is reinforced by authoritative studies released by the National Academy of Sciences and the Office of Technology Assessment. In its study of climate change , the National Academy of Sciences concluded that:

The United States could reduce its greenhouse gas emissions by between 10 and 40 percent of the 1990

level at very low cost. Some reductions may even be at a net savings if the proper policies are implemented.

In testimony before the committee, Dr. John Gibbons, the Director of the Office of Technology Assessment stated that the United States could return to its 1990 level of carbon dioxide emissions `at little or no net cost until 2005 if we start now.'

Dr. Gibbons went on to note that:

The longer we wait to make the commitment to stabilize or reduce greenhouse gases, the more difficult it becomes. The short term goal of emissions reductions becomes less attainable because more retrofits are required. The long term goal of concentration reductions fades into the more distant future because of a momentum similar to population momentum. We know that the delay between the time the gases are produced and the time when the climatic and ecological impacts are fully felt is considerable (many decades).

Early in this administration, then-Secretary of State Baker addressed the Intergovernmental Panel on Climate Change and articulated four principles to guide the international response to climate change

They are: First, that we cannot afford to wait until all uncertainties have been resolved before we act; second, that while efforts to refine our knowledge are underway, we should focus immediately on prudent steps that are already justified on grounds other than climate change --this has come to be called the no regrets policy; third, that actions taken to address global climate should be as specific and cost effective as possible; and fourth, that the solutions should reconcile the need for economic growth and environmental protection.

Unfortunately, the administration appears to have abandoned these principles. This despite strong evidence that controlling emissions of greenhouse gases will be essential in limiting the increase in atmospheric concentrations of greenhouse gases and thus in limiting climate change , and authoritative analysis which shows that such measures would not adversely affect the economy, and could in fact promote economic growth.

Indeed, as was noted at the committee's hearing, faithful implementation of the convention may be essential to future U.S. competitiveness in world markets. In his testimony, Dr. Gibbons noted that:

(A)nalysis underway at OTA and in other organizations reveals potential negative repercussions for the U.S. economy if we fail to adhere to commitments and objectives such as those established in the Convention. If other countries, for instance Germany and/or Japan, elect to engage in a more rigorous pursuit of emissions reductions, more efficient products and industrial processes, and nonfossil energy sources, their industries and products may become more competitive than ours.

In light of the key role energy efficiency will place in future U.S. economic competitiveness, I had hoped the administration would have pursued an aggressive program to increase energy efficiency and to reduce our reliance on fossil fuels. Unfortunately, this is not the case. The administration is pursuing policies that reinforce the status quo, or may in fact actually be making matters worse.

For example, the national energy strategy will continue our Nation's unfortunate reliance on imported oil and in fact is likely to increase them in the future. Further, the NES fails to pursue aggressive energy conservations policies; OTA and National Academy of Sciences analyses identify two to three times the low-cost energy conservation that the NES does. Moreover, the NES will actually reduce the percentage

of electricity generated in the United States from renewable energy sources.

Mr. President, all of this points to the fact that the administration has simply not responded adequately to one of the most serious environmental and foreign policy issues facing our Nation today. The convention we have before us is an essential first step, but it is only that. The Senate should advise and consent to its ratification and then push for the initiation of a new round of negotiations on a protocol that would limit anthropogenic greenhouse gas emissions.

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Mr. BAUCUS. The Framework Convention on Climate Change before the Senate is a first step toward addressing this Nation's need to curb its greenhouse gas emissions as part of a global effort. We are playing roulette with the planet by not taking more aggressive action to curb greenhouse gas emissions.

The President claims it costs jobs to protect the environment. This is an old-fashioned way of thinking that is simply not supported by the facts. In today's highly competitive, computerized marketplace, pollution itself is a sign of inefficiency. This inefficiency costs jobs when our competitors eliminate this inefficiency.

Japan has set up the International Center for Environmental Technology Transfer. You can be sure they are most interested in transferring Japanese technology to developing countries. America should be in the forefront of such efforts. Thirty-five percent of our exports go to developing countries. An international environmental agreement on greenhouse gas emissions would only increase the demand for U.S. environmental goods and services.

But the President's turns his back on these types of jobs. He wants to give workers in the 1990's jobs of the 1950's. Only we aren't building Studebakers anymore, Mr. President. We are building electrostatic precipitators, computerized monitors for a wide variety of air pollution, and a host of other technologies.

We need to provide Americans jobs with a future. These are high-paying, skilled jobs; not just flipping burgers at minimum wage.

The President seems blind to the opportunities he is missing. He cannot lead us forward, he can only turn toward the past.

I attended the Earth Summit and I was astonished at how out of step the administration's negotiating team was from the rest of the industrialized world.

Other nations--and business in those nations--recognize this rare opportunity to gain market share in a bull market. Other nations understand we can have greater prosperity and better environmental protection.

I was deeply disappointed in the failure of American leadership at the Earth Summit. I support the climate change treaty before us today, but only as a minimal first step. There is more we must do.

We must prepare an action agenda, to which we are committed by the terms of the treaty. We must have public comment on the agenda so that it can be a document we can all support.

Parties to the convention should meet soon to decide on the next step. We can start this process at the next meeting of the Intergovernmental Negotiating Committee.

We run the risk of losing an enormous trade and economic opportunity if we remain imprisoned by past ideas.

The administration needs to change its outlook on the environment and see the opportunity that exists. Jobs are created when we improve our environmental performance. I hope we are not the last nation to recognize this truth.

Mr. MITCHELL. I am pleased that the Senate today is prepared to consider the Framework Convention on Climate Change . This convention does not take the action I believe is necessary to adequately protect this planet from the risks associated with climate change . The Bush administration prevented a meaningful convention from being signed at the Earth summit last June.

The Bush administration resists agreements for meaningful reductions in greenhouse gases because it says that controlling emissions will harm the economy. This is false reasoning on two counts.

First, controlling pollution can create jobs and enhance our economic health. In fact, pollution may be the most tangible sign of economic inefficiency. Reducing pollution can create jobs by increasing efficiency and creating products in demand elsewhere. A global effort to protect the environment would create demand for environmental goods and services. Japan and Germany are already consciously targeting this market. We need to seize the opportunity if we are to compete successfully in this growing international market.

Second, the administration claims a need to wait for more scientific certainty. There is not certainty on every aspect of climate change , but there is consensus that greenhouse gas emissions from industrialized societies are placing the globe at risk. This was the conclusion of the Intergovernmental Panel on Climate Change . Waiting for absolute certainty as to every aspect of this risk is a delay we cannot afford.

The administration seems to assume that more science will justify their delay. But experience teaches us otherwise. In the case of ozone depletion, another, major international air pollution issue, science, showed us that the situation was worse, not better, then science first anticipated. We need not wait for more science to adopt a prudent course of action and reduce our greenhouse gas emissions.

Despite my great concerns about the shortcomings of the convention before the Senate, I recommend we ratify this convention as a first, small step.

The treaty calls for an action agenda on climate change by January 1993. We need to move quickly to act on this agenda. The public must be involved and able to comment on development of such a plan, and justification for the various provisions of the plan should be made public.

There should be a meeting of the parties to the convention to review progress and we should begin to take action now to develop a protocol to the convention. That protocol should address the need to reduce greenhouse gas emissions, not merely count them. We have an opportunity to take the next step at the meeting of the Intergovernmental Negotiating Committee in December.

The IPCC must also continue its work. We need meaningful information, not a political analysis, about the science of climate change and what strategies can best counter the program.

It is within our power as a Nation to address this program. It only remains to see if the administration has the will to do so.

Mr. GORE. Mr. President, I rise today to urge my colleagues to join me in support of the Framework Convention on Climate Change that the president signed in June at the Earth summit in Rio de Janeiro. While I believe that this treaty falls far short of what is necessary effectively to address the serious threat of global climate change --and I think it is clear that the responsibility for the treaty's shortcomings rests squarely with President Bush--it is nevertheless an important step forward and a foundation upon which responsible policy can be built.

The process leading to the conclusion of the Climate Change Treaty was initiated--and driven--by the virtual unanimous opinion of the world scientific community that, by overloading the atmosphere with carbon dioxide and other greenhouse gases, we are risking disruptions in the climate system more severe than any in the past 10,000 years. More severe storm systems in some areas; intense bouts of drought in others; rising sea levels and flooding of coastal communities would be among the consequences. The imperative--to most of the world community--was clear; we need to take action now.

What became clear during the course of the discussions--again, to most of the world community--was that taking action to combat climate change is also an economic imperative. The fact is that cutting CO2 emissions can most readily and effectively be achieved by improving efficiency in every sector of the economy. And improving efficiency means reducing waste; enhancing productivity and profits.

Apparently all of this was lost on President Bush. As we all are now all too well aware, the Bush administration was--throughout these negotiations--the single largest obstacle to progress. While our major industrialized trading partners and competitors called for decisive action to forestall this global threat, the United States alone refused. Germany, Japan, the United Kingdom--all of our G-7 partners--urged our President to join in a treaty with substance to its emissions limitations commitments. But we stonewalled the world and in the end, our intransigence meant that the final agreement is completely devoid of any legally binding commitments to action.

As I mentioned, we signed the convention at the Earth summit in Rio. The real meaning of the Earth summit was also lost on the President. This is a turning point in history. Leaders of nearly every nation on Earth gathered together in a profound awareness of the true nature and magnitude of the global environmental crisis we face.

Perhaps even more significantly, they realized that the alleviation of human suffering around the globe is inextricably intertwined with out efforts to relieve the building pressures on the environment. They understood that--to combat the poverty, suffering, and pain that afflicts so many in the world today--we have to pursue economic growth that is not destructive of the environment.

In addition, while clearly a milestone in terms of international diplomatic relations, the Earth summit was also a powerful coming together of concerned citizens from all parts of the world. They were parents who are concerned about the quality of life their children will enjoy; they were children who are determined to clean up the damage that has been done and move forward to a brighter future.

Citizens of the United States were there too, in strong numbers. Proud of the many positive steps we have taken in this country to clean our air and water, they wanted to demonstrate United States resolve to lead the world in confronting the larger, global challenges we now face.

They were disappointed. Together with a bipartisan delegation of Senators, I travelled to Rio hoping to amplify their voices. All of our voices were drowned out, however, by the firestone of protest against the United States. Rather than lead the world, President Bush had instructed our negotiators to block progress and drag the talks to a halt. This was nothing new, of course, it had been the President's tack throughout the negotiations. But the world community had had enough of his obstructionism and in Rio,

the depth of their disdain and frustration became clear.

In response to the outcry, President Bush presses on the American public a false choice. He says that we can't take a lead on environmental issues if we want to have a strong economy. This just isn't so. The truth is that we won't be able to revitalize our economy unless we move aggressively forward--away from the polluting ways of the past and toward the cleaner more efficient means of production that are the way of the future.

Japan and Germany are sounding an economic wakeup call. Honda's new present, for example, made 99 speeches to his employees around the world on the imperative of environmentally sound production processes. Specifically with regard to increased fuel efficiency--a policy that President Bush has strongly opposed--he stated in an interview with Business Week that `If a car maker doesn't build more efficient cars, it can't survive.'

Mr. Bush should know that taking action to protect the environment will also help our economy. Indeed, the reports of his own experts say just that. A recent report by the EPA, for example, concludes that effective policies to stem carbon dioxide emissions will increase economic growth.

The National Academy of Sciences, the Office of Technology Assessment, and other private analyses all point to the same conclusion: job creation; increased efficiency; enhanced productivity and competitiveness will come with progress in confronting global climate change .

The environmental and economic imperatives are therefore clear. It's time for us to move ahead.

While the climate change convention--at Mr. Bush's insistence--is a nonbinding and very weak document, it does lay an important foundation on which we can build.

We need to move quickly to ratify the convention and then to begin discussions with the conference of the parties to develop a protocol to the convention that would contain effective and binding commitments to action. We also should act quickly to develop a national dialogue on climate change and specifically, provide a forum for citizens groups, scientists, and industry to help craft and comment on our action strategy to stem greenhouse gas emissions.

The challenges that the threat of climate change poses are not too great for the world to meet--if there is strong U.S. commitment and leadership. I believe that our Nation can, and must, meet the challenge. Our industry is innovative and resourceful. In the past, as we have committed ourselves to achieving serious goals in solving environmental problems, our industries have risen to the ocassion to meet--and not infrequently exceed--the mark. Our effort--and remarkable success--in phasing our ozone destroying chemicals pursuant to the precise target and timetables laid out in the Montreal Protocol is but one example of this. Let's ratify this convention and work with industry and with concerned citizens to regain the leadership position on the environment--and on the economy--that the United States has always proudly held.

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Mr. SIMPSON. Mr. President, I trust that all of my colleagues will vote in favor of ratification of the U.N. Framework Convention on Climate Change , as I shall. The formal negotiations lasted almost 17 months and were difficult. Notwithstanding the many differences that existed among the parties before the final document was agreed upon, there was unanimous agreement, upon conclusion of the negotiations, as to what the convention meant in terms of the issue that had captured so much of the attention of the media and the public. President Bush deserves a great deal of credit for negotiating a

realistic agreement.

Specifically, as we vote to ratify the convention, we do so with the confidence that all of the participants in the negotiation of the convention and many of the observers of that process understood and agreed that the wording of the convention was carefully chosen so as not to constitute or imply the commitment, binding or otherwise, of any country to a specific level of carbon dioxide or other greenhouse gas emissions at any time.

Instead, the convention provides for a flexible approach by which nations will develop action plans appropriate to the specific circumstances of the country. For example, industrialized nation's plans to limit greenhouse gas emissions may take into account important factors such as economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies, and other individual circumstances. The U.S. national action strategy fully meets our Nation's obligations concerning greenhouse gas emissions.

Some of the participants were pleased with the conventions's approach to commitments to limit emissions, and others were not. But, the important point for the Senate, Mr. President, is that, regardless of their policy preferences, they had a common understanding of what the convention did and did not prescribe. I would like the record to reflect some examples of this unanimous understanding, which was contemporaneous with the final negotiation of the convention text and the agreement to its provisions by the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change [INC] the international negotiating body that had been established by resolution of the U.N. General Assembly.

Mr. Jean Ripert, chairman of the INC, spoke with reporters concerning his proposed text of commitments by the industrialized countries to limit greenhouse gas emissions, which text subsequently was agreed upon by all the participating nations. The May 4, 1992 issue of the Bureau of National Affairs' Environment Reporter reported: `Explaining why his draft did not contain targets and timetables, Ripert said `No government is in the position to guarantee levels of emissions.'

On May 8, 1992, once the parties had agreed to the provisions concerning commitments regarding limitations on greenhouse gas emissions by the industrialized countries, as set

forth in article 4, paragraph 2 of the convention, Clayton Yeutter, who then was Counselor to the President for Domestic Policy and who was coordinating the administration's negotiating policies and position, wrote to Chairman **John Dingell** of the House Committee on Energy and Commerce.

With reference to convention article 4, paragraph 2(a), which refers to `recognizing that the return by the end of the present decade to earlier levels of anthropogenic emissions * * * would contribute to * * * modification' of long-term emissions trends, Mr. Yeutter's letter stated: `But there is nothing in any of the language which constitutes a commitment to a specific level of emissions at any time.' With reference to convention article 4, paragraph 2(b), which refers to reports of nations about their policies and measures, `with the aim of returning' greenhouse gas emissions to their 1990 levels, Mr. Yeutter stated: `The word `aim' was carefully chosen, and it does not constitute a commitment, binding or otherwise. Nor does this sentence prescribe or imply any kind of timetable.'

The Department of State has furnished the Committee on Foreign Relations with a comprehensive document, entitled `Environmental Documentation: United Nations Framework Convention on Climate Change ,' dated September 1992. Among other things, that document was intended to `provide a description of the obligations parties will undertake on ratifying the Convention and upon its entry into force.' Included in its description of the goals sought to be achieved by the convention is `specifically avoiding the imposition of uniform, rigidly specified requirements--in favor of a more flexible approach

enabling countries to develop strategies that best meet their individual situations, needs and capabilities.'

The many environmental groups who had been active in the negotiations from the beginning also understood this. Their joint, formal policy statement, delivered to the plenary session of the INC on May 4, state: `And yet in front of you is a text which not only does not commit the developed countries to reducing carbon dioxide emissions, it does not even guarantee stabilization * * *'.

There are many other illustrations that the governments which negotiated the Climate Change Convention, as well as the environmental and business organizations participating in those negotiations, were in total agreement, at the time the convention was agreed upon, as to what its provisions were intended to mean. I have set these matters forth, as part of the record of Senate ratification, so that, as we vote, we, too, have a clear understanding of the meaning and intent of these important provisions of the convention.

I want to add that I am pleased the United States stood up to certain interest groups and foreign governments and did not go along with pressure to turn political rhetoric into legally binding commitments.

My point, Mr. President, is that accusing the United States of having frustrated a more far-reaching convention, as some nations advocated, presupposes that it makes more sense to listen to rhetoric than to look at real plans. As demonstrated by the U.S. national action strategy, our country has a real plan, not an illusory one, to deal with the issue of potential global climate change .

I am glad we saw through the posturing of others and that we effectively resisted them. My hope is that we will continue to do so in the interest of the American people.

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Mr. CRAIG. Mr. President, I will be voting in favor of Senate ratification of the U.N. Framework Convention on Climate Change .

At the same time, I strongly disagree with those who argue that the convention did not go far enough and that the United States should have agreed to legally binding targets and timetables for limitations on U.S. emissions of carbon dioxide and other greenhouse gases. Those who make such criticisms, in my opinion, fail to reckon with facts concerning the issue of potential global climate change .

Interestingly, one of the most important of those facts has been acknowledged by the junior Senator from Tennessee, our colleague **Al Gore.** On April 7, 1992, during Senate debate on comprehensive energy legislation, as reported in the **Congressional Record** at page S4890, the Senator stated:

If the United States not only stabilizes emissions but reduces greenhouse gas emissions by 50 percent, and if every other industrial country also reduces greenhouse emission by 50 percent, and the developing countries continue on their current path, then worldwide greenhouse gas emissions will, by the year 2030, increase by 250 percent.

Senator **Gore's** observation was confirmed by the Department of State's Environmental Documentation, which it submitted to the Committee on Foreign Relations. Commenting on the thinking of the nations that negotiated the Climate Change Convention, it noted:

[T]here was awareness that the `savings' achieved by the industrialized countries--the only countries to

which binding limits would apply--could be eclipsed by increased emissions of developing countries.

The industrialized countries now account for around half of global greenhouse gas emissions. However, the relative contribution of different countries is shifting. Emissions from the developing countries are increasing rapidly, as their populations grow and they seek improved standards of living through economic development. Once the countries of the former U.S.S.R. and of Eastern Europe make the transition to market economies, their economies will grow, rather than shrink, as has been the case during the last few years. That means more emissions from those nations. As a consequence of the increased greenhouse gas emissions from these other countries, it is estimated that, by 2025, the net carbon dioxide emissions from developing nations and from those with economies in transition will constitute two-thirds of the world total, and, when all greenhouse gases are considered, the emissions from these other nations jumps to as much as three-quarters of the world total.

The correct point made by Senator **Gore** and by the State Department is that the projected growth of developing countries' greenhouse gas emissions will more than offset--indeed, will dwarf--any amount of greenhouse gas emissions that would be avoided by the United States and other industrialized countries if they and we had agreed in the Climate Change Convention, or in the future would agree, to so-called stabilization of such emissions at 1990 levels by the year 2000.

What we have to remember, Mr. President, is that proponents of limiting carbon dioxide emissions of the industrialized countries in 2000 to their 1990 levels simply cannot tell us how much unacceptable, potential global climate change , if any, would be avoided during the next century as a result of such policies. Moreover, even if there were some *de minimis* avoidance of climate change , as a result of what industrialized nations did, there is no credible scientific evidence that it would last more than a very few years at most, because of the huge, ongoing increases in emissions from the developing nations in particular.

We also have to consider the economic cost of such proposals. There are studies by eminent economists that policies necessary to stabilize U.S. carbon dioxide emissions at 1990 levels by the year 2000 could cost American workers hundreds of thousands of their jobs and cost the economy more than $90 billion of gross national product. Whether those predictions are better than those which forecast less drastic consequences ignores the crucial point, which is this: Now is not the time to gamble recklessly with our Nation's economic future, especially when, as on this issue, nobody can tell us how we or the world would benefit from that gamble.

Unless and until we have persuasive evidence that binding emissions targets and timetables for the United States and other industrialized countries will actually avert any material amount of global climate change , there is no justification for our taxpayers and consumers to be asked to endure the economic burdens.

The Climate Change Convention, as written, goes quite far enough from the standpoint of U.S. obligations. We should only ratify it and talk about increasing the burdens on our citizens, if ever, when we have sound scientific reasons for doing so.

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Mr. BIDEN. Mr. President, I have supported efforts to put global warming on the U.S. agenda and to create national and international strategies for lessening the threat posed by accumulating greenhouse gases. So it is with mixed emotions that I support ratification of the U.N. Framework Treaty on Climate Change that is only a faint call to global action.

I am encouraged by the participation of nearly every country in the world in the arduous task of negotiating the global responsibilities of nations. The countries of the world, the United State included, have recognized the magnitude of the dangers of the current emissions trends. One of the positive elements of the treaty is a call for a coordinated global research effort to further document the climate changes that are underway and understand their effect on our global environment.

However, I am disappointed in the short-sightedness of the agreement. The convention creates no targets or timetables to stem the documented increases in carbon dioxide, methane, chlorine and other greenhouse gases. Due to the administration's efforts, the treaty mandates only good intentions.

The climate convention declares a goal of restoring emissions of greenhouse gases to 1990 levels by the year 2000. But, participating countries are not bound by this goal. Section 4 of the document, which contains the binding elements of the agreement, commits the countries to inventory their emissions and issue progress reports on reduction efforts to a conference of the parties. This is much closer to the pledge and review approach, which was widely criticized for its inadequacy to the task at hand, than it is to a global response to this threat.

The Rio treaty was intended to couple worldwide recognition with an international commitment to reduce the threat of global warming. An obligation merely to assess emissions and report on efforts to reduce them does not create the depth of commitment many of us had envisioned. In an effort to block any commitment by the United States, the administration's negotiators deprived everyone of assurance of mutual commitments.

In 1988, President Bush used the White House effect to battle the greenhouse effect. But, in my quarters, the United States' role in the treaty negotiations has been assessed as a failure. In one respect, though, the final treaty is a testament to United States' influence and leadership, to the `White House effect.'

At the outset, the United States stood almost alone in opposing targets and timetables, but the administration triumphed over the wishes of more than 150 countries to have its way. The White House effect was shown to be a truly powerful influence in international environmental affairs, although in exactly the opposite manner that the President had promised. The true judges of the success or failure of these efforts will be future generations who will live with the administration's results.

We need to take steps now to avoid the worst effects of global climate change . Contrary to the administration's predictions, these steps do not involve drastic lifestyle changes or economic ruin. We can admit the dangers of our current wasteful ways and we can take steps to change them.

The framework convention is not what we need or what we hope for to address emissions of greenhouse gases. But it is a foundation we can build upon in the years ahead. Although some may be tempted to eject this treaty for falling far short of its goal, truly we will be better off with the convention than without it, providing that we do build upon it and not allow it to languish. That will be one of our challenges for the years ahead.

Mr. FORD. Mr. President, I ask for consideration of the resolution before the Senate by a division vote.

The ACTING PRESIDENT pro tempore. A division vote is requested.

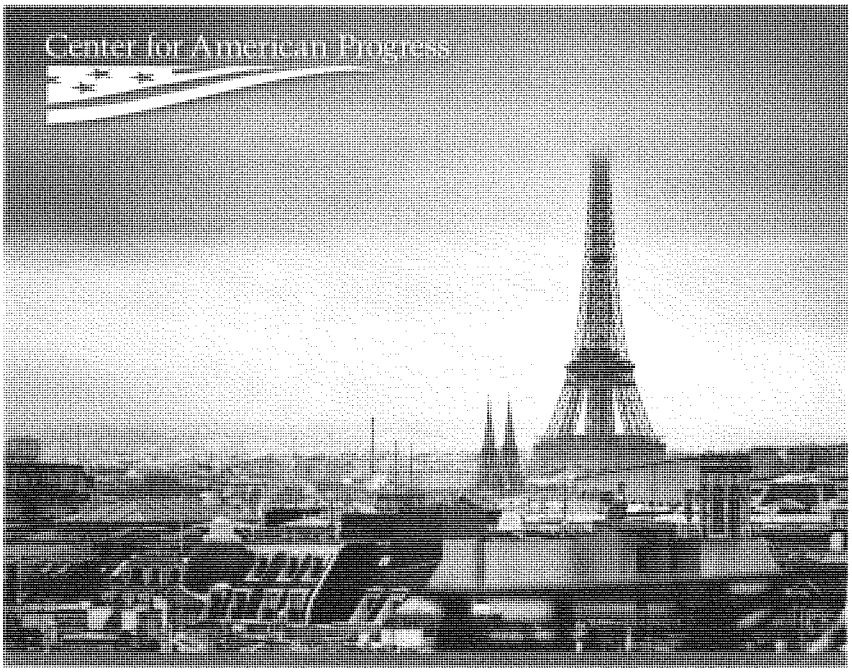
All of those in favor of the resolution of ratification will please stand and be counted.

Those opposed please stand and be counted.

On a division, two-thirds of the Senators present and voting having voted in the affirmative, the resolution of ratification is agreed to, as follows:

Resolved (two-thirds of the Senators present concurring therein), That the Senate advise and consent to the ratification of the United Nations Framework Convention on Climate Change , adopted May 9, 1992, by the Resumed Fifth Session of the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change (`Convention'), and signed on behalf of the United States at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro on June 12, 1992.

Mr. FORD. I ask unanimous consent that the motion to reconsider the vote be tabled, that the President be notified of the Senate's action, and that the Senate return to legislative session.



The Authority for U.S. Participation in the Paris Climate Agreement

By Gwynne Taraska and Ben Bovarnick July 2015

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Introduction and summary

In December 2015, the parties to the U.N. Framework Convention on Climate Change, or UNFCCC, will meet in Paris to strike a new international agreement that aims to limit climate change. A central aspect of the agreement will be a set of national goals—from both developed and developing countries—to reduce greenhouse gas emissions. Many major emitters, including the United States, China, the European Union, and Mexico, have already announced their intended goals.[1] The United States, for example, aims to reduce emissions 26 percent to 28 percent below 2005 levels by 2025.[2]

There has been considerable discussion, however, about whether the United States will be able to become a party to the agreement, given the conspicuous opposition of some members of the U.S. Senate to addressing climate change. This report aims to shed light on this discussion by explaining the types of international agreements in the United States and the possible nature of the forthcoming climate agreement.

In the United States, there are two categories of agreements that are binding under international law: treaties, which require the formal consent of a two-thirds majority of the Senate, and executive agreements, which the president can be authorized to conclude on a variety of grounds. These grounds may include the consent of the Senate to a prior treaty to which the agreement is pursuant, the enactment by Congress of a statute to which the agreement is pursuant, or the president's independent constitutional authorities.

Despite popular understanding, executive agreements are a well-established means of entering international agreements and account for the overwhelming majority—94 percent—of international agreements in the United States in the modern era.[3] They are also on par with treaties in force and weight under international law, as both can create international legal obligations for the United States.[4] The Appendix to this report—which presents a memorandum from the Congressional Research Service on the 182 multilateral executive agreements

entered by the United States from 1985 through 2014—illustrates that executive agreements have been used in almost all areas of international law, in matters of both great and minor significance, and throughout both Republican and Democratic administrations and congresses.

The general topic of the Paris agreement and its level of importance, therefore, do not predetermine that it will qualify as a treaty rather than an executive agreement. Instead, the content and context of the agreement must be considered. To this point, U.S. Special Envoy for Climate Change Todd Stern has said:

> *We will submit to Congress any kind of agreement that requires that kind of submission. Some agreements do and some agreements don't. So it's going to depend entirely on how this agreement is written, how it's framed, what is or isn't legally binding, and so forth.*[5]

The Paris agreement is still under negotiation. It is becoming increasingly clear, however, that the final agreement could lack the features—such as legally binding national emissions reduction targets or legally binding national targets for providing financial assistance—that would suggest the need for formal congressional consent.[6] It is therefore possible that the Paris agreement will qualify as an executive agreement. If so, U.S. participation would be based on the authority granted by the Senate when it approved the original UNFCCC treaty in 1992, as well as the president's constitutional foreign affairs power. The fact that the agreement would be consistent with existing U.S. laws, such as the Clean Air Act, and could be implemented without new legislation would supplement these authorities.[7]

Meanings of 'treaty'

In general conversation and outside the United States, "treaty" is often used to refer to any written international agreement that is governed by international law.[8] In a narrower, U.S.-specific sense, it refers to an international agreement—governed by international law—that is approved pursuant to Article II of the Constitution, requiring the consent of at least two-thirds of the Senate.[9] This report uses "treaty" in the U.S.-specific sense. Binding international agreements in the United States that are not treaties are called "executive agreements." President George Washington concluded the first executive agreements during his tenure, and U.S. courts have upheld their constitutionality.[10]

Background on the UNFCCC and the Paris agreement

In 1992, the George H.W. Bush administration submitted the U.N. Framework Convention on Climate Change to the Senate for its consent to U.S. ratification. It was approved and entered into force in 1994.[11] Since then, the parties to the treaty have aimed to stabilize greenhouse gas levels in order to avoid dangerous climate change and have aimed to build global resilience to the climate change that is now unavoidable.

In 2011, the parties began the process of developing a new international climate agreement to be adopted in December of this year in Paris and to take effect no later than 2020.[12] The agreement is intended to be more effective than previous efforts of the parties, including both the Kyoto Protocol of 1997 and the Copenhagen Accord of 2009. The Kyoto Protocol, a legally binding agreement with national targets that were internationally negotiated, required emissions reductions from only developed countries and lacked—or lost—the participation of several major economies, including the United States, which never sought to ratify it. As a consequence, the Kyoto Protocol now covers only a fraction of global emissions. The Copenhagen Accord, a political agreement with nationally determined goals, had insufficient collective ambition to rein in global warming.[13]

In contrast to the Kyoto Protocol, the Paris agreement will require action from both developed and developing countries, will have nationally determined goals to mitigate greenhouse gas emissions, and is expected to elicit broad participation. In contrast to the Copenhagen Accord, the agreement is to have force under international law and is expected to elicit more adequate mitigation efforts, especially over successive 5- or 10-year cycles that give countries the opportunity to improve their national goals.[14] It is possible that the Paris agreement will become the first climate agreement that successfully limits carbon pollution.

The fact that the Paris agreement will be governed by international law does not imply that the associated national goals—called "nationally determined contributions"—also will be legally binding. It is possible for the core agreement to be binding while the associated national goals remain political commitments. The parties to the UNFCCC continue to negotiate the legal status of the nationally determined contributions. Although the European Union has proposed legally binding national mitigation targets, other parties may be coalescing around an agreement in which there are binding procedural obligations—such as obligations to submit national goals and to report on progress—but in which the national goals have political, not legal force.[15]

Categories of international agreements in the United States

Treaties, executive agreements, and the authorities that underlie them

In the United States, there are two categories of bilateral or multilateral agreements that are internationally binding: treaties and executive agreements. The president submits treaties to the Senate, where they require approval by a two-thirds majority, as outlined in Article II of the U.S. Constitution.[16]

Executive agreements, which carry the legal force and weight of treaties under international law, have a variety of authorities that can underlie them:

- The president can conclude an executive agreement that is pursuant to a prior treaty. Such agreements are sometimes referred to as "treaty-executive agreements." Executive agreements made pursuant to treaty obligations are well entrenched in U.S. practice and law. In *Wilson v. Girard*, for example, the U.S. Supreme Court determined that the Senate's approval of a treaty provided authorization for a subsequent agreement.[17]

- The president can conclude an executive agreement using authority delegated by Congress through the previous enactment of a statute that approved such an agreement.[18] Executive agreements that are sanctioned by prior statutes are referred to as "ex ante congressional-executive agreements."

- The president can negotiate an agreement and subsequently submit it to both the Senate and House for approval through the adoption of a statute.[19] This is in contrast to treaties, which are submitted only to the Senate for approval by a supermajority. Such agreements are referred to as "ex post congressional-executive agreements."

- The president can conclude an executive agreement based on the president's inherent foreign affairs power or other independent constitutional authorities. These include, for example, the president's authority as commander in chief and

the authority to "take care that the laws be faithfully executed."[20] Agreements authorized only in this way are sometimes called "sole executive agreements." Sole executive agreements may be strengthened if they are consistent with U.S. law and can be implemented without new legislation.[21]

This categorization is not meant to imply that the possible authorities to enter an agreement are always mutually exclusive. It is possible, for example, for a prior treaty, a statute, and the president's foreign affairs power to simultaneously provide authorization.

Although most forms of international agreement involve a measure of congressional approval, only treaties and ex post congressional-executive agreements involve formal congressional approval after the agreement has been negotiated.

Self-executing and non-self-executing agreements

The authority to enter an agreement and create an international legal obligation for the United States does not necessarily imply the authority to implement the agreement—that is, the means to meet and enforce the agreement under domestic law.

Some international agreements—both treaties and executive agreements—are "self-executing," which means that U.S. courts can directly enforce them.[22] Most treaties and executive agreements, however, are not self-executing; instead, they rely on what is known as "implementing legislation" for domestic legal effect.[23] Under international law, an agreement carries the responsibility to create the domestic means of implementation if they do not already exist.[24]

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Prevalence of executive agreements

Executive agreements are not only common but also account for an overwhelming majority of international agreements. From 1939 to 2013, the United States entered approximately 94 percent of its international agreements as executive agreements and only 6 percent as treaties: There were 17,300 executive agreements, compared with 1,100 treaties.[25] From 1980 to 2000, there were more than 3,000 executive agreements and only 375 treaties.[26] An empirical study of executive agreements finds that approximately 80 percent of executive agreements between 1990 and 2000 were congressional-executive agreements. The majority of these were ex ante, that is, they were concluded according to the authority previously delegated by Congress in a statute.

Executive agreements also account for the majority of multilateral agreements, although multilateral agreements are more likely than bilateral agreements to be treaties.[27] The Appendix to this report—which presents a memorandum from the Congressional Research Service to Rep. Earl Blumenauer (D-OR)—shows 182 recorded multilateral executive agreements entered from 1985 through 2014 on subjects including atomic energy, aviation, environment, pollution, defense, forestry, migration, and arms limitation, among others.

The United States entered approximately 94 percent of its legally binding international agreements as executive agreements and only 6 percent as treaties from 1939 to 2013.

Considerations in choosing a path

In some cases, it may be relatively clear how the executive branch should pursue a potential international agreement. The agreement may, for example, fall under legislation that authorizes it, such as the 1954 Atomic Energy Act, which has sanctioned executive agreements on nuclear research, safety, and waste management.[28] Alternatively, the agreement may fall within the purview of a prior treaty, such as the Convention on International Civil Aviation, which has sanctioned several executive agreements on air safety and transport.[29]

In other cases, it may be less clear whether an emerging international agreement will be an executive agreement or a treaty. Despite popular understanding, importance does not necessitate that an agreement be a treaty rather than an executive agreement. Many truly significant international agreements are executive agreements: examples include the General Agreement on Tariffs and Trade; the North American Free Trade Agreement; the World Trade Organization; the Bretton Woods Agreement; the Algiers Accords; the Paris Peace Accords; the Yalta Agreement; and the Convention on Long-range Transboundary Air Pollution, or LRTAP, among many others.[30] Several notable executive agreements are highlighted throughout this section.

Convention on Long-range Transboundary Air Pollution and subsequent agreements

LRTAP, signed in 1979 during the Carter administration, "was the first international legally binding instrument to deal with problems of air pollution on a broad regional basis."[31] The United States entered LRTAP—and several subsequent protocols signed during the Reagan and Clinton administrations—as executive agreements.[32] The agreements committed the United States to help finance monitoring and evaluation of pollutants; control emissions of nitrogen oxides; control heavy metals pollution; and support abatement of acidification, eutrophication, and ground-level ozone. U.S. acceptance of these protocols did not require new legislation or modification of U.S. laws.[33]

Neither does subject matter necessitate that an agreement be a treaty rather than an executive agreement. The United States has entered executive agreements in almost all areas of international law.[34] There are, however, some patterns in practice, although these patterns may be rooted more in tradition than reason.[35] From 1980 to 2000, for example, agreements on human rights and extradition were pursued only as treaties, whereas agreements on defense, atomic energy, and economic cooperation tended to be pursued as executive agreements.[36]

Environmental agreements during this time typically were pursued as either treaties or agreements pursuant to treaties: There were 8 treaties and more than 30 executive agreements, many of which were treaty-executive agreements, over the 1980–2000 span.[37] There are, however, several important examples of executive agreements on environmental topics that were not pursuant to prior treaties, including LRTAP and its protocols and the North American Agreement on Environmental Cooperation.[38] The Minamata Convention on Mercury is another recent case.

Minamata Convention on Mercury

In 2013, the United States became the first country to join the Minamata Convention on Mercury, a multilateral agreement to combat mercury pollution.[39] Regulation of mercury under the convention requires control of mercury emissions through "best available techniques (BAT) and best environmental practices (BEP)," while preserving flexibility of individual countries to comply with the agreement through "nationally appropriate mechanisms."[40] The convention has 128 signatories and has been ratified by 12 countries to date.[41] The United States concluded the convention as an executive agreement. The State Department noted that it could be implemented "under existing legislative and regulatory authority."[42]

It is noteworthy that an empirical study of international agreements finds that the data do not support the theory that presidents are likely to use executive agreements to circumvent an antagonistic Senate.[43] The Appendix to this report, which sorts multilateral agreements by president and the majority party in the House and Senate, confirms that executive agreements are common regardless of the configurations of the parties in the executive and legislative branches.

Convention on International Civil Aviation and subsequent agreements

The Convention on International Civil Aviation established international rules for air travel and the International Civil Aviation Organization, or ICAO, which is the agency tasked with regulating international air travel.[44] The United States entered the convention as a treaty in 1946. Since then, the United States has participated in several executive agreements pursuant to its treaty obligations, such as an agreement to ban smoking on international flights, signed under President Bill Clinton, and an agreement on the liberalization of international air transportation, signed under President George W. Bush.[45]

Space treaties and subsequent agreements

The 1998 Agreement Concerning Cooperation on the Civil International Space Station, or ISS, set forth commitments by the United States and partner countries to design, develop, and operate the ISS. The 1988 International Cospas-Sarsat Programme Agreement established cooperation on a satellite-based distress alert system to aid search and rescue operations.[46] The United States entered both agreements as executive agreements pursuant to four prior treaties concerning international activity in outer space.[47] The agreements did not require new implementing legislation.

The case of Paris

Some have argued that acts such as the Clean Air Act, the National Environmental Policy Act, and the Clean Water Act give the president sufficient authority to conclude an agreement with legally binding national emissions reduction targets as an ex ante congressional-executive agreement.[48] This position, however, is controversial. An agreement with national emissions reduction targets that are binding under international law would suggest the need for formal congressional consent after the agreement has been negotiated, as would an agreement with national targets for providing climate finance that are binding under international law.[49]

As the contours of the Paris agreement come into focus, however, it is becoming clear that the agreement may not include national emissions reduction targets or finance targets that have legal force. Instead, the agreement may include legally binding procedural obligations—such as obligations for the parties to submit national emissions reduction goals and to report on progress—but the national goals themselves may be only politically binding.

Such an agreement would qualify as an executive agreement, and the United States could become a party to it on several grounds. First, the U.N. Framework Convention on Climate Change, approved by the Senate in 1992, would lend authorization as a parent treaty. Framework conventions as a class are understood to produce more specific agreements that advance their missions over time.[50] The Paris agreement would advance the purpose of the UNFCCC, the primary goal of which is to stabilize greenhouse gas levels in order to avoid dangerous climate change.[51] Further, the United States already pledged to make emissions mitigation efforts and to report on progress when it ratified the UNFCCC.[52]

Again, the president's authority to enter agreements that are within the purview of a preceding treaty is established. According to political scholars Glen Krutz and Jeffrey Peake, "Executive agreements pursuant to U.S. treaty obligations are rarely controversial and are generally considered well within the domain of the executive

as chief diplomat."[53] It is worth noting that the Senate, during the hearing on the original treaty, expressed its preference only that further agreements with legally binding national targets should come back before it for formal consent.[54]

The president's constitutional foreign affairs power would also lend authorization for U.S. participation in the Paris agreement and would be strengthened by statutory support: The agreement would be consistent with current U.S. laws, and implementing legislation would not need to be created.[55] Instead, the agreement would be domestically grounded through the same statutes that implemented—and continue to implement—the original UNFCCC treaty. These include the Clean Air Act, which requires the regulation of air pollution—including greenhouse gas emissions—and the Energy Policy Act, which directs the Energy Information Administration to inventory emissions and provides implementation power for monitoring and reporting requirements.[56] The Paris agreement would therefore be akin to LRTAP and the Minamata Convention, insofar as becoming a party to the agreement would not require any change to existing U.S. law.[57]

Conclusion

As the Paris climate meeting approaches, a narrative has emerged that the executive branch will seek to circumvent the Senate by pursuing the agreement as an executive agreement rather than as a fully legitimate treaty. This narrative is misguided in multiple ways and may be dispelled by an examination of the role of executive agreements in U.S. diplomacy and the content and context of the Paris agreement.

Executive agreements are well established in U.S. law and practice. They are ubiquitous in both Republican and Democratic administrations; they have been used in matters of great significance, as evidenced by agreements such as the Paris Peace Accords, which ended U.S. combat in Vietnam; and they can be found on nearly all topics of international cooperation, including the environment and air pollution. The Convention on Long-range Transboundary Air Pollution and its protocols, approved during both Republican and Democratic administrations, is a vivid example.

Although the Paris climate agreement is still under negotiation, it is becoming clear that it could ultimately lack any features that would suggest the need for formal congressional approval. An agreement with legally binding national emissions reduction goals or legally binding national finance commitments would likely be appropriate as a treaty. But an agreement in which the national goals themselves lack legal force—although there may be binding procedural obligations to submit and update those goals—would qualify as an executive agreement. Such an agreement would advance the original U.N. Framework Convention on Climate Change treaty, which itself obliged the United States to mitigate emissions and report on progress, and would not require any change to U.S. law for implementation. Formal congressional approval of such an agreement would be unnecessary and uncharacteristic given U.S. practice.

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Endnotes

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3 Michael John Garcia, "International Law and Agreements: Their Effect upon U.S. Law" (Washington: Congressional Research Service, 2014), available at https://fas.org/sgp/crs/misc/RL32528.pdf. See the section of our report titled "Prevalence of executive agreements" for more information.

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7 Bodansky presents the idea of presidential executive agreements augmented with statutory support in ibid.

8 See, for example, United Nations, "Vienna Convention on the Law of Treaties."

9 "[The president] shall have power, by and with the advice and consent of the Senate, to make treaties, provided two thirds of the Senators present concur." See U.S. Constitution, Article II, Section 2.

10 Nigel Purvis, "The Case for Climate Protection Authority," *Virginia Journal of International Law* 49 (4) (2009): 1007–1062.

11 See, for example, Emily C. Barbour, "International Agreements on Climate Change: Selected Legal Questions" (Washington: Congressional Research Service, 2010), available at http://fpc.state.gov/documents/organization/142749.pdf.

12 U.N. Framework Convention on Climate Change, "Decision 1/CP.17: Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action" (2012), available at http://www.unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

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14 Gwynne Taraska, "The Paradox of Paris: How a Successful Climate Agreement Could Have Inadequate and Nonobligatory Emissions Reduction Targets," Center for American Progress, June 6, 2015, available at https://www.americanprogress.org/issues/green/news/2015/06/03/114333/the-paradox-of-paris-how-a-successful-climate-agreement-could-have-inadequate-and-nonobligatory-emissions-reduction-targets/.

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18 See *Dames & Moore v. Regan*, 453 U.S. 654 (1981).

19 Oona A. Hathaway, "Presidential Power over International Law: Restoring the Balance," *The Yale Law Journal* 119 (2) (2009): 140–268, available at http://www.yalelawjournal.org/article/presidential-power-over-international-law-restoring-the-balance; Purvis, "The Case for Climate Protection Authority."

20 U.S. Constitution, Article II, Sections 2 and 3. See also Hannah Chang, "International Executive Agreements on Climate Change," *Columbia Journal of Environmental Law* 35 (2) (2010): 337–372; Louis Henkin, *Foreign Affairs and the United States Constitution, Second edition* (New York: Oxford University Press, 1996). *American Insurance Association v. Garamendi* recognizes the power of the president to conclude internationally binding agreements as executive agreements, without formal congressional approval. See *American Insurance Association v. Garamendi*, 539 U.S. 396 (2003).

21 For the idea of sole executive agreements with statutory support, see Bodansky, "Legal Options for U.S. Acceptance of a New Climate Change Agreement."

22 See, for example, Chang, "International Executive Agreements on Climate Change."

23 See, for example, Garcia, "International Law and Agreements."

24 See, for example, Oona A. Hathaway, "Treaties' End: The Past, Present, and Future of International Lawmaking in the United States," *The Yale Law Journal* 117 (7) (2008): 1236–1372, available at http://www.yalelawjournal.org/article/treaties-end-the-past-present-and-future-of-international-lawmaking-in-the-united-states.

25 Garcia, "International Law and Agreements."

26 Hathaway, "Presidential Power over International Law."

27 Six percent of executive agreements were multilateral between 1980 and 2000; 35 percent of treaties were multilateral over the same timespan. See Hathaway, "Treaties' End."

28 Ibid.

29 Ibid.

30 See, for example, Purvis, "The Case for Climate Protection Authority."

31 U.N. Economic Commission for Europe, "The Convention – The 1979 Geneva Convention on Longe-range Transboundary Air Pollution," available at http://www.unece.org/env/lrtap/lrtap_h1.html (last accessed June 2015).

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33 U.S. Department of State, *Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-Level Ozone* (1999), available at http://www.state.gov/documents/organization/125299.pdf.

34 Hathaway, "Treaties' End." A typical view, in fact, is that treaties and congressional-executive agreements are interchangeable. In *Foreign Affairs and the United States Constitution*, Louis Henkin makes the often-quoted claim that "it is now widely accepted that the Congressional-Executive agreement is available for wide use, even general use, and is a complete alternative to a treaty." Henkin, *Foreign Affairs and the United States Constitution*. This may be an overstatement, as the U.S. Supreme Court, in *Missouri v. Holland*, said that treaty-making power could address issues beyond the powers of Congress as outlined in Article I of the Constitution. *Missouri v. Holland*, 252 U.S. 416 (1920).

35 Hathaway, "Treaties' End."

36 Ibid.

37 Ibid.

38 The North American Agreement on Environmental Cooperation was negotiated alongside the North American Free Trade Agreement. See Hathaway, "Treaties' End."

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40 Tseming Yang, "The Minamata Convention on Mercury and the Future of Multilateral Environmental Agreements," *Environmental Law Reporter* 45 (1) (2015): 10064–10073.

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43 Glen S. Krutz and Jeffrey S. Peake, *Treaty Politics and the Rise of Executive Agreements: International Commitments in a System of Shared Powers* (Ann Arbor, MI: University of Michigan Press, 2011).

44 International Civil Aviation Organization, "Convention on International Civil Aviation" (1944), available at http://www.icao.int/publications/Documents/7300_orig.pdf.

45 Chang, "International Executive Agreements on Climate Change"; Foreign Affairs, Trade and Development Canada, "Agreement to Ban Smoking on International Passenger Flights," available at http://www.treaty-accord.gc.ca/text-texte.aspx?id=102789 (last accessed July 2015); International Civil Aviation Organization, "Aeronautical Agreement - ICAO Registration Number 4778," available at http://cfapp.icao.int/dagmar/agr_details.cfm?UserLang=&icaoregno=4778%2E0 (last accessed July 2015).

46 Parties to the International Cospas-Sarsat Programme Agreement, "The International Cospas-Sarsat Programme Agreement" (1988), available at https://www.uscg.mil/hq/cg5/cg534/EmergencyBeacons/Internationa_C-S._Agreement1988.pdf.

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48 See, for example, David R. Baake, "International Climate Action without Congress: Does §115 of the Clean Air Act Provide Sufficient Authority?", *Environmental Law Reporter* 44 (7) (2014): 10562–10573. See also Kevin Bundy and others, "*Yes, He Can*: President Obama's Power to Make an International Climate Commitment Without Waiting for Congress." Working Paper 2 (Center for Biological Diversity Climate Law Institute, 2009), available at http://www.biologicaldiversity.org/programs/climate_law_institute/pdfs/Yes_He_Can_120809.pdf.

49 Bodansky, "Legal Options for U.S. Acceptance of a New Climate Change Agreement."

50 See, for example, Barbour, "International Agreements on Climate Change"; United Nations, "U.N. Framework Convention on Climate Change" (1992), available at http://unfccc.int/files/essential_background/convention/background/application/pdf/convention_text_with_annexes_english_for_posting.pdf.

51 The Congressional Research Service's report for the Senate Committee on Foreign Relations says that "executive agreements pursuant to treaties are supposed to be within the purview of the treaty, that is, carry out the purposes of the treaty." See Congressional Research Service, "Treaties and Other International Agreements."

52 At the hearing on the UNFCCC before the Senate Committee on Foreign Relations in 1992, the Bush administration was asked about U.S. obligations under the treaty. Its response was, "There will be commitments with respect to greenhouse gas emissions, reporting, cooperation in science and education, provision of financial resources, technology cooperation, and participation in the convention's various institutions." See Senate Committee on Foreign Relations, *U.N. Framework Convention on Climate Change: Hearing on Treaty doc. 102-38*, S. Hrg. 970, 102 Cong. 2 sess. (Government Printing Office, 1992), available at http://babel.hathitrust.org/cgi/pt?id=pst.000021075452.

53 Krutz and Peake, *Treaty Politics and the Rise of Executive Agreements*.

54 "… A decision by the executive branch to reinterpret the Convention to apply legally binding targets and timetables for reducing emissions of greenhouse gases to the United States would alter the "shared understanding" of the Convention between the Senate and the executive branch and would therefore require the Senate's advice and consent." See Senate Committee on Foreign Relations, "United Nations Framework Convention on Climate Change: report to accompany Treaty doc. 102-38" (Government Printing Office, 1992). Quoted in Congressional Research Service, "Treaties and Other International Agreements."

55 Again, for the idea of sole executive agreements with statutory support, see Bodansky, "Legal Options for U.S. Acceptance of a New Climate Change Agreement."

56 For the means of implementation for the UNFCCC treaty, see Barbour, "International Agreements on Climate Change"; Chang, "International Executive Agreements on Climate Change." See also Senate Committee on Foreign Relations, *U.N. Framework Convention on Climate Change: Hearing on Treaty doc. 102-38*. The UNFCCC treaty provides authorization to enter a new agreement that is pursuant to it, but—as it is not self-executing—it would not itself provide domestic implementation power for an agreement in its purview.

57 It is worth noting that existing U.S. statutes—such as the International Development and Food Assistance Acts of 1975 and 1977 and the Foreign Assistance Act of 1961, which are statutes that authorize ex ante congressional-executive agreements—would supply additional support for any obligations to assist vulnerable countries in their development efforts or efforts to manage and protect natural resources. For a selected list of acts that authorize ex ante congressional-executive agreements, see Hathaway, "Presidential Power over International Law."

Appendix: Multilateral agreements—other than treaties—the United States entered from 1985 to 2014

The following information was originally compiled by the Congressional Research Service, or CRS, in a memorandum to Rep. Earl Blumenauer (D-OR). It has not been edited for substance but has been reorganized chronologically by presidential administration and the concurrent congressional sessions.[1]

The CRS memorandum draws from the annual *Treaties in Force* reports from the U.S. Department of State—which list all international agreements to which the United States is a party—and excludes agreements that were sent to the Senate for formal consent. It therefore captures international agreements that are considered executive agreements.

President Ronald Reagan: 14 multilateral executive agreements from 1985 to 1989

1985 to 1987: Democratic House majority, Republican Senate majority

- Convention establishing the Multilateral Investment Guarantee Agency (MIGA) with annexes and schedules.
  Done at Seoul October 11, 1985. Entered into force April 12, 1988.

- Memoranda of understanding concerning salmonid research and enforcement of the international convention for the high seas fisheries of the North Pacific Ocean.
  Signed at Vancouver April 9, 1986. Entered into force April 9, 1986.

- Agreement concerning the international fund for Ireland, with annexes.
  Done at Washington September 26, 1986. Entered into force September 26, 1986.

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1987 to 1989: Democratic House majority, Democratic Senate majority

- Amendment to Constitution of the International Organization for Migration.
  Done May 20, 1987.

- Memorandum of understanding concerning general arrangements for the collaborative development and production of a modular standoff weapon system.
  Signed June 12-July 24, 1987. Entered into force July 24, 1987.

- Inter-American convention on amateur radio service.
  Done at Lima August 14, 1987. Entered into force February 21, 1990; for the United States March 20, 1991.

- Memorandum of understanding concerning a NATO anti-air warfare system (NAAWS), with annex.
  Signed September 11 to October 19, 1987. Entered into force October 19, 1987.

- Memorandum of understanding for the project definition phase of a NATO frigate replacement for the 1990s (NFR 90).
  Signed October 20, 1987, January 23, 1988, and January 25, 1988. Entered into force January 25, 1988.

- Agreement regarding inspections relating to the treaty of December 8, 1987 between the United States and the Union of Soviet Socialist Republics on the elimination of their intermediate-range and shorter-range missiles, with annex.
  Signed at Brussels December 11, 1987. Entered into force June 1, 1988.

- Memorandum of understanding concerning the four power air senior national representative cooperative long term technology projects.
  Signed at Washington and Paris April 11, April 27, and June 28, 1988. Entered into force June 28, 1988.

- Agreement concerning the accession of Belgium, the Netherlands and the United Kingdom to the United States-German memorandum of understanding of March 10 and June 13, 1986 for cooperative software development and implementation for the EIFEL system.
  Signed at Bonn, Brussels, Washington, The Hague, and London January 27, March 8, April 5, June 27, and July 19, 1988. Entered into force July 19, 1988.

- International COSPAS–SARSAT program agreement.
  Done at Paris July 1, 1988. Entered into force August 30, 1988.

- Agreement for the establishment of the International Development Law Organization.
  Signed at Rome February 5, 1988. Entered into force April 28, 1989.

- Protocol to the 1979 Convention on long-range transboundary air pollution concerning the control of emissions of nitrogen oxides or their transboundary fluxes, with annex.
  Done at Sofia October 31, 1988. Entered into force February 14, 1991.

President George H.W. Bush: 28 multilateral executive agreements from 1989 to 1993

1989 to 1991: Democratic House majority, Democratic Senate majority

- Terms of reference of the International Copper Study Group.
  Done at Geneva February 24, 1989. Entered into force January 23, 1992.

- Declaration of Cartagena concerning the production of, trafficking in and demand for illicit drugs.
  Signed at Cartagena February 15, 1990. Entered into force February 15, 1990.

- Agreement regarding protection of information transferred into the United States in connection with the initial phase of a project for the establishment of a uranium enrichment installation in the United States based upon the gas centrifuge process developed within the three European countries.
  Signed at Washington April 11, 1990. Entered into force April 11, 1990.

- Agreement establishing the European Bank for Reconstruction and Development, with annexes.
  Done at Paris May 29, 1990. Entered into force March 28, 1991.

- Amendment to Memorandum of understanding for the cooperative support of the 76/62 OTO Melara Compact Gun (OMCG), with annexes.
  Signed May 30, June 22, August 24 and November 8, 1990.

- Memorandum of understanding concerning cooperation in the fight against illicit trafficking of narcotic drugs through the use of equipment and personnel based at Great Inagua and such other bases as may be established in the Turks and Caicos Islands, with annexes.
  Signed at Washington July 12, 1990. Entered into force July 12, 1990.

- Memorandum of understanding concerning a cooperative program for full integration of a radar in the AV-8B weapon system and the production and life cycle support of a radar equipped AV-8B (AV-8B Harrier II Plus), with annexes.
  Signed at Rome, Washington, and Madrid August 8, August 31, and September 28, 1990. Entered into force September 28, 1990.

- Agreement concerning the convention of October 23, 1954, on the presence of foreign forces in the Federal Republic of Germany.
  Exchange of notes at Bonn September 25, 1990. Entered into force September 25, 1990.

- Agreement regarding the status of foreign forces in the former territory of the German Democratic Republic.
  Exchange of notes at Bonn September 25, 1990. Entered into force October 3, 1990.

- Agreement concerning the convention of May 26, 1952, as amended, on relations between the Three Powers and the Federal Republic of Germany and the convention of May 26, 1952, as amended, on settlement of matters arising out of the war and the occupation.
  Exchange of notes at Bonn September 27 and 28, 1990. Entered into force September 28, 1990.

- Declaration suspending the operation of quadripartite rights and responsibilities.
  Signed at New York October 1, 1990. Entered into force October 3, 1990.

- Memorandum of understanding concerning a cooperative project for the establishment, operation, management and support of the NATO Insensitive Munitions Information Center (NIMIC), with annexes.
  Signed at Brussels October 24, 1990. Entered into force October 24, 1990.

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1991 to 1993: Democratic House majority, Democratic Senate majority

- Memorandum of understanding for exchanges of information regarding third-generation anti-tank guided missiles.
  Signed at Washington, London, Paris, and Bonn January 30, February 13, and March 7, 1991. Entered into force March 7, 1991.

- Memorandum of understanding concerning a cooperative program for full integration of a radar in the AV-8B weapon system and the production, remanufacture and in-service support of a radar equipped AV-8B (AV-8B HARRIER II PLUS), with annexes and supplemental agreement.
  Signed at Rome and Washington February 7 and March 4, 1992. Entered into force November 12, 1992.

- Memorandum of understanding on the avoidance of overlaps and conflicts relating to deep seabed areas, with annexes.
  Signed at New York February 22, 1991. Entered into force February 22, 1991.

- Amendment to Memorandum of understanding for the cooperative support of the 76/62 OTO Melara Compact Gun (OMCG), with annexes.
  Signed June 14, 1991, July 5, 1991, October 9 1991, December 3, 1991, and February 5, 1992.

- Memorandum of understanding on the avoidance of overlaps and conflicts relating to deep sea-bed areas, with annexes.
  Done at New York August 20, 1991. Entered into force August 28, 1991; effective August 20, 1991.

- Program memorandum of understanding concerning general arrangements for the collaborative program on a multifunctional information distribution system, with supplement no. 1.
  Signed at Paris, Madrid, Washington, Rome, and Bonn June 17, 1991, July 4, 1991, August 27, 1991, October 4, 1991, and January 7, 1992. Entered into force October 4, 1991.

- Agreement on cooperation in the engineering design activities for the International Thermonuclear Experimental Reactor.
  Signed at Washington July 21, 1992. Entered into force July 21, 1992.

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- Agreement regarding the establishment, construction and operation of a uranium enrichment installation in the United States, with annex and agreed minute.
  Signed at Washington July 24, 1992. Entered into force February 1, 1995.

- Memorandum of understanding on cooperative research, development and demonstration of internetworking technologies to improve communications systems network interoperability, with annex.
  Signed at Bonn, Washington, London, and Paris October 22, November 7, November 14, and December 16, 1991. Entered into force December 16, 1991.

- Agreement on a comprehensive political settlement of the Cambodia conflict, with annexes.
  Done at Paris October 23, 1991. Entered into force October 23, 1991.

- Agreement concerning the sovereignty, independence, territorial integrity and inviolability, neutrality and national unity of Cambodia.
  Done at Paris October 31, 1991. Entered into force October 31, 1991.

- Amendment to Memorandum of understanding concerning the EURO-NATO Joint Jet Pilot Training (ENJJPT) Program.
  Signed December 6, 1991, January 31, 1992, March 20, 1992, April 9, 1992, May 5, 1992, July 17, 1992, August 14, 1992, September 9, 1992, October 19 1992, November 3, 1992.

- OECD Council decision on the control of transfrontier movements of wastes destined for recovery operations.
  Adopted at Paris March 30, 1992. Entered into force March 30, 1992.

- Agreement establishing the Inter-American Institute for Global Change Research.
  Done at Montevideo May 13, 1992. Entered into force March 12, 1994.

- Agreement on state and local taxation of foreign employees of public international organizations.
  Done at Washington April 21, 1992. Entered into force May 24, 1994.

- North American free trade agreement, with notes and annexes.
  Signed at Washington, Ottawa, and Mexico December 8, 11, 14 and 17, 1992. Entered into force January 1, 1994.

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President Bill Clinton: 62 multilateral executive agreements from 1993 to 2001

1993 to 1995: Democratic House majority, Democratic Senate majority

- Amendments to Memorandum of understanding concerning the EURO-NATO Joint Jet Pilot Training (ENJJPT) Program.
  Signed January 15, 1993, March 16, 1993, and April 15, 1993. November 3, 1993, January 11, 1994, February 4, 1994, February 16, 1994, April 1, 1994, April 28, 1994, May 11, 1994, May 25, 1994, June 6, 1994, June 28, 1994, July 20, 1994, and October 4, 1994.

- Establishment agreement for the Center for International Forestry Research (CIFOR), with constitution.
  Done at Canberra March 5, 1993. Entered into force March 5, 1993; for the United States May 3, 1993.

- Amendments to Agreement to supplement the agreement of June 19, 1951 between the parties to the North Atlantic Treaty regarding the status of their forces with respect to foreign forces stationed in the Federal Republic of Germany, with protocol of signature.
  Signed March 18, 1993; May 16, 1994.

- Administrative agreement to implement article 60 of the agreement of August 3, 1959, as amended, to supplement the agreement between the parties to the North Atlantic Treaty regarding the status of their forces with respect to foreign forces stationed in the Federal Republic of Germany.
  Done at Bonn March 18, 1993. Entered into force March 29, 1998.

- North American agreement on labor cooperation, with annexes.
  Signed at Mexico, Washington and Ottawa September 8, 9, 12 and 14, 1993. Entered into force January 1, 1994.

- North American agreement on environmental cooperation, with annexes.
  Signed at Mexico, Washington and Ottawa September 8, 9, 12 and 14, 1993. Entered into force January 1, 1994.

- Agreement to establish a science and technology center in Ukraine.
  Done at Kiev October 25, 1993. Entered into force July 16, 1994.

- Memorandum of understanding concerning cooperation on an international military satellite for communications (INMILSAT) (Feasibility Study).
  Done at Washington, London, and Paris December 30, 1993, January 6, 1994, and January 28, 1994. Entered into force January 28, 1994.

- International tropical timber agreement, 1994, with annexes.
  Done at Geneva January 26, 1994. Entered into force provisionally, January 1, 1997.

- Agreement on technological safeguards associated with the launch of the INMARSAT-3 satellite.
  Signed at Washington February 14, 1994. Entered into force August 19, 1994.

- Marrakesh agreement establishing the World Trade Organization (WTO).
  Done at Marrakesh April 15, 1994. Entered into force January 1, 1995.

- Agreement on government procurement.
  Done at Marrakesh April 15, 1994. Entered into force January 1, 1996.

- North American framework agreement between the United States Treasury, the Banco de Mexico/Government of Mexico and the Bank of Canada.
  Signed at Mexico April 22 and 26, 1994. Entered into force April 26, 1994.

- Memorandum of understanding for the development of synthetic aperture radar application to support coastal warfare and surface shipwake detection and characterization, with annexes.
  Signed at Washington, London, and Kjeller August 12, August 25, and September 5, 1994. Entered into force September 5, 1994.

- Agreement terminating the agreement of September 25, 1990, concerning the presence and status of Allied Forces in Berlin.
  Exchange of notes at Bonn September 12, 1994. Entered into force September 12, 1994.

- Agreement on the status of missions and representatives of third states to the North Atlantic Treaty Organization.
  Done at Brussels September 14, 1994. Entered into force March 28, 1997.

- Amendment to Memorandum of understanding concerning a cooperative project for the establishment, operation, management and support of the NATO Insensitive Munitions Information Center (NIMIC), with annexes.
  Signed October 6, October 12, October 17, October 25, and November 2, 1994.

- Agreement to ban smoking on international passenger flights.
  Done at Chicago November 1, 1994. Entered into force March 1, 1995.

1995 to 1997: Republican House majority, Republican Senate majority

- Agreement on the establishment of the Korean Peninsula Energy Development Organization.
  Done at New York March 9, 1995. Entered into force March 9, 1995.

- Amendments to Memorandum of understanding concerning a cooperative project for the establishment, operation, management and support of the NATO Insensitive Munitions Information Center (NIMIC), with annexes.
  Signed March 15, 28 and 29, 1995.
  March 15, March 28, March 29, April 4, and April 10, 1995.
  March 15, March 28, March 29, April 4, and April 12, 1995.
  March 29, April 2, April 9, April 16, April 18, April 22, April 30, and June 13, 1996.

- Amendments to Memorandum of understanding concerning the EURO-NATO Joint Jet Pilot Training (ENJJPT) Program.
  Signed March 17, March 29, March 30, April 27, June 16, June 30, July 27, and September 19, 1995.

- Arrangement on the joint financing of a North Atlantic Height Monitoring System.
  Signed at Montreal July 31, August 11, 18 and 23, September 28, October 25 and December 12, 1995. Entered into force December 12, 1995.

- Memorandum of understanding for senior national representatives (ARMY) cooperation and exchanges of information, with attachments and an understanding.
  Signed at Washington, London, Paris, and Bonn October 19, 1995, November 13, 1995, November 27, 1995, and January 9, 1996. Entered into force January 9, 1996.

- Memorandum of understanding concerning multilateral exchange of research and development information, with appendix.
  Signed at Washington, Ottawa, London, and Canberra October 20, 1995, November 15, 1995, December 1, 1995, January 30, 1996, and February 12, 1996. Entered into force February 12, 1996.

- Memorandum of understanding for the technical cooperation program, with appendices.
  Signed at Melbourne October 24, 1995. Entered into force October 24, 1995.

- Addendum to the memorandum of understanding of May 20, 1977 for cooperative support of the NATO seasparrow surface missile system concerning the cooperative engineering and manufacturing development of the evolved seasparrow missile, with annexes and related letter.
  Signed at Washington April 26 and June 16, 1995. Entered into force June 16, 1995.

- Agreement among the States Parties to the North Atlantic Treaty and other States participating in the Partnership for Peace regarding the status of their forces.
  Done at Brussels June 19, 1995. Entered into force January 13, 1996.

- Memorandum of understanding on the establishment and operation of the International Planning and Coordination Staff for the Multinational Reaction Forces (Air) of NATO – Reaction Force Air Staff, with annexes.
  Signed at Casteau July 20, 24, 25, and 28, and August 1, 10, and 15, 1995. Entered into force August 15, 1995.

- Memorandum of agreement concerning the SARSAT Space Segment.
  Done at Washington September 11, 1995. Entered into force November 10, 1995.

- Memorandum of understanding concerning the establishment, mission, financing, administration and status of Headquarters 5 Allied Tactical Air Force (HQ 5 ATAF), with annexes.
  Signed at Casteau September 25, 26, and 29, and October 2, 1995. Entered into force October 2, 1995; effective January 1, 1994.

- Memorandum of understanding concerning the manning, funding and support of NATO Southern Region Maritime Sub-Principal Subordinate Command Headquarters of Commander Gibraltar Mediterranean (HQ GIBMED), Commander Maritime Air Forces Mediterranean (HQ MARAIRMED), Commander Central Mediterranean (HQ MEDCENT), Commander Eastern Mediterranean (HQ MEDEAST), Commander Northeast Mediterranean (HQ MEDNOREAST) and Commander Submarines Mediterranean (HQ SUBMED), with annexes.
  Signed at Casteau September 27 and October 2, 1995. Entered into force October 2, 1995; effective January 1, 1994.

- Memorandum of understanding concerning a feasibility study for a NATO influence minesweeping system (NIMS), with annexes.
  Signed at Haakonsvern, Ottawa, Paris, and Washington December 4, 1995, December 5, 1995, March 11, 1996, and June 3, 1996. Entered into force June 3, 1996.

- Memorandum of understanding covering a feasibility study for a NATO submarine rescue system (NSRS).
  Signed at Bristol, Oslo, Washington, Rome, and Paris February 21, February 29, March 15, March 22, and June 12, 1996. Entered into force June 12, 1996.

- Memorandum of understanding covering subphase two of the design and development phase of the NATO improved link eleven (NILE) project, with annex and related letter.
  Signed at Quebec, Bristol, Rome, Bonn, The Hague, Washington, and Paris May 24, June 5, June 6, June 11, July 2, and July 8, 1996. Entered into force July 2, 1996.

- Memorandum of understanding concerning multilateral exchange of military information, with appendix.
  Signed at Washington, London, Ottawa, Canberra, and Wellington November 19, 1996, January 8, 1997, March 10, 1997, March 26, 1997, and April 18, 1997. Entered into force April 18, 1997.

- Agreement establishing the Middle East Desalination Research Center.
  Signed at Muscat December 22, 1996. Entered into force December 22, 1996.

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1997 to 1999: Republican House majority, Republican Senate majority

- Agreement between the parties to the North Atlantic Treaty for the security of information, with annexes.
  Done at Brussels March 6, 1997. Entered into force August 16, 1998.

- Agreement on cooperation among the original members of the Korean Peninsula Energy Development Organization. Signed September 19, 1997.
  Signed at Washington September 19, 1997. Entered into force September 19, 1997.

- Amendment to agreement on the establishment of the Korean Peninsula Energy Development Organization.
  Signed September 19, 1997.

- Agreement for the High speed Anti-Radiation Missile (HARM) AGM-88 upgrade, with annexes.
  Signed at Washington, Bonn, and Rome October 14, 1997, February 5, 1998, and March 7, 1998. Entered into force March 7, 1998.

- Arrangement concerning application of the space station intergovernmental agreement pending its entry into force.
  Signed at Washington January 29, 1998. Entered into force January 29, 1998.

- Agreement concerning cooperation on the civil international space station, with annex.
  Signed at Washington January 29, 1998. Entered into force March 27, 2001.

- Agreement on the international dolphin conservation program, with annexes.
  Done at Washington May 21, 1998. Entered into force February 15, 1999.

- Protocol to the 1979 Convention on long-range transboundary air pollution on heavy metals, with annexes.
  Done at Aarhus June 24, 1998. Entered into force December 29, 2003.

- Agreement concerning the establishing of global technical regulations for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles, with annexes.
  Done at Geneva June 25, 1998. Entered into force August 25, 2000.

- Memorandum of understanding for the cooperation in the engineering and manufacturing development phase of the U.S. lightweight 155mm howitzer program.
  Signed at Washington and Bristol August 9 and 28, 1998. Entered into force August 28, 1998.
  Amendments and extension
  March 19, 24 and 26, 1999.

- Memorandum of understanding concerning trilateral technology research and development projects, with annex.
  Signed November 3, 1998. Entered into force November 3, 1998.

1999 to 2001: Republican House majority, Republican Senate majority

- Amendment to Memorandum of understanding concerning a cooperative project for the establishment, operation, management and support of the NATO Insensitive Munitions Information Center (NIMIC), with annexes.
  Signed April 7, April 20, April 21, April 26, April 27, May 6, May 18 and May 21, 1999.

- Agreement establishing the Group of States against Corruption (GRECO), with appendix.
  Done at Strasbourg May 1, 1999. Entered into force May 1, 1999; for the United States September 20, 2000.

- Agreement concerning cooperation on the application of non-proliferation assurances to low enriched uranium transferred to the United States for fabrication into fuel and retransfer to Taiwan, with annex and related side letter.
  Exchanges of notes at Washington July 21, 1999. Entered into force May 1, 2000.

- Protocol to the 1979 Convention on long-range transboundary air pollution to abate acidification, eutrophication and ground-level ozone.
  Done at Gothenburg November 30, 1999. Entered into force May 17, 2005.

- Memorandum of understanding concerning the research, development and acquisition of chemical, biological and radiological defense materiel, with appendices.
  Signed at Washington April 6, April 10, and June 1, 2000. Entered into force June 1, 2000.

- Memorandum of understanding concerning the establishment, financing, administration, manning and status of headquarters naval striking and support forces, southern region, with annexes.
  Signed June 1, June 7, June 8, June 13, June 14, June 19, June 26, and July 27, 2000. Entered into force July 27, 2000; effective September 1, 1999.

- International coffee agreement 2001, with annex.
  Done at London September 28, 2000. Entered into force provisionally October 1, 2001.

- Amendment to Memorandum of understanding for the technical cooperation program, with appendices.
  Signed October 16, 2000.

- Memorandum of understanding for interoperable networks for secure communications.
  Signed at Washington, Koblenz, Rome, London, Ottawa, Baerum, Paris, and The Hague October 31, 2000, November 27, 2000, December 21, 2000, December 22, 2000, January 3, 2001, January 16, 2001, and February 16, 2001. Entered into force February 16, 2001.

President George W. Bush: 68 multilateral executive agreements from 2001 to 2009

January 2001 to May 24, 2001: Republican House majority, Republican Senate majority

- Memorandum of understanding concerning cooperative framework for system development and demonstration of the Joint Strike Fighter.
  Signed at Washington January 17, 2001. Entered into force January 17, 2001.
  Amendments and Related Agreements
  January 17, 2001.

- Multilateral agreement on the liberalization of international air transportation, with annex and appendix.
  Done at Washington May 1, 2001. Entered into force December 21, 2001.

- Memorandum of understanding concerning cooperation in navigation warfare technology demonstrator and system prototype projects, with annexes.
  Signed at Washington, Canberra, and Bristol May 13, May 31, and July 6, 2001. Entered into force July 6, 2001.

May 24, 2001, to 2003: Republican House majority, Democratic Senate majority

- Agreement on the appointment of the International Mines Rescue Body (IMRB), with attachment.
  Signed at Bytom, Poland May 29, 2001. Entered into force May 29, 2001.

- Memorandum of understanding concerning cooperative framework for system development and demonstration of the Joint Strike Fighter.
  Done February 1 and 5, 2002.
  February 1 and 7, 2002.
  May 16 and 28, 2002.
  May 28 and June 20, 2002.
  June 5, June 10, June 17, July 8, and September 17, 2002.
  June 17, June 20, July 8, September 17, and October 14, 2002.
  June 17, June 24, July 8, September17, October 14, and November 14, 2002.
  July 11, September 17, October 14, and November 14, 2002.
  October 31 and November 14, 2002.

- Memorandum of understanding for future air capabilities projects, with annexes.
  Signed at Gramat, London, and Paris March 26, April 5, and May 3, 2002. Entered into force May 3, 2002.

- Memorandum of understanding concerning the in-service support phase of the NATO improved link eleven project, with annexes.
  Signed at Washington, Ottawa, Paris, Koblenz, Rome, and London June 13, June 18, June 20, June 27, and July 2, 2002. Entered into force July 2, 2002.

- Amendments to Agreement for the establishment of the International Development Law Organization.
  Signed June 30, 2002; November 30, 2002.

- Amendment to Memorandum of understanding for senior national representatives (ARMY) cooperation and exchanges of information, with attachments and an understanding.
  Signed September 19, 2002.

- Memorandum of understanding concerning cooperative projects for the C-130J, with annexes.
  Signed at Washington, London, Rome, and Canberra December 16, 2002, and January 7, 2003, January 17, 2003, and January 31, 2003. Entered into force January 31, 2003.

- Agreement on mutual acceptance of oenological practices, with annex.
  Done at Toronto December 18, 2001. Entered into force December 1, 2002.

2003 to 2005: Republican House majority, Republican Senate majority

- Framework agreement on a multilateral nuclear environmental programme in the Russian Federation.
  Signed at Stockholm May 21, 2003. Entered into force April 14, 2004. Entered into force for the United States June 14, 2013.

- Memorandum of understanding concerning the mission training via distributed simulation (MTDS) project.
  Signed February 19, February 20, February 23, February 26, February 27, and March 4, 2004. Entered into force March 4, 2004.

- Memorandum of understanding concerning exchange of electric warship information.
  Signed at Washington, Paris, and Bristol April 7, April 30, and May 6, 2004. Entered into force May 6, 2004.

- Amendments to Memorandum of understanding for the cooperation in the engineering and manufacturing development phase of the U.S. lightweight 155mm howitzer program.
  Signed April 28, June 7 and July 13, 2004.

- Amendment to Memorandum of understanding concerning a cooperative program for full integration of a radar in the AV-8B weapon system and the production, remanufacture and in-service support of a radar equipped AV-8B (AV-8B HARRIER II PLUS), with annexes and supplemental agreement.
  Signed June 28, 2004.

- The Dominican Republic-Central America-United States free trade agreement.
  Signed at Washington August 5, 2004. Entered into force March 1, 2006.

- Amendment to Memorandum of understanding concerning cooperative projects for the C-130J, with annexes.
  Signed August 27, September 8, September 15, and September 29, 2004.

- Memorandum of understanding concerning the Multilateral Interoperability Program (MIP).
  Signed September 24, 2004, October 13, 2004, October 26, 2004, January 6, 2005, January 19, 2005, and February 3, 2005. Entered into force February 3, 2005.

- Framework memorandum of understanding concerning cooperation in post production support of harrier aircraft, with annexes.
  Signed October 5, 2004, December 9, 2004, and January 10, 2005. Entered into force December 9, 2004; for the United States January 10, 2005.

- Amendment to Memorandum of understanding for future air capabilities projects, with annexes.
  Signed October 7 and 27, 2003.

- Memorandum of understanding for the production of STANDARD missile, with annexes.
  Signed at Koblenz, The Hague, and Washington October 20, October 21, and December 3, 2004. Entered into force December 3, 2004.

- Memorandum of understanding for STANDARD missile upgrades and improvements, with annexes.
  Signed at Koblenz, The Hague, Ottawa, and Washington October 20, October 21, November 15, and December 3, 2004. Entered into force December 3, 2004.

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2005 to 2007: Republican House majority, Republican Senate majority

- Memorandum of understanding concerning the in-service support phase of the NATO improved link eleven project, with annexes.
  Signed February 10, February 21, February 22, February 25, March 8, March 9, and September 27, 2005.

- Framework agreement for international collaboration on research and development of generation IV nuclear energy systems.
  Signed at Washington February 28, 2005. Entered into force February 28, 2005.

- Agreement amending the memorandum of understanding of January 25, 1991, as amended, concerning a cooperative project for the establishment, operation, management and support of the Munitions Safety Information Analysis Center (MSIAC).
  Signed at Brussels, Stockholm, Helsinki, Paris, Abbey Wood, Rome, and Koblenz April 26, April 27, April 28, May 19, May 24, June 2, June 8, July 11, July 28, August 10, August 31, and September 16, 2005.

- Amendment to Memorandum of understanding for interoperable networks for secure communications.
  Signed June 2, June 20, June 22, June 27, June 28, July 1, August 12, and December 14, 2005.

- Memorandum of understanding concerning the cooperative framework for the F/A 18 program, with annex.
  Signed at Washington and Tikkakoski August 23 and September 23, 2005. Entered into force September 23, 2005.

- Amendment to Memorandum of understanding concerning cooperation in navigation warfare technology demonstrator and system prototype projects, with annexes.
  Signed October 14, 2005, October 25, 2005, November 17, 2005, and January 11, 2006.

- Amendment to Memorandum of understanding for the technical cooperation program, with appendices.
  Signed October 15, 2005.

- Agreement on duty-free treatment of multi-chip integrated circuits (MCPs).
  Done at Brussels November 28, 2005. Entered into force January 4, 2006.

- Memorandum of understanding for cooperation in the ocean surface topography mission.
  Signed at Washington, Darmstadt and Paris March 21, March 24, March 30, and April 7, 2006. Entered into force April 7, 2006.

- Amendment to Agreement constituting an International Commission for the International Tracing Service.
  Signed May 6, 2006.

- Combined joint military information exchange annex concerning operational and technical information for naval command, control, communications and computers (C4), with appendices.
  Signed at Quebec and Washington May 24 and June 2, 2006. Entered into force June 2, 2006.

- Memorandum of understanding concerning the establishment, administration, and operation of the combined joint operations from the sea center of excellence, with annexes.
  Signed at Norfolk May 31, 2006. Entered into force May 31, 2006.

- Amendment to Memorandum of understanding concerning the research, development and acquisition of chemical, biological and radiological defense materiel, with appendices.
  Signed August 24 and 25 and September 8, 2006.

- Operation arrangement concerning the establishment of a Virtual Regional Maritime Traffic Centre (V-RMTC) for the Mediterranean and Black Seas.
  Signed at Venice October 12, 2006. Entered into force October 12, 2006.

- Memorandum of understanding concerning the exchange of information and data between warfare and tactical development centers.
  Signed October 26 and November 6, 2006. Entered into force November 6, 2006.

- Agreement on the establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER project, with annexes.
  Signed at Paris November 21, 2006. Entered into force October 24, 2007.

- Memorandum of understanding concerning the production, sustainment, and follow-on development of the joint strike fighter, with annexes.
  Signed at Washington, Oslo, and Copenhagen November 14, 2006, December 11, 2006, December 12, 2006, January 25, 2007, January 31, 2007, February 7, 2007, and February 27, 2007. Entered into force December 31, 2006.

- Amendments to memorandum of understanding concerning cooperative framework for system development and demonstration of the Joint Strike Fighter.
  Signed December 18, 2006; November 14, December 11 and 12, 2006. Entered into force September 16, 2005.

2007 to 2009: Democratic House majority, Democratic Senate majority

- Agreement for assistance in securing nuclear fuel for a research reactor, with annexes.
  Signed at Warsaw and Vienna January 8, 12, and 16, 2007. Entered into force January 16, 2007.

- Amendments to memorandum of understanding concerning cooperative framework for system development and demonstration of the Joint Strike Fighter.
  Signed January 17, 2007; January 25 and 31, February 7 and 27, 2007.

- Memorandum of understanding for the cooperation in global positioning system and navigation warfare research, development, test and evaluation, with annexes.
  Signed at Bonn, Washington, The Hague, Ottawa, Copenhagen, Canberra, Seoul, Bristol, Rome, and Stockholm February 15, February 21, March 1, March 7, April 3, April 13, April 16, April 20, April 30, 2007, and March 7, 2008. Entered into force April 3, 2007.

- Memorandum of understanding for aeronautical cooperative research and technology projects, with annex.
  Signed at London, Rome, Bonn, Washington, and Paris March 12, March 13, March 15, and May 7, 2007. Entered into force May 7, 2007.

- Amendment to Framework memorandum of understanding concerning cooperation in post production support of harrier aircraft, with annexes.
  Signed April 30, 2007, May 24, 2007, November 14, 2008, and January 26, 2009.

- Memorandum of understanding regarding funds to use for the benefit of poor citizens of Kazakhstan, with annexes.
  Signed at Washington May 2, 2007. Entered into force May 2, 2007.

- Memorandum of understanding for senior national representatives (Army) collaboration projects, with annexes.
  Signed at Paris June 14 and 18, 2007. Entered into force June 18, 2007.
  Related Agreements
  November 21 and 27, 2007, December 3 and 4, 2007, and January 9, 2008.

- Memorandum of understanding for the coalition secure management and operations system (COSMOS) Advanced Concept Technology Demonstration (ACTD) Project.
  Signed at Singapore, London, Canberra, Arlington, and Ottawa July 6, 9, 23 and August 21, 2007, and February 19, 2008. Entered into force February 19, 2008.

- Agreement for cooperation in energy science and technology, with annexes.
  Signed at Victoria July 23, 2007. Entered into force July 24, 2008.

- Amendment to Memorandum of understanding concerning cooperative projects for the C-130J, with annexes.
  Signed January 29, February 13, February 22, March 4, April 16, and April 21, 2008.

- Memorandum of understanding concerning strategic airlift capability, with annexes.
  Signed at Stockholm, Budapest, Sofia, Vilnius, Washington, Ljubljana, Brussels, Helsinki, Oslo, Tallinn, Warsaw, and Bucharest March 11, March 31, May 7, May 30, June 11, June 12, June 19, June 20, June 27, July 15, and July 30, 2008. Entered into force September 23, 2008.

- Memorandum of understanding for the research, development, test and evaluation of overhead non-imaging infrared data exploitation tools and techniques, with annexes.
  Signed April 28, May 19, May 20, and June 12, 2008. Entered into force June 12, 2008.

- Cooperative agreement to foster trade, investment and development.
  Signed at Washington July 16, 2008. Entered into force July 16, 2008.

- Postal payment services agreement.
  Done at Geneva August 12, 2008. Entered into force January 1, 2010; definitively for the United States July 28, 2010.

President Barack Obama: 10 multilateral executive agreements from 2009 to 2013

2009 to 2011: Democratic House majority, Democratic Senate majority

- Agreement on International Renewable Energy Agency (IRENA).
  Signed at Bonn June 29, 2009. Entered into force April 3, 2011.

- Agreement concerning surface combatant aluminum structure design.
  Signed at Arlington and Koblenz October 1, 7, and 28, 2009. Entered into force for United States October 28, 2009.

- Amendment to Memorandum of understanding concerning the cooperative framework for the F/A 18 program, with annex.
  Signed June 14, 22, 24 and 28, July 8, August 19 and 24, 2010.

- Agreement concerning exchange of secured software-defined radio (SSDR) research and development information.
  Signed at Washington, Warsaw, Bagneux, Rome, Stockholm, Madrid, and Helsinki August 17, 20 and 23, September 8, 15 and 16, and October 1, 2010. Entered into force October 1, 2010.

2011 to 2013: Republican House majority, Democratic Senate majority

- Agreement regarding the establishment, construction and operation of uranium enrichment installations using gas centrifuge technology in the United States of America, with agreed minutes.
  Signed at Paris February 24, 2011. Entered into force January 31, 2012.

- Agreement on cooperation on aeronautical and maritime search and rescue in the Arctic.
  Signed at Nuuk May 12, 2011. Entered into force January 19, 2013.

- Agreement concerning the replacement of highly enriched uranium by low enriched uranium, with annexes.
  Signed at Vienna July 13, 29 and August 1, 2011. Entered into force August 1, 2011.

- Food assistance convention.
  Done at London April 25, 2012. Entered into force January 1, 2013.

2013 to 2015: Republican House majority, Democratic Senate majority

- Agreement for Assistance in Securing Low Enriched Uranium for a Research Reactor, with annex.
  Signed at Vienna May 2 and December 16, and Geneva November 25, 2013. Entered into force December 16, 2013.

- Memorandum of Understanding on Defense Joint Strike Fighter Program Test and Evaluation.
  Signed at High Wycombe, The Hague, Breda, Washington, and Canberra July 7, 11, 17, and 21, 2014. Entered into force July 17, 2014.

Endnotes

1 Susan Chesser, "Multilateral Executive Agreements 1985–2014; Memorandum to the Honorable Earl Blumenauer" (Washington: Congressional Research Service, 2015), available at http://blumenauer.house.gov/images/pdf/070615_intlagreements.pdf.

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Client	Total
Bracewell & Giuliani	Amerian Corp
	Arch Coal
	Duke Energy
	Electric Reliability Coordinating Council
	Energy Future Holdings Corp
	Portland Cement Assn
	Progress Energy
	Salt River Project
	Southern Co
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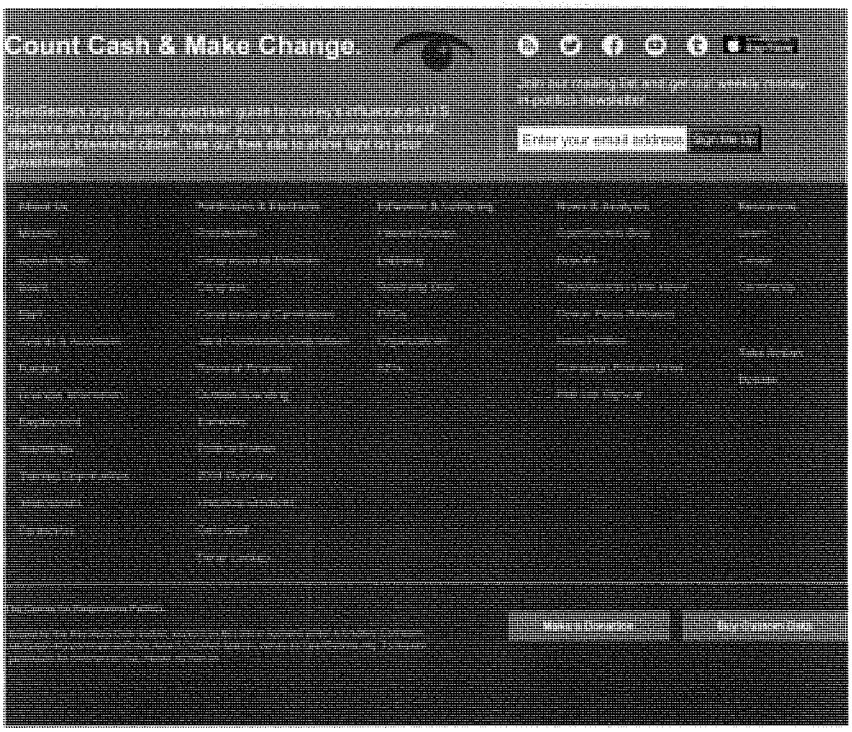

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Business Lobbied	Client
Business & Industry	Ameren Corp
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	DTE Energy
	Duke Energy
	Electric Reliability Coordinating Council
	Energy Future Holdings Corp
	Mosaic Co
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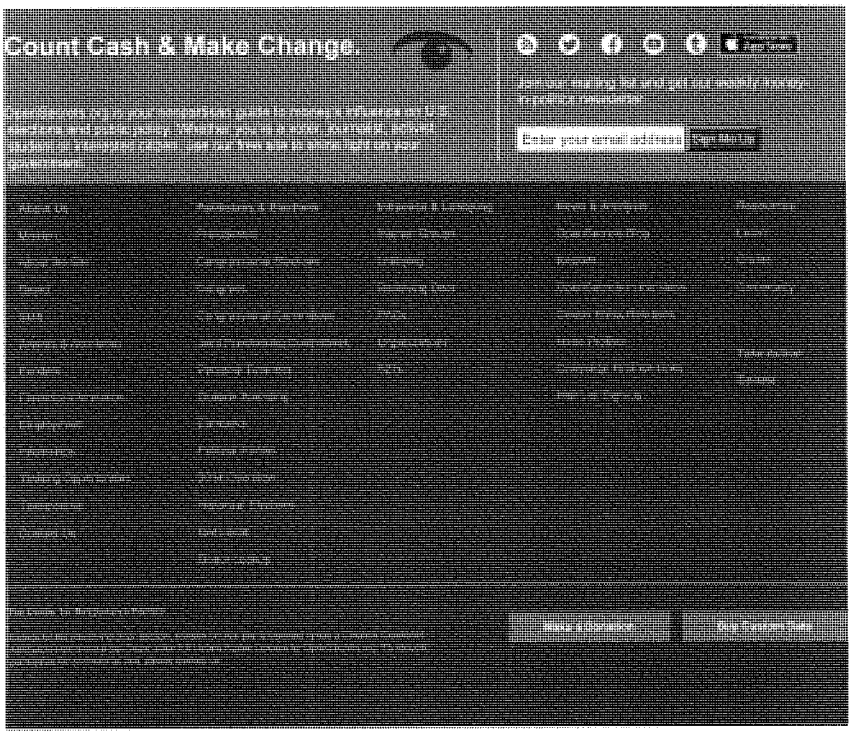

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Year: 2012

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ADVANCED SEARCH

Client Industry	Client
Business & Citizens	Ameren Corp
	Arch Coal
	Chesapeake Power Development
	DTE Energy
	Duke Energy
	Electric Reliability Coordinating Council
	Energy Future Holdings Corp
	Progress Energy
	Salt River Project
	Southern Co

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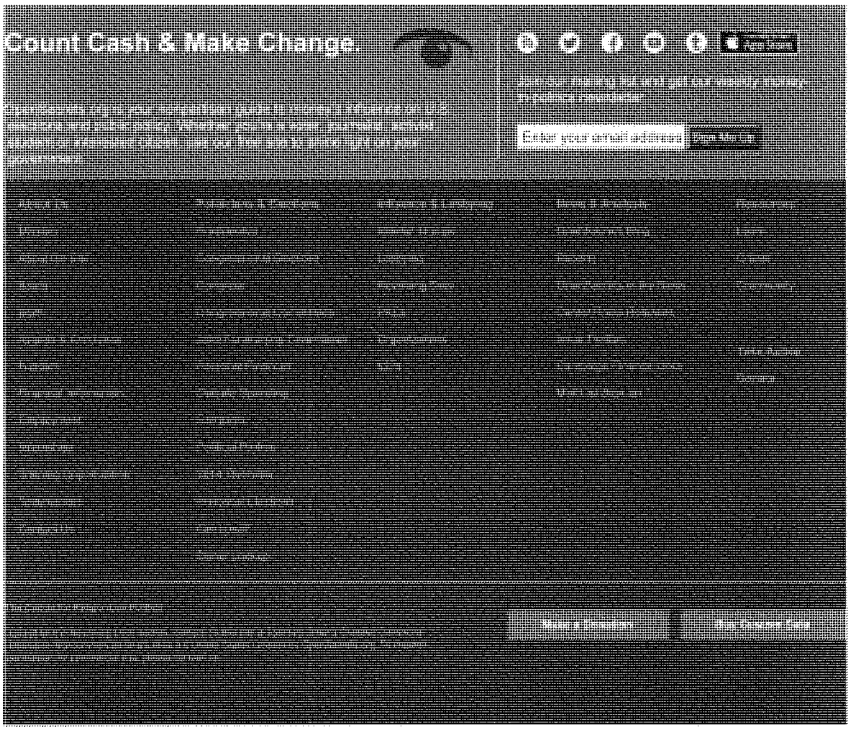

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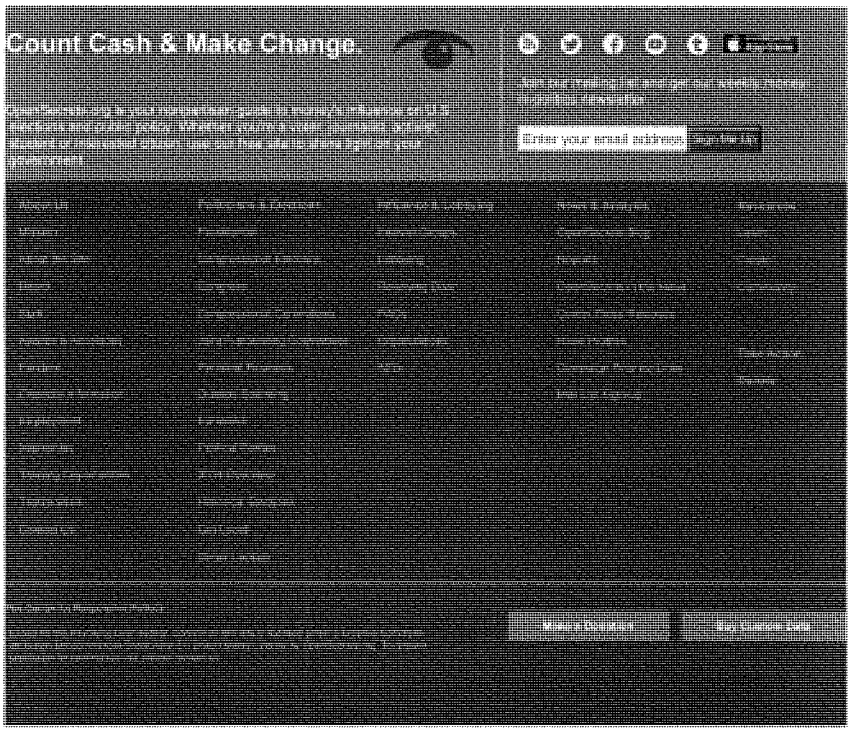

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Client	Year
Brunswick & Gulland	American Coal
	Arch Coal
	DTE Energy
	Duke Energy
	Electric Reliability Coordinating Council
	Energy Future Holdings Corp
	Gas Plant Project
	Southern Co

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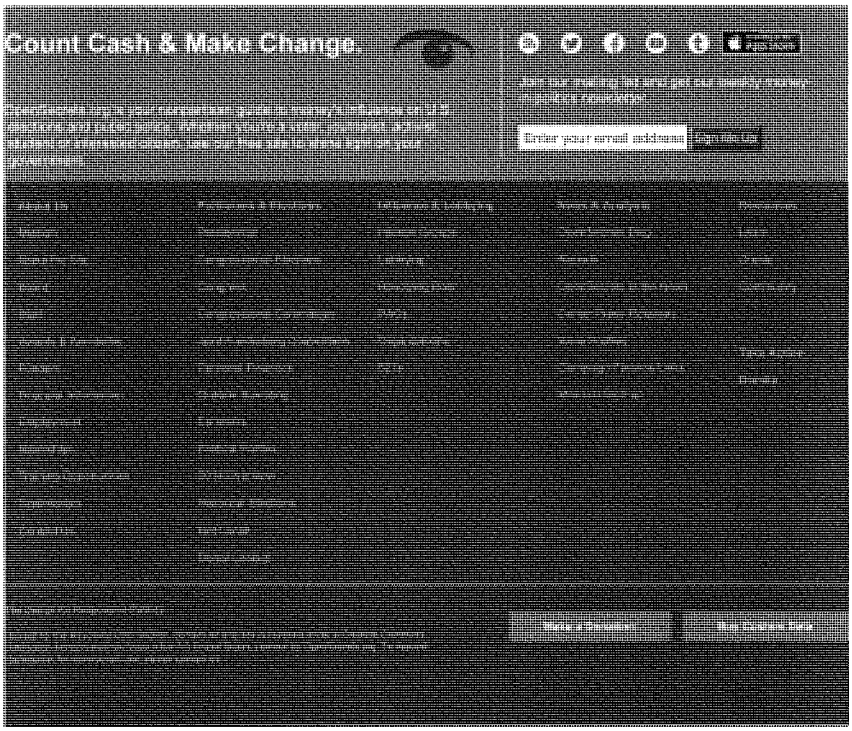

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Lobbying For	Client
Business & Industry	Ameren Corp
	Arch Coal
	DTE Energy
	Duke Energy
	Electric Reliability Coordinating Council
	Energy Future Holdings Corp
	LS&R & RJ Energy LLC
	Sun Power Project
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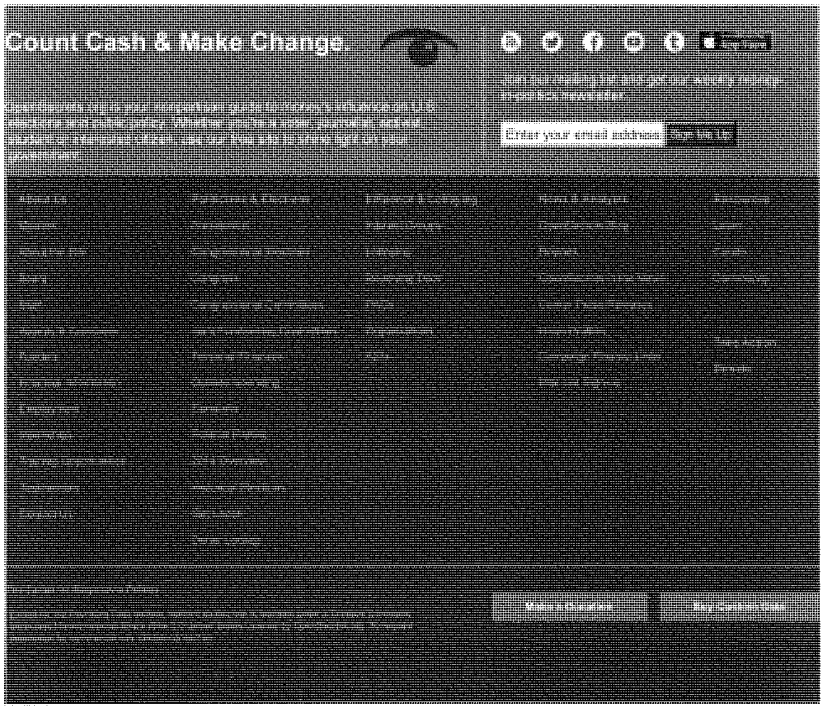
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