

**EXAMINING THE INTERNATIONAL
CLIMATE NEGOTIATIONS**

HEARING
BEFORE THE
COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

NOVEMBER 18, 2015

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ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

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EXAMINING THE INTERNATIONAL CLIMATE NEGOTIATIONS

WEDNESDAY, NOVEMBER 18, 2015

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

The committee met, pursuant to notice, at 9:33 a.m. in room 406, Dirksen Senate Office Building, Hon. Shelley Moore Capito (chairwoman of the committee) presiding.

Present: Senators Capito, Inhofe, Barrasso, Crapo, Boozman, Sessions, Wicker, Rounds, Carper, Cardin, Whitehouse, Merkley, Gillibrand, Booker, and Markey.

Senator CAPITO. The hearing will come to order.

We have some unusual circumstances. I am not the chairman of the full committee; the chairman is sitting to my right, as you know, Chairman Inhofe. He is on the conference committee for the highway reauthorization, so he has asked to make some statements and then he is going to go to his meeting. So, with that, I will recognize Chairman Inhofe.

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

Senator INHOFE. I thank you, Madam Chairman. We actually have three members of the conference, the highway conference. I already talked to the witnesses and explained to them. It is very significant what is going on. We are actually going to have a formal conference on the highway reauthorization bill. That hasn't happened since 2005, so we are very excited about it. And I am sure that another conferee is Senator Fischer, so I am sure we will all be wanting to go over there.

But she has graciously allowed me to make a brief opening statement, which I will do now, and I am sure that Senator Carper won't mind if I go ahead and make my statement.

Senator CARPER. I object.

[Laughter.]

Senator INHOFE. All right, good.

Well, let me start by saying that all of our prayers are with the people and what has been happening in Paris. It is so regrettable.

I thank the witnesses for being here today to discuss the international climate negotiations. Despite President Obama's constant rhetoric about transparency, we are a week and a half away from the start of the United Nation's twenty-first session of the Conference of Parties. This is the twenty-first year that we have had

this, and several of us on this panel up here have had different ideas about what is to be accomplished there. My idea is nothing.

I just sent a letter in July seeking information relating to the President's intended nationally determined contribution. Now, that is where he is supposed to be able to document what he wants, and he did send information in that he is going to be reaching between a 26 and 28 percent reduction in emissions, but failed to say how he is going to do this. So we tried to have a conference. We tried to have a meeting in this committee and asked the EPA to attend, and they refused to attend.

Now, this is the first time in my experience in the years that I have been here, 8 years in the House and 20 years in the Senate, that the committee of jurisdiction making a request that someone appear and they don't appear. So I think there is a reason: because they don't know how the calculation of 26 to 28 percent was working.

Together we are especially here to discuss the potential legal form of the COP 21 agreement. I think that goes without saying. There have been a lot of things published about is it legal, is it binding. Until yesterday, when we had, in the Financial Times, Secretary Kerry announced that there would be no binding agreement from COP 21. No binding agreement from COP 21. Now, that incurred the wrath of President Hollande of France, along with several other people. Anyway, that was an honest statement because there won't be any.

When it comes to the financing, I know that a lot of people over there, the 192 countries would assume the Americans are going to line up and joyfully pay \$3 billion into this fund, but that is not going to happen either.

So, anyway, this is going to be very similar to the other 20, so I am sure there will be many on this panel who will be attending. I don't plan to attend.

Thank you, Madam Chairman.

[The prepared statement of Senator Inhofe follows:]

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

Let me start off by saying my prayers are with the city of Paris and all those who have been impacted by the attacks last Friday.

We are a week and a half away from the start of the United Nation's 21st session to the Conference of Parties and have yet to hear directly from this administration on the president's international climate agenda. This is not due to a lack of outreach on our part, but rather a continued disrespect for the rule of law and on obstructionist approach to Senate oversight.

I invited the EPA, CEQ and State Department to testify before the committee and provide missing information related to the president's 26 to 28 percent greenhouse gas emission reduction target (by 2025). According to our last expert panel on the subject, which included former Sierra Club Climate Counsel, David Bookbinder, the president's plan simply does not add up. Even Senator Boxer's witness from the World Resources Institute admitted that additional actions will have to occur for the targets to be met,

which will likely come from the refining, cement and agriculture industries, among others.

EPA and CEQ's response that they lacked involvement and relative expertise is not only counter to public records and press accounts, but completely unbelievable. Recently released agency documents related to the Keystone XL Pipeline decision further confirm that Administrator McCarthy has an authoritative role in State Department actions, especially when they concern the president's climate agenda and international perceptions. Just last week, it was reported (in Climatewire) that Administrator McCarthy meets weekly with White House staff alongside Secretary Kerry and Secretary Moniz to "prepare for Paris" and is likely going herself.

If as Secretary Kerry recently stated, the administration does not have a problem with congress reviewing the Paris agreement, then I expect an affirmative response to testify from EPA, CEQ and the State Department in the new year.

Primarily from press accounts, we know the presidents alongside international bureaucrats intend to produce an agreement of some form that commits countries to reduce greenhouse gas emissions over certain time periods. We have seen this type of agreement before, most recently with the Kyoto Protocol and there was never a question that if President Clinton wanted to make the United States a party to that agreement, the Senate had to be involved.

With the formal submission of various countries "intended nationally determined contributions" (INDCs), we know the structure of emission reduction commitments has changed from a top-down Kyoto-style approach to a bottoms-commitments has changed for President Obama is the application of the 1992 UNFCCC ratification agreement and its express limitations. Specifically, the caveat included in the Foreign Relations Committee report the "[A] decision by the Conference of Parties to adopt targets and timetables would have to be submitted to the Senate for its advice and consent before the United States could deposit its instruments of ratification for such an agreement."

If the president wished to produce something substantive from the Paris negotiations - and presumably stronger than Kyoto - there is no way around the Senate. However, if the president heeds the advice of other COP 21 participants and wished to bypass congress, then he will be limited to making a non-binding, political commitment with no means of enforcement, accountability, or longevity.

Beyond the process, there is the financing element of these negotiations for the Green Climate Fund. The president would like to shut down livelihoods and ship American jobs overseas while imposing a cap and trade energy tax on the American people so he can pay for his international climate legacy that hinges on cooperation from rent-seeking developing countries lining up for a piece of the president's multi-billion dollar slush fund.

This administration has shown time and time again that political perceptions carry more merit than any expert assessments, especially when they include technical or economic inconveniences. Beyond diplomatic grand-standing and a few good press releases, the only certain outcome of the Paris negotiations is increased global CO₂ emissions.

The president's so-called "Climate Action Plan" has never been about saving the environment or the world from impending global warming doom. It is about making up for the embarrassment of Copenhagen and solidifying his environmental legacy. I, along with my Republican colleagues, am not willing to let him or any other United Nation's bureaucrat circumvent the Constitution in an attempt to imbed climate change policies whose net effort will do nothing more than undermine America's outlook for success.

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

**OPENING STATEMENT OF HON. SHELLEY MOORE CAPITO,
U.S. SENATOR FROM THE STATE OF WEST VIRGINIA**

Senator CAPITO. I thank the chair and we wish good luck and quick work on the conference committee, because I think we are all anxious to have that piece of legislation before us. So I will go ahead and open, if that is OK with you, for my opening statements.

I want to welcome the panelists, first of all, and the members, the senators here. Much of what Senator Inhofe has said is contained in my opening statement, but I think some of it bears repeating.

Just yesterday we passed two bipartisan resolutions under the congressional Review Act, one of which I sponsored. And I brought those up because, in my opinion, they are inextricably tied to the upcoming climate negotiations. President Obama cannot meet his goal of 26 to 28 percent reduction of CO₂ emissions without the full implementation of this regulation, and we believe that that stands on shaky legal and political ground. The Senate has now formally rejected these rules and we expect the House to do the same, and then the President will have a chance to make his opinion known. But over half our States, 27 to be precise, have now sued the EPA to block these rules.

Last week, as Chairman Inhofe said, it was reported that Secretary of State insisted that the international climate agreement expected to be reached in Paris was "definitely not going to be a treaty," and Chairman Inhofe mentioned that he said there would be no binding agreement.

This prompted French Foreign Minister Laurent Fabius to suggest that Secretary Kerry was "confused." The French president then weighed in: "If the agreement is not legally binding, there won't be agreement," as did the European Union, whose spokesperson was quoted as saying, "We work on the basis that the Paris agreement must be an internationally binding agreement."

If major participants in the upcoming COP 21 negotiations cannot agree on the legal status of any forthcoming agreement, no wonder those of us here today have questions. Will this agreement be legally binding or not? If so, will it be submitted to the Senate for ratification, as required by the Constitution?

Chairman Inhofe, as he mentioned, too, invited the EPA, the CEQ, and State Department to testify before the committee and provide missing information related to the President's 26 to 28 percent greenhouse gas emissions target. EPA and CEQ have thus far demurred, saying they lack involvement and relative expertise.

I share the chairman's hope that the Administration will reconsider and allow witnesses to come before this committee in the coming year, particularly given press reports such as last week when Climate Wire reported that EPA Administrator McCarthy meets regularly with White House staff, alongside Secretary of State Kerry and Secretary of Energy Munez to prepare for Paris and is likely going herself.

The legal status of an agreement is one issue that negotiators must resolve. Financial payments demanded by developing countries from the United States and other countries are another, and I hope we will touch on those today.

The President has pledged to send \$3 billion to the Green Climate Fund. He included a \$500 million request in his Fiscal Year 2016 budget. The House and the Senate, State and foreign appropriators, I am on the appropriation committee, have allocated zero dollars. It is important to make clear, I think, to the rest of the world, as climate talks approach, that Congress has the power of the purse.

I look forward to hearing from our distinguished panel of witnesses. Again, I thank them for coming and that we have a robust discussion, as we always do on this committee. I have learned that in the short time I have been here.

And I would like to recognize Senator Carper for an opening statement.

**OPENING STATEMENT OF HON. THOMAS R. CARPER,
U.S. SENATOR FROM THE STATE OF DELAWARE**

Senator CARPER. Thanks, Madam Chair. It is a pleasure to have a couple of West Virginia kids up here leading the charge on this important day. Thanks for pulling this together and thanks to all of our witnesses for joining us on what is a much welcomed hearing.

Today we are here to discuss, as we know, our Country's efforts to fulfill a promise that was made some 23 years ago, in 1992, to address global climate change. George Herbert Walker Bush was our president at that time, as you will recall. But in 1992, the United States and other countries around the world agreed to a treaty that established the United Nations Framework Convention on Climate Change. The goal, to find a way to limit global climate pollution and limit the impacts of climate change to preserve and protect our environment for future generations.

In 1992, President Bush signed the treaty and the Senate subsequently ratified it. Today, there are 196 countries that are part of that treaty.

Over the past 23 years, the United States and our treaty partners have held meetings, usually each year, to address these goals, and later this month the twenty-first meeting will take place in Paris. These negotiations are critical because to effectively address climate change we cannot act alone. We cannot do this alone. We have to work cooperatively with our neighbors around the world.

There are a host of scientific studies that underscore the urgent need for action, but, for me, the most compelling factor in supporting efforts to address climate change is more personal. I live in the lowest lying State in America. We see every day the ravages

of climate change and sea level rise. I have children, someday I hope to have grandchildren, and I want to make sure they have a real bright future in Delaware and other places throughout our Country and, frankly, around the world.

The science is clear. Our future generations face no greater environmental threat. We face a lot of threats, but no greater environmental threat than the threat of climate change. We know the price of action pales in comparison to the cost of doing nothing. This is why I believe we have an absolute duty to fight to change our behavior, continue to change our behavior not only in Delaware and across the Country, but also around the world, to help stem the tide of climate change.

When it comes to global challenges, the United States doesn't just sit back and wait for someone else to lead. We lead. This should be no different. When the challenge was fascism, when the challenge was communism, today terrorism, cyberattacks, the U.S. has led as the world has risen to face those challenges.

Climate change is real. Global warming is real. Sea level rise is real. We see it, again, happening every day in my own State. We see it every day happening in Ben's State, over here, my neighbor to the east and to the south. The U.S. cannot do it alone, but we can provide leadership, and somebody needs to do that, and that should be us.

Since the current Administration has retaken a leadership role on this issue, others have followed. Countries like China and Brazil, that have been hesitant before to make carbon reductions, have changed their tune. I think largely because we have acted.

As someone, again, who was born in coal country, Beckley, West Virginia, but spent his entire adult life, most of his adult life in the lowest lying State in the Nation, I know this issue is complicated and I know compromises have to be made for all of us to survive in a low carbon world. However, let me conclude by saying I have confidence that this Administration, working in conjunction with 50 laboratories of democracies, our States across America, using common sense, using sound science, will find the right recipe.

In closing, I encourage our Administration to continue its work to drive the international community toward a broader global agreement in Paris so that together we can successfully meet the challenges facing our planet and ensure a brighter future for our grandchildren and for their grandchildren.

Thank you, Madam Chair.

[The prepared statement of Senator Carper follows:]

STATEMENT OF HON THOMAS R. CARPER, U.S. SENATOR
FROM THE STATE OF DELAWARE

Madam Chairman, thank you for convening this hearing today, and thank you to our witnesses for joining us. I look forward to hearing your testimony.

Today, we are here to discuss our country's efforts to fulfill a promise we made in 1992 to address global climate change.

In 1992, the United States, and other countries around the world, agreed to a treaty that established the United Nations Framework Convention on Climate Change. The goals—find a way to limit global carbon pollution and limit the impacts of climate change to preserve and protect our environment for future generations.

In 1992, President George H.W. Bush signed the treaty and Congress subsequently ratified it. Today, there are 196 countries that are part of that treaty.

Over the past 23 years, the United States and our treaty partners have held meetings, usually each year, to address these goals and, later this month, the 21st

meeting will take place in Paris. These negotiations are critical—because to effectively address climate change we cannot act alone, we have to work cooperatively with our neighbors around the world.

There's a host of scientific studies that underscore the urgent need for action but, for me, the most compelling factor in supporting efforts to address climate change is deeply personal.

Being a parent has been a transformative experience in my life, and my love for my sons has inspired me to make the world a better place for them, their children, and their grandchildren.

And the science is clear, our future generations face no greater environmental threat than the threat of climate change. We know the price of action pales in comparison to the cost of doing nothing.

This is why I believe we have an absolute duty to fight to change our behavior—not only in Delaware and across the country, but also around the world—to help stem the tide of climate change.

When it comes to global challenges, the United States doesn't often sit back and wait for someone to lead. We take the lead. Here should be no different.

Fascism, Communism, Terrorism, Cyberattacks, the U.S. is a leader of the world. Climate change is real. Global warming is real. Sea level rise is real. We see it happening every day. The U.S. can't do it alone, but we can provide leadership.

Since the administration has retaken a leadership role on this issue, others have followed. Countries like China and Brazil that have been hesitant to make carbon reductions have changed their tune because we have acted.

As someone who was born in coal country—Beckley, West Virginia—but spent his adult life in the lowest lying State in the nation—I know this issue is complicated. I know compromises have to be made for all of us to survive in a low-carbon world.

However, I have confidence that this administration, and future administrations, working with 50 labs of democracy in the states, using common sense and sound science, will find the right compromises.

In closing, I encourage the administration to continue its work to drive the international community toward a broader global agreement in Paris, so that, together, we can successfully meet this challenge facing our planet and ensure a brighter future for our grandchildren and for their children.

Senator CAPITO. Thank you, Senator.

We will begin to hear testimony from our witnesses. I am going to introduce everybody briefly and then we will begin with Mr. Ku.

Mr. Julian Ku, who is the Maurice A. Deane Distinguished Professor of Constitutional Law & Faculty Director of International Programs, that is one long title, at the Maurice A. Deane School of Law at Hofstra University. Next we will hear from Mr. Oren Cass, who is Senior Fellow at the Manhattan Institute for Policy Research, Incorporated. Next we have Mr. Steven Eule, Vice President of Climate and Technology, U.S. Chamber of Commerce Institute for 21st Century Energy. We have Mr. David Waskow, Director, International Climate Initiative, World Resources Institute. And then we have Ms. Lisa Jacobson, President, Business Council for Sustainable Energy.

Again, thank you all. We will have 5 minute statements. Your full statements have been submitted to the record.

Mr. Ku.

STATEMENT OF JULIAN KU, MAURICE A. DEANE DISTINGUISHED PROFESSOR OF CONGRESSIONAL LAW & FACULTY DIRECTOR OF INTERNATIONAL PROGRAMS, MAURICE A. DEANE SCHOOL OF LAW AT HOFSTRA UNIVERSITY

Mr. KU. Thank you, Madam Chairman. I want to thank the chairman, the ranking member, the members of this committee for inviting me to participate in today's hearing.

As you just noted, my name is Julian Ku. I am Professor of Law at Hofstra University in New York, and my academic research fo-

cuses on the relationship between international law, international agreements, and the United Constitution. My testimony today will consider the requirements and limitations under the Constitution for an agreement relating to climate change.

In my written testimony I review the legal status of each kind of international agreement; a treaty, a congressional executive agreement, a sole executive agreement. And I also explain my written testimony why I believe the Paris agreement should be submitted to the Senate for its approval if that agreement contains legally binding emissions reduction targets and timetables. And I am happy to take questions on that issue particularly if members of the committee are interested.

But for the purposes of my oral remarks, I want to focus on the possibility that the Paris agreement will contain non-legally binding political commitments. I think this is the direction that the Administration is heading.

In response to a letter from Senator Bob Corker, the State Department has indicated that the United States is not seeking an agreement in which the parties take on legally binding emissions targets, and this response means that, at the heart of the Paris agreement, the emissions targets will not be legally binding if the United States gets it way in Paris.

Now, I do not have any constitutional objection to the use of a political commitment in the manner described by the State Department as long as all parties understand what a political commitment, as opposed to a legally binding commitment, is.

By making a political commitment, the United States would not owe any legal obligations to foreign countries under international law to reach any particular emissions reductions target. And as a political commitment, no future president or Congress would be bound under U.S. law to reach these emissions targets.

So, as a matter of law, a non-legally binding Paris agreement would be no different than the President giving a speech saying I promise to reduce emissions or reach certain emissions targets in future years. However, as Madam Chairman noted, press reports indicate that other countries in Paris are expect the agreement to be a legally binding agreement. I also will quote again the statements from France's President, Francois Hollande, in which he said if the agreement is not legally binding, there won't be agreement, because that would mean it would be impossible to verify or control the undertakings that are made.

So statements like this by our treaty partners, or potential treaty partners, will make it tempting for U.S. negotiators to call the Paris agreement legally binding while they are in Paris, while at the same time assuring Congress it is not legally binding. And I think this kind of deception, or at least some confusion, is troubling because it either results in misleading foreign governments as to what the United States is promising or it results in the President violating the Constitution by concluding an agreement on his own authority as a sole executive agreement.

So as I explained in my written testimony, I don't believe the Constitution allows the President to use a sole executive agreement without any approval from Congress to legally bind the United States to particular greenhouse gas emissions targets. And a lack

of clarity on the legal nature of the Paris agreement could spur future litigation where a plaintiff might sue, for instance, to demand U.S. compliance with a legally binding Paris agreement.

So, for this reason, if the Paris agreement is finalized with political commitments, as Secretary Kerry and the Department of State seem to indicate, I recommend that the Senate request that the Administration identify publicly which particular provisions of the Paris agreement, if any, are legally binding and which particular provisions are just political commitments. Such an explanation ideally should take the form of a public statement by a senior member of the Administration, ideally Secretary of State Kerry himself, that reviews each provision of the Paris agreement and explains what is binding and what is not.

Such a statement would make it clear that the Paris agreement is or is not binding under domestic or international law and such a statement would also make clear, if it is not binding, that no future U.S. president or Congress is bound to fulfill the substantive obligations in the Paris agreement, and also shield a future president from litigation on this question.

So thank you. I would be happy to take questions on other issues, if you are interested.

[The prepared statement of Mr. Ku follows:]

Testimony of
Julian Ku
Maurice A. Deane Distinguished Professor of Constitutional Law
Hofstra University School of Law
“Examining the International Climate Negotiations”
Hearing Before the Environment and Public Works Committee
United States Senate
November 18, 2015

Introduction and summary

I would like to thank the Chairman, the Ranking Member, and the distinguished members of this Committee for inviting me to participate in today’s hearing.

My name is Julian Ku. I am a professor of law at Hofstra University in New York teaching both constitutional and international law subjects. Much of my academic research has focused on the relationship between international agreements and the U.S. Constitution.

My testimony today will consider requirements and limitations under the Constitution for an agreement relating to climate change arising out of next month’s climate change conference in Paris.

My testimony today has four parts.

First, I will review the different ways that the United States can enter into international agreements under the U.S. Constitution. Second, I will consider whether and under what circumstances the Paris Agreement must be approved by two-thirds of the U.S. Senate under Article II of the Constitution. Third, I will consider whether and under what circumstances the Paris Agreement can be concluded as an executive agreement. Finally, I will consider the implications of concluding the Paris Agreement as a political commitment rather than as a legally binding international agreement.

To briefly summarize my conclusions:

I conclude that if the Paris Agreement contains legally binding emissions targets binding, the agreement should be submitted to the Senate for approval as a treaty. I also conclude that if the Paris Agreement is merely a political commitment that is not binding under international law, the Senate and Congress do not have to approve such a commitment. However, it is crucial that the United States government declare which parts of the Paris Agreement are legally binding, and which parts are not. This is necessary in order to make clear to the world that a future U.S.

president is not legally bound by the Paris Agreement, or at least by those particular provisions of the Paris Agreement which are merely political commitments. The Senate can play an important role by forcing clarity and transparency from the Administration on the legal nature of the promises it has made.

I. Background: The Constitution and International Agreements

The text of the U.S. Constitution identifies only one method for concluding international agreements. In Article II, the President has the power to “to make Treaties, provided two thirds of the Senators present concur.” Many important international agreements, such as the United Nations Charter, have been concluded by the United States as treaties pursuant to Article II.

The text of the Constitution also refers to international agreements that are not treaties,¹ and as a matter of historical practice, the U.S. government has frequently made international agreements outside of the Article II process. Sometimes, this occurs when Congress pre-authorizes the President to make executive agreements pursuant to its domestic constitutional authority, and then reserves the right to approve such agreements afterward. The most recent example of this process occurred when Congress granted trade promotion authority to President Obama before he concluded the Trans Pacific Partnership trade agreement.²

In other situations, the President will conclude international agreements without getting any authorization from Congress, or without seeking any Congressional approval. These “sole” executive agreements have been quite common as a matter of historical practice. One of the most famous sole executive agreements was the “Algiers Accords” between the U.S. and Iran that resolved the Iran Hostage crisis.

There is little doubt today that all three forms of international agreements – treaties, congressional-executive agreements, and sole executive agreements – are constitutional. But there remains wide disagreement on the degree to which these three forms of international agreements are interchangeable. In other words, could the President choose to conclude an arms control treaty pursuant to a sole executive agreement? Do trade agreements like the Agreement creating the World Trade Organization have to receive approval from two-thirds of the Senate? This debate over interchangeability intersects directly with the legal form that the Paris Climate Change Agreement must take. In general, scholars and courts have agreed that treaties and congressional-executive agreements can be interchangeable in many circumstances, but that sole executive agreements can only be used in much more narrow and limited circumstances.

¹ See U.S. Const. art. I, § 10 (“No State shall enter into any Treaty, Alliance, or Confederation...”)

² See Bipartisan Congressional Trade Priorities and Accountability Act of 2015, 129 STAT. 320, §103(b) (June 29, 2015).

It is also worth noting that in some circumstances, the President may make a “political commitment” to another country. Such a commitment has no legal force, either under international or U.S. law. Such commitments are also common through U.S. history. Most recently, the U.S., Iran, and five other countries entered into a “Joint Comprehensive Plan of Action” to with respect to Iran’s nuclear program. The JCPOA is a political commitment that does not by itself bind the U.S. under international law.

II. Climate Change and Article II Treaties

While it has not been finalized, we can already say that the Paris Agreement will be a multilateral international agreement that will include almost every country in the world. The Paris Agreement will be the final outcome of a process set in motion by the Conference of State Parties to the United Nations Framework Convention on Climate Change. The UNFCCC parties (of which the United States is one) agreed in 2011 “to launch a process to develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties.”³ This “protocol, another legal instrument, or agreed outcome with legal force” is the pending Paris Agreement.

It is likely that the Paris Agreement will require states to make promises to reduce greenhouse gas emissions in the form of “nationally determined mitigation contributions.” Press reports suggest that many other parties to the Paris Agreement, especially in Europe, would like to make these obligations legally binding.⁴ If the outcome of the Paris Conference is to make these promises to reduce emissions legally binding, it is my view that the Paris Agreement must be submitted to the Senate for approval as a treaty under Article II.

Although the Constitution does not require that every international agreement be approved under the Article II process, historical practice and precedents should guide the President and Senate in determining what form an international agreement addressing climate change should take. From the outset of international efforts to create agreements to tackle climate change in the 1980s, various U.S. presidents and the Senate have used the Article II process.

The UNFCCC itself was approved under Article II, setting an important precedent for all future climate change-related international agreements. Most importantly, during the Senate’s consideration of the UNFCCC, the Senate Foreign Relations Committee specifically asked the then-Bush Administration whether subsequent agreements concluded under the UNFCCC containing “targets and timetables to limit emissions” would be submitted to the Senate. The Bush Administration responded:

³ <http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf#page=2>

⁴ *See, e.g.*, “Paris climate talks not just hot air, France tells U.S.,” Reuters (November 11, 2015) (quoting France’s President as saying “If the agreement is not legally binding, there won’t be an agreement, because that would mean it would be impossible to verify or control the undertakings that are made.”)

If such a protocol were negotiated and the United States wished to become a party, we would expect such a protocol to be submitted to the Senate.⁵

The report by the Senate Foreign Relations Committee recommending approval of the UNFCCC made clear that it had the same expectation.⁶ Thus, we can say that the Senate's approval of the UNFCCC was made with an assurance that the protocols and agreements made pursuant to the UNFCCC, especially those with targets and timetables for reduction in emissions, would be submitted to the Senate under Article II. The Paris Agreement would qualify as an agreement made pursuant to the UNFCCC.

To be sure, this inter-branch interaction from 1992 involved a different president and a different Congress. But brushing aside decades of executive branch practice and assurances would undermine the ability of the two branches to cooperate in the process of making international agreements in the future. For this reason, the 1992 assurances as well as the general practice with respect to multilateral environmental agreements, leads me to conclude that a Paris Agreement with legally binding emissions reduction "targets or timetables" should be submitted to the Senate as an Article II treaty.

III. Climate Change and Executive Agreements

Some scholars and advocates have argued that a climate change agreement in Paris can be concluded as an executive agreement instead of as an Article II treaty.⁷ It is important to distinguish between the two types of executive agreements when considering this view.

A. Congressional-Executive Agreement

First, some scholars argue that an agreement, including one with legally binding emissions reductions, can be concluded as a congressional-executive agreement.⁸ In other words, Congress as a whole (and not just the Senate) could pass new legislation to authorize such an agreement or to approve the agreement after the fact. As I explained above, I believe that if the Paris Agreement contains legally binding emissions reduction "targets or timetables," the Agreement should be submitted to the Senate under Article II due to past practice and historical precedents.

⁵ Hearing, *U.N. Framework Convention on Climate Change (Treaty Doc. 102-38)*, Committee on Foreign Relations, U.S. Senate, 102nd Cong., 2nd Sess., September 18, 1992, pp. 105–106.

⁶ S. Exec. Rept. 102-55, 102d Cong., 2d Sess., 1992, p. 14.

⁷ See, e.g., 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?* 39 HARV. ENV'T'L L. REV. 515 (2015).

⁸ See, e.g., 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?* 39 HARV. ENV'T'L L. REV. 515 (2015).

But the line between treaties and congressional-executive agreements remains contested. Thus, it is possible that the Administration could adopt legally binding emissions targets through a congressional-executive agreement. This process would require a new Act of Congress to approve the Paris Agreement. I stress, however, that this method is rarely used in the environmental agreement context, and use of this method for the Paris Agreement would breach the 1992 assurance that binding emissions targets would be submitted under Article II to the Senate. But if the Administration chose not to use a treaty, a congressional-executive agreement is the option with the strongest claim to constitutionality.

B. Sole Executive Agreements

Some scholars have gone further and argued the President can enter into the Paris Agreement as a “sole” executive agreement as long as he possesses the domestic legal authority to implement that agreement.⁹ In this view, if the United States can fulfill all of the Paris Agreement’s obligations pursuant to regulatory initiatives like the Clean Power Plan, then neither the Senate nor Congress needs to give approval for the President to join the Paris Agreement.

I agree that in some limited circumstances the President has the authority to make a binding international legal obligation through a sole executive agreement. But the Supreme Court has emphasized that the constitutionality of such sole executive agreements will depend greatly on past historical practice and congressional acquiescence.¹⁰ For instance, when the Court upheld the Algiers Accords resolving the Iran Hostage Crisis, a sole executive agreement, the Court emphasized that it was “[c]rucial” to its decision that “Congress has implicitly approved the practice of claim settlement by executive agreement.”¹¹

In this case, there is much less historical practice or congressional acquiescence in the use of sole executive agreements to make climate change agreements with foreign countries. The 2013 Minamata Convention on Mercury is the most prominent example of an environmental agreement concluded in this way.¹² But this recent example must be considered against a practice of submitting multilateral environmental agreements, and climate change agreements in particular, to the Senate. Not only was the UNFCCC submitted to the Senate, but the Kyoto Protocol was also thought to require Senate approval as well. Many key international environmental agreements have been submitted to the Senate as treaties rather than having been concluded as sole executive agreements.¹³

⁹ David A. Wirth, *The International and Domestic Law of Climate Change: A Binding International Agreement Without the Senate or Congress?* 39 HARV. ENV'T L. REV. 515 (2015).

¹⁰ *Dames & Moore v. Regan*, 453 U.S. 654, 680-83 (1981) (discussing congressional acquiescence in sole executive agreements for settling claims or normalizing relations).

¹¹ *Id.* at 680.

¹² Minamata Convention on Mercury, Oct. 10, 2013

¹³ See, e.g., Convention on International Trade in Endangered Species of Flora and Fauna (CITES), Mar. 3, 1973, 27 U.N.T.S. 243 (entered into force July 1, 1975);

Moreover, unlike in the case of the Minamata Convention, there are serious doubts about whether the President has the domestic legal authority to reduce greenhouse gas emissions by the level sought in the Paris Agreement. The centerpiece of the President's domestic authority to reduce emissions is the Clean Power Plan. But the viability of the Clean Power Plan is under review as 24 states recently filed a lawsuit challenging its legality.¹⁴ Even the possibility that the CPP will be invalidated leads me to conclude that a sole executive agreement should not be used for the Paris Agreement. Otherwise, the possibility remains that the President will unilaterally bind the U.S. to international legal obligations that he does not have the legal authority to carry out. Constitutional practice and prudence strongly weigh against using a sole executive agreement in this circumstance.

IV. Climate Change and Political Commitments

In response to a letter from Senator Bob Corker, the State Department has recently indicated that the United States is not “seeking an agreement in which Parties take on legally binding emissions targets.”¹⁵ This response means that the heart of the Paris Agreement, the emissions targets, will not be legally binding if the U.S. gets its way in Paris. Instead, the “intended nationally determined contribution” will be a voluntary nonbinding “political commitment.” The U.S. may be legally bound only with respect to procedural requirements to submit reports on U.S. progress in reducing emissions.

As I explained earlier, political commitments are not legally binding international agreements. Presidents have typically used them to make political statements of goals or aspirations jointly with foreign governments. They also have a long constitutional pedigree and it is generally accepted that the President has wide powers to make political commitments to foreign countries without getting Congress or the Senate to approve it.

I do not have any constitutional objection to the use of a political commitment in the manner described by the State Department in their recent letter to Senator Corker as long as all parties understand what a political commitment is. By making a mere political commitment, the United States would not owe any obligations to foreign countries under international law to reach particular emissions reduction targets. Moreover, as a mere political commitment, no future President or Congress would be bound under U.S. law to reach these emission targets. As a matter of law, the Paris Agreement would be no different than the President giving a speech, or stating at a news conference, that he will make reductions in emissions.

International Convention for the Prevention of Pollution from Ships, Nov. 2, 1973 1340 UNTS 184 (1973); Vienna Convention for the Protection of the Ozone Layer, March 27, 1985, UNEP/IG.53/5; Montreal Protocol on Substances that Deplete the Ozone Layer (U.N. Doc. UNEP/002565 (1987);

¹⁴ “Two dozen states file lawsuits against the Clean Power Plan”, *The Washington Times* (October 23, 2015); *See, e.g.,* Laurence Tribe, “The Clean Power Plan is Unconstitutional,” *The Wall Street Journal* (December 22, 2014).

¹⁵ Letter from Assistant Secretary of State for Legislative Affairs Julia Frifield to Senator Bob Corker, at 2 (October 19, 2015).

However, as I have also noted earlier, press reports indicate that other countries expect the COP in Paris to result in a legally binding agreement. For example, France's president Francois Hollande recently declared:

If the [Paris] agreement is not legally binding, there won't be an agreement, because that would mean it would be impossible to verify or control the undertakings that are made.¹⁶

Sentiments like this among members of the COP will make it tempting for US negotiators to call the Paris Agreement legally binding in front of its treaty partners, while at the same time assuring Congress it is not legally binding. This type of deception is troubling because it either results in misleading foreign governments, or it results in the President violating the Constitution by using a sole executive agreement. As I stated before, the Constitution does not permit the President to use a sole executive agreement to legally bind the United States to particular greenhouse gas emissions targets. Moreover, a lack of clarity on the legal nature of the Paris Agreement could spur future litigation where, for instance, a plaintiff might sue to demand U.S. compliance with the Paris Agreement.

For this reason, if the Paris Agreement is finalized with "political commitments", I recommend that the Senate demand that the Administration identify publicly which particular provisions of the Paris Agreement (if any) are legally binding and which ones are merely non-binding political commitments. Such an explanation should take the form of a public statement from the State Department, ideally made by Secretary Kerry himself, that reviews each provision of the Paris Agreement in detail.

Such a statement would make it clear that the Paris Agreement does not bind the United States, under either domestic or international law, to reduce greenhouse gas emissions by a particular amount or by a particular time. Such a statement would also make clear that no future U.S. president is bound to fulfill the substantive commitments in the Paris Agreement, and would shield a future president from litigation on this question.

Conclusion

The Senate can and should play an important role in U.S. efforts to use international cooperation to deal with the problem of climate change. If the Paris Conference results in an international agreement to impose legally binding "targets or timetables" for reductions in emissions, I believe such an agreement must be submitted to the U.S. Senate for approval. I do not believe the Constitution would permit the President to conclude such an agreement as a sole executive agreement.

If the Paris Conference results in a mere political commitment to reduce greenhouse gas emissions, it is important that the United States make clear to its foreign partners that this

¹⁶ "Paris climate talks not just hot air, France tells U.S.," Reuters (November 11, 2015).

commitment is not binding under either international or domestic law. The Senate can and should require the Administration to go “on the record” and declare the non-binding nature of this commitment.

Biography**Julian Ku****Maurice A. Deane Distinguished Professor of Constitutional Law
Maurice A. Deane School of Law at Hofstra University**

Professor Ku's primary research interest is the relationship of international law to constitutional law. He has also conducted academic research on a wide range of topics including international dispute resolution, international criminal law, and China's relationship with international law. He teaches courses such as U.S. constitutional law, U.S. foreign affairs law, transnational law, and international trade and business law. Since 2012, he has served as the faculty director of international programs, overseeing Hofstra Law's study abroad, exchange and LL.M. programs. He has also been selected as the John DeWitt Gregory Research Scholar and as a Hofstra Law Research Fellow. He is a member of the American Law Institute and the New York Bar. He is a graduate of Yale College and Yale Law School.

He is the co-author, with John Yoo, of *Taming Globalization: International Law, the U.S. Constitution, and the New World Order* (Oxford University Press 2012). He also has published more than 40 law review articles, book chapters, symposia contributions, and essays. He has given dozens of academic lectures and workshops at major universities and conferences in the United States, Europe and Asia.

He co-founded the leading international law blog *Opinio Juris*, which is read daily by thousands worldwide. His essays and op-eds have been published in major news publications such as *The Wall Street Journal*, the *Los Angeles Times* and NYTimes.com. He has been frequently interviewed for television news programs and quoted in print and electronic media. He has also signed or submitted amicus briefs to national and international courts and served as an expert witness in both domestic and international proceedings.

Before joining the Hofstra Law faculty, Professor Ku served as a law clerk to the Honorable Jerry E. Smith of the U.S. Court of Appeals for the Fifth Circuit and as an Olin Fellow and Lecturer in Law at the University of Virginia Law School. Professor Ku also practiced as an associate at the New York City law firm of Debevoise & Plimpton, specializing in litigation and arbitration arising out of international disputes. He has been a visiting professor at the College of William & Mary Marshall-Wythe School of Law in Williamsburg, Virginia; a Fulbright Distinguished Lecturer in Law at East China University of Political Science and Law in Shanghai, China; and a Taiwan Fellow at National Taiwan University in Taipei, Taiwan.

Senator CAPITO. Thank you, Mr. Ku.
Mr. CASS.

**STATEMENT OF OREN CASS, SENIOR FELLOW, MANHATTAN
INSTITUTE FOR POLICY RESEARCH, INC.**

Mr. CASS. Thank you for inviting me today. My name is Oren Cass. I am a Senior Fellow at the Manhattan Institute for Policy Research.

My primary message to the committee is this: climate negotiations no longer bear a substantial relationship to the goal of sharply reducing greenhouse gas emissions. Rather, the upcoming Paris conference will focus on a commitment by developed nations, including the United States, to transfer enormous sums of wealth to poorer countries.

This outcome is not surprising to those skeptical that U.S. so-called leadership on climate policy could persuade the developing world to forgo economic growth for the sake of emissions reductions. However, it differs dramatically from the popular narrative in which Paris represents the historic culmination of a worldwide process to bring countries together and act on climate.

My written testimony makes three points which I will summarize here.

First, the negotiating process is specifically designed to produce an easy consensus and excuse inaction. It relies upon each country announcing an intended nationally determined contribution, or INDC, that represents its proposed actions and emissions reductions. However, the contents of the INDC itself are entirely discretionary. There is no requirement that cuts achieve certain levels or that the INDC even use consistent formats, metrics, or baseline. There is also no consequence for missing a plan's goals.

Boosters are highlighting the INDC-driven structure and the parade of submitted plans as proof that the world can take meaningful action on climate. That is exactly backward. Negotiations have followed this course of discretionary, unenforceable pledges only because the positions of the countries are so irreconcilable that no substantive agreement is possible.

And that brings to me to my second point, which is that attempts at so-called leadership, as Senator Carper described in his introduction, have not spurred others to action. My written testimony details the various manipulations that have produced impressive estimates for INDC impact. However, these use a century's worth of escalating efforts, not the actual commitments made, or else they compare the actual commitments to plainly incorrect baselines that the UNIPCC does not recommend. And this is precisely the basis for positive-seeming estimates cited in Mr. Waskow's testimony as well.

A more realistic interpretation of the analyses suggest total impact of all the INDCs is less than 0.2 degrees Celsius, and using the U.N.'s own A1B baseline for longtime standard, there is no improvement at all. Country-by-country analysis tells the same story. China has committed to reaching peak emissions around 2030, but studies consistently show they were already on this trajectory.

India's commitment manages to be even weaker. The most obvious reference point is in the INDC itself. India reports that energy

efficiency improved more than 17 percent in that country between 2005 and 2012. India could improve only half as fast going forward and still meet the goal that it set for itself.

Now, such efforts have received loud applause from the White House, from the media, and by NGO's demanding climate action. But if the INDC process relies on peer pressure and so-called naming and shaming those who drag their feet, then cheerleading for empty non-commitments destroys the premise of the entire enterprise. One might even conclude that political point-scoring has taken precedence over actually addressing climate change, which brings me to my third point.

The Paris negotiations are not about emissions reduction; they are about cash. The developing world expects developed countries to offer more than \$100 billion per year in what is called climate finance. The rationale for the money, the source of the money, and the use of the money are all unclear. Developing nations believe they are owed a "ecological debt" for past developed world emissions and also owed "reparations" for the damage from storms they link to climate change.

Now, these are plainly non-starters for the United States. But the developing world is also asking to be reimbursed the cost of mitigation measures they take. India alone says in its INDC it needs \$2.5 trillion between now and 2030. But if the INDCs represent business as usual, funding is clearly inappropriately.

Realistically, developed world leaders are pursuing a transaction in which, having staked their political capital and their legacies on achieving an agreement, any agreement, they will now pay developing nations to sign on the dotted line.

To conclude, we should worry that U.S. negotiators and their colleagues desperate to produce an agreement will commit dollars from taxpayers that they cannot actually develop and get nothing in return. The Senate should preempt any purchase of a piece of paper. A clear, simple resolution rejecting enormous transfers of wealth from the United States to other countries would highlight the issue for the American public, it would tie negotiators' hands, and it would ensure that any future climate change negotiations actually focus on climate change.

Thank you again for the opportunity to appear before the committee, and I look forward to answering your questions.

[The prepared statement of Mr. Cass follows:]

**Testimony of Oren M. Cass
before the Senate Committee
on Environment and Public Works
November 18, 2015**

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

My name is Oren Cass. I am a senior fellow at the Manhattan Institute for Policy Research where my work addresses both domestic environmental policy and international climate negotiations.

My primary message to the committee is this: international climate negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) no longer bear a substantial relationship to the goal of sharply reducing greenhouse gas emissions. Rather, the only likely achievement of the upcoming Paris conference (COP21) is a commitment by developed nations including the United States to transfer large sums of wealth to poorer nations.

This outcome is not surprising to those skeptical that U.S. "leadership" on climate policy could persuade the developing world to make economic sacrifices for the sake of reducing emissions. However, it differs dramatically from the popular narrative in which COP21 represents the historic culmination of an effective process to bring the world together and act on climate. Policymakers must understand why that narrative is wrong and what the reality means for U.S. policy and the role of Congress in particular.

I will make three points here: First, that the negotiating process is designed to produce an easy consensus while excusing inaction. Second, that the much-celebrated developing nation commitments in fact reflect only a promise to continue with business as usual. Third, that the emphasis on so-called "climate finance" is unproductive and should – and can – be strongly resisted by the Congress.

1. The UNFCCC Negotiating Process

After the collapse of the Copenhagen talks in 2009, the world appears to have abandoned the prospect of achieving a binding agreement to reduce greenhouse-gas emissions. Certainly, no global cap-and-trade program, carbon tax, or other "price on carbon" is under discussion.

Instead, negotiators have adopted a "pledge-and-review" process whereby each country announces an "Intended Nationally Determined Contribution" (INDC) that represents its proposed actions and emissions reductions. The contents of these INDCs

are at the discretion of the individual countries. At the insistence of developing nations, there is no requirement that INDCs achieve cuts of certain levels or that they even use consistent formats, metrics, or baselines.¹ Developing nations also oppose “any obligatory review mechanism for increasing individual efforts of developing countries.”² No consequences have been established for missing a plan’s goals.

The hope is that, to quote from a preliminary negotiating text, this approach will produce an “upward spiral of ambition over time”³—or, as the *New York Times* headlined it, “A Climate Accord Based on Global Peer Pressure.”⁴ But as David J.C. Mackay and his colleagues noted in a recent commentary for *Nature*: “History and the science of cooperation predict that quite the opposite will happen.”⁵ A process that ignores the collective-action problems associated with climate change and provides no concrete incentives to act is ill-suited to the purported objectives of climate negotiators.

Boosters of the negotiations have highlighted the agreement to move forward with an INDC-driven structure, followed by the parade of submitted INDCs, as proof that the world can in fact come together and take meaningful action on climate change. That view is precisely backward. Negotiations have followed this course of discretionary, unenforceable pledges only because the positions and interests of countries were so plainly incompatible that a substantive agreement was not possible.

Of course, one should not exclude the possibility of progress on the basis of theory alone. Unfortunately, the poor quality of the submitted INDCs only confirms what rational analysis of the process would have predicted: significant obfuscation and posturing, but insignificant results.

2. Estimated Impact of INDCs

Because creation of INDCs was left entirely to the discretion of individual countries, with no common baseline or metrics, measuring the cumulative impact of submissions is not a straightforward process. INDCs must be standardized and then translated into a plausible emissions trajectory. A realistic baseline for emissions absent the INDCs must be established, against which progress can be measured.

¹ Coral Davenport, “A Climate Accord Based on Global Peer Pressure,” *New York Times*, December 14, 2014, <http://www.nytimes.com/2014/12/15/world/americas/lima-climate-deal.html>.

² Press Release, “Meeting of Negotiators of Like-Minded Developing Countries Concludes; Javadekar Lauds Work Done by LMDC,” Press Information Bureau, Government of India, September 15, 2015, <http://pib.nic.in/newsite/PrintRelease.aspx?relid=126913>.

³ Parties’ Views and Proposals on the Elements for a Draft Negotiating Text (ADP.2016.6.NonPaper), UNFCCC, October 2014, http://unfccc.int/documentation/documents/advanced_search/items/6911.php?prif=600008013.

⁴ *Supra* note 1.

⁵ David J.C. MacKay et al, “Price Carbon—I Will If You Will,” *Nature*, October 12, 2015, <http://www.nature.com/news/price-carbon-i-will-if-you-will-1.18538>.

If INDCs slow emissions growth relative to the past, but only by the amount emissions were already likely to slow given economic and technological progress, then countries are “committing” only to proceeding with business as usual (BAU). Conversely, choosing an implausibly high baseline and then comparing it to BAU can make simply proceeding with BAU appear significant.

Most efforts at quantification show the INDCs achieving significant progress, however that progress is the illusory result of poorly chosen baselines and unwarranted inferences.

2.A “Top-Down” Assessments

Aggregations of INDCs have produced confusing and seemingly inconsistent results:

- Climate Interactive, a Washington-based non-profit that has partnered with the U.S. State Department,⁶ reports that temperatures by 2100 would rise 4.5°C above pre-industrial levels in a BAU case but only 3.5°C based on INDCs.⁷ However, it uses the UN Intergovernmental Panel on Climate Change (IPCC)’s RCP 8.5 reference case as its BAU, even though the IPCC specifies that: “The RCP 8.5 pathway has higher emissions than all but a few published baseline scenarios.”⁸
- Climate Action Tracker (a partnership of Climate Analytics, Ecofys, NewClimate Institute, and Potsdam Institute for Climate Impact Research) reports that temperatures by 2100 would rise 3.6°C based on current policy action but only 2.7°C based on INDCs.⁹ However, that 2.7°C figure is reached only by assuming that all countries will make additional commitments to further reduce emissions after the end of the period covered by the INDCs.¹⁰
- The Massachusetts Institute of Technology’s Joint Program on the Science and Policy of Global Change reports that temperatures by 2100 would rise 3.9°C without INDCs and 3.7°C with them.¹¹ The MIT study uses an apples-to-apples comparison of its own projections before and after incorporating the INDCs. Unfortunately, much of the progress thus disappears.

⁶ “About,” Climate Interactive, <https://www.climateinteractive.org/about/> (accessed November 11, 2015).

⁷ “Climate Scoreboard,” Climate Interactive, <https://www.climateinteractive.org/tools/scoreboard/> (accessed November 11, 2015).

⁸ IPCC, Fifth Assessment Report, Working Group 3, Section 6.3.1.3, http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_full.pdf.

⁹ “Global,” Climate Action Tracker, <http://climateactiontracker.org/global.html> (accessed November 11, 2015).

¹⁰ “Global Pathways,” Climate Action Tracker, <http://climateactiontracker.org/methodology/18/Global-pathways.html> (accessed November 11, 2015).

¹¹ John Reilly et al., “Energy & Climate Outlook: Perspectives from 2015,” MIT Joint Program on the Science and Policy of Global Change, 2015, <http://globalchange.mit.edu/files/2015%20Energy%20%26%20Climate%20Outlook.pdf> (box 2).

- The UN has conducted its own analysis, concluding that INDCs will reduce global carbon-dioxide-equivalent emissions in 2030 from 60.3 to 56.7 gigatons, with a twentieth percentile estimate of no improvement and an eightieth percentile estimate of a 7.5 gigaton improvement.¹² The UN emphasizes that this reduction equates to growth of “11–23 per cent in the 2010–2030 period compared with 24 per cent in the 1990–2010 period,”¹³ implying that continuation of the prior growth rate would represent a baseline and any slowing of growth an improvement (see Figure 1). But as the IPCC observed only two years earlier in its Fifth Assessment Report: “most baseline scenarios project a deceleration in emissions growth, especially compared to the rapid rate observed in the past decade.”¹⁴

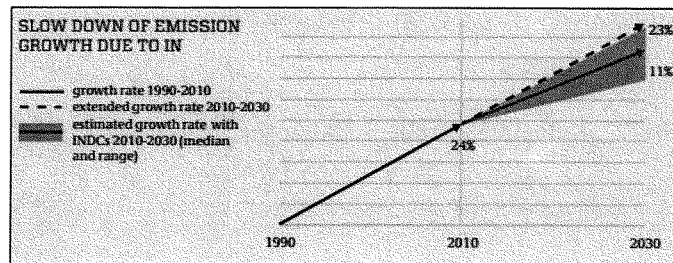


Figure 1. UNFCCC Assessment of INDC Impact from Constant-Growth Baseline.¹⁵

In aggregate, the best estimate for temperature rise with INDCs appears to be 3.5°C (Climate Interactive) to 3.7°C (MIT), while the best estimate of the world’s trajectory absent them is 3.6°C (Climate Action Tracker current policy) to 3.9°C (MIT). In other words, the actual improvement if all countries follow through with their voluntary contributions, is 0.1 to 0.2°C.

However, even this estimate may overstate the impact of the INDCs.

2.B A Better Baseline

None of the assessments described above uses the set of baseline scenarios developed by the IPCC Special Report on Emissions Scenarios (SRES) in 2000 to describe the likely emissions associated with various future trajectories of economic growth and

¹² Synthesis Report on the Aggregate Effect of the Intended Nationally Determined Contributions, UNFCCC, October 30, 2015, <http://unfccc.int/resource/docs/2015/cop21/eng/07.pdf>.

¹³ *Id.*

¹⁴ *Supra* note 8.

¹⁵ Synthesis Report on the Aggregate Effect of the Intended Nationally Determined Contributions (Brief Overview), UNFCCC, October 30, 2015, http://unfccc.int/files/focus/inde_portal/application/pdf/synthesis_report_-_brief_overview.pdf

technological progress.¹⁶ Of these, the “A1B” scenario provides a particularly useful and widely-used baseline. According to the IPCC:

The A1 storyline and scenario family describes a future world of very rapid economic growth, global population that peaks in mid-century and declines thereafter, and the rapid introduction of new and more efficient technologies. Major underlying themes are convergence among regions, capacity building and increased cultural and social interactions, with a substantial reduction in regional differences in per capita income. The A1 scenario family develops into three groups that describe alternative directions of technological change in the energy system. The three A1 groups are distinguished by their technological emphasis: fossil-intensive (A1F), non-fossil energy sources (A1T) or a balance across all sources (A1B) (where balanced is defined as not relying too heavily on one particular energy source, on the assumption that similar improvement rates apply to all energy supply and end use technologies).¹⁷

The A1B scenario has been used as a baseline in recent years by both the U.S. government¹⁸ and European researchers¹⁹. Climatologists Michael Mann and Richard Alley of Penn State University call it “a ‘middle of the road’ emission scenario that is often used as a baseline for comparisons.”²⁰ Its emissions trajectory falls in between those of the RCP 6.0 and RCP 8.5 pathways,²¹ consistent with the IPCC’s observation that: “Although most baseline scenarios project a deceleration in emissions growth, especially compared to the rapid rate observed in the past decade, none is consistent in the long run with the pathways in the two most stringent RCP scenarios [2.6 and 4.5], with the majority falling between the 6.0 and 8.5 pathways.”²²

One possible reason that INDC analyses have avoided using the A1B baseline is that using it eliminates any sign of progress. According to the Model for the Assessment of Greenhouse-gas Induced Climate Change (MAGICC), developed through support of the U.S. Environmental Protection Agency,²³ the projected climate change by 2100 under the A1B scenario is 3.4°C.²⁴ This result is consistent with the IPCC’s own estimate

¹⁶ IPCC, Fourth Assessment Report, Working Group I, Summary for Policy Makers, https://www.ipcc.ch/publications_and_data/ar4/wg1/en/spmssp-projections-of.html.

¹⁷ *Id.* (emphasis added).

¹⁸ Jeremy Melillo et al, eds., “Climate Change Impacts in the United States: The Third National Climate Assessment,” U.S. Global Change Research Program, October 2014, http://s3.amazonaws.com/nca2014/low/NCA3_Climate_Change_Impacts_in_the_United%20States_LowRes.pdf.

¹⁹ Ole B. Christensen et al, “European and Global Climate Change Projections,” The ClimateCost Project, September 2011, http://www.climatecost.ce/images/Policy_brief_1_Projections_05_lowres.pdf.

²⁰ Michael Mann and Richard Alley, “SRES Scenarios,” Penn State University, <https://www.e-education.psu.edu/meteo469/node/145> (accessed November 11, 2015)

²¹ IPCC, Fifth Assessment Report, Working Group 2, Chapter 1, http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap1_FINAL.pdf (figure 1-4).

²² *Supra* note 8 (and figure 6.4).

²³ “MAGICC/SCENGEN: About,” <http://www.cgd.ucar.edu/cas/wigley/magicc/about.html> (accessed November 11, 2015).

²⁴ M. Meinshausen et al, “Emulating coupled atmosphere-ocean and carbon cycle models with a simpler model, MAGICC6: Part I – Model Description and Calibration,” Atmospheric Chemistry and Physics, 2011, <http://live.magicc.org> (accessed November 11, 2015).

for the scenario of 3.3°C warming.²⁵ Either figure is *already below* the best estimate for what the INDCs achieve. In its report, MIT also shows the A1B trajectory of emissions as virtually indistinguishable from the INDC-driven projection.²⁶

A “bottoms-up” assessment of individual INDCs confirms the view that countries have promised only what was already likely to happen.

It is the major developing nations whose aggressive emissions trajectories will dictate the world’s total emissions this century – four-fifths of carbon-dioxide emissions in the A1B scenario. But those are the same nations whose desperate need for economic growth precludes a willingness to focus on emissions reductions. They are committing only to doing what they believed their economies would do anyway, rather than making sacrifices or incurring costs.

Two, China and India, are reviewed in detail here.

2.C Country Assessment: China

China has committed to reaching peak emissions “around 2030” but offered no commitment regarding the level of that peak or the subsequent rate of emission decline. It has also committed to reducing carbon-dioxide emissions per unit of GDP by 60 to 65 percent in 2030 as compared to 2005.²⁷

But four years ago, in 2011, a study by the U.S. government’s own Lawrence Berkeley National Laboratory had already concluded that Chinese emissions would peak around 2030.²⁸ An analysis by Bloomberg New Energy Finance further concludes that the commitment with respect to emissions intensity is actually *less* ambitious than BAU.²⁹

China’s recent announcement that its coal consumption is up to 17 percent higher than previously estimated makes the commitment even weaker and more easily achievable,

²⁵ IPCC, Fourth Assessment Report, Summary for Policy Makers, https://www.ipcc.ch/publications_and_data/ar4/svr/en/spms3.html (table SPM.1 provides warming since 1980-1999; note (d) provides adjustment to pre-industrial baseline).

²⁶ John Reilly et al, “Energy & Climate Outlook: Perspectives from 2015,” MIT Joint Program on the Science and Policy of Global Change, 2015, <http://globalchange.mit.edu/files/2015%20Energy%20%26%20Climate%20Outlook.pdf> (figure 17).

²⁷ “Intended Nationally Determined Contribution of China,” UNFCCC, June 30, 2015, <http://www4.unfccc.int/submissions/INDC/Published%20Documents/China/1/China's%20INDC%20-%20on%2030%20June%202015.pdf>.

²⁸ Nan Zhou et al, “China’s Energy and Carbon Emissions Outlook to 2050,” Lawrence Berkeley National Laboratory, April 2011, <https://china.lbl.gov/sites/all/files/lbl-4472e-energy-2050april-2011.pdf>.

²⁹ “How Ambitious Are the Post-2020 Targets?,” Bloomberg New Energy Finance, October 2, 2015, <http://about.bnef.com/content/uploads/sites/4/2015/10/2015-10-02-How-ambitious-are-the-post-2020-targets-UPDATE-2-Oct.pdf>.

as its officials acknowledge.³⁰ Because its commitments include no absolute emissions targets, starting from a higher baseline simply means it can consume and emit more while still meeting its goal. Especially insofar as Chinese leaders may have been aware their official statistics underreported coal consumption and emissions, they have played the INDC game masterfully.

Climate Action Tracker, one of the organizations attempting to calculate INDC impacts, provides a China-specific view and projects the country's commitments to fall squarely in the middle of the projection for current policy (i.e., absent the INDC). Notably, the analysis disregards the emissions intensity target entirely because "the weak INDC carbon intensity targets, if taken literally, would only be reached at the expense of important national policies and actions, including in relation to reduced air pollution. This appears unlikely in our judgment."³¹ The analysis acknowledges that the commitment is meaningless but therefore dismisses it as implausible and substitutes a more climate-friendly estimate.

2.D Country Assessment: India

Nonetheless, China's INDC is a model of climate ambition when compared to India's. While the *New York Times* headlined India's announcement with "India Announces Plan to Lower Rate of Greenhouse Gas Emissions,"³² the country offered no commitment with respect to its emissions – even a potential future peak – and only a 33 to 35 percent reduction in emissions per unit of GDP in 2030 as compared to 2005.³³

Analyses from multiple perspectives demonstrate the emptiness of this commitment. In April, India's Centre for Policy Research estimated an emissions trajectory for the country absent further policy action³⁴ and the INDC commitment falls squarely in the middle of the established range. Bloomberg finds it significantly worse than BAU³⁵ and researcher Glen Peters has shown the proposed progress is slower than historical trend.³⁶ Indeed, the most obvious reference point is in the INDC itself: India reports that

³⁰ Chris Buckley, "China Burns Much More Coal Than Reported, Complicating Climate Talks," *New York Times*, November 3, 2015, <http://www.nytimes.com/2015/11/04/world/asia/china-burns-much-more-coal-than-reported-complicating-climate-talks.html>.

³¹ "China," Climate Action Tracker, <http://climateactiontracker.org/countries/china.html> (accessed November 11, 2015).

³² Ellen Barry and Coral Davenport, "India Announces Plan to Lower Rate of Greenhouse Gas Emissions," *New York Times*, October 1, 2015, <http://www.nytimes.com/2015/10/02/world/asia/india-announces-plan-to-lower-rate-of-greenhouse-gas-emissions.html>.

³³ "Intended Nationally Determined Contribution of India," UNFCCC, October 1, 2015, <http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf>.

³⁴ Navroz K. Dubash et al., "Informing India's Energy and Climate Debate: Policy Lessons from Modelling Studies," Centre for Policy Research, April 2015, http://cprindia.org/sites/default/files/Informing%20India%27s%20Energy%20and%20Climate%20Debate_CPR-IIASA.pdf.

³⁵ *Supra* note 29.

³⁶ Glen Peters, "Is the Indian #INDC ambitious?" Twitter, October 12, 2015, https://twitter.com/Peters_Glen/status/653497917613830144/photo/1 (accessed November 11, 2015).

its energy efficiency has already improved more than 17 percent between 2005 and 2012. Assuming no change in its carbon intensity of energy, India could improve only half as fast going forward and still achieve its “goal.”

Climate Action Tracker also concedes that India’s target is less ambitious than BAU, but nevertheless awards the country a rating of “Medium.”³⁷ The only countries in the world to receive better ratings are Morocco, Costa Rica, Ethiopia, and Bhutan.

Looking beyond China and India, Indonesia has submitted a plan³⁸ so vague that the World Resource Institute could not assess it; Taryn Fransen, project director of the Institute’s Open Climate Network concluded it “does not allow for any accountability.”³⁹ Even Climate Action Tracker rates the plan “Inadequate” and finds it less aggressive than current policy projections.⁴⁰

Brazil, the most ambitious of the large developing countries, may actually have proposed an improvement on current policy. However, its carbon footprint has historically been driven by deforestation, which has slowed dramatically in recent years leading to significantly lower emissions. In its INDC, Brazil reports a 41 percent decline in emissions between 2005 and 2012 but commits to only a 37 percent reduction between 2005 and 2025.⁴¹ As professor Timmons Roberts and research fellow Guy Edwards of Brown University observed at the Brookings Institution, this is “seeking credit for work done” and “the new targets mean only tepid steps forward.”⁴²

Pakistan and Nigeria have submitted nothing, failing to comply with even the entirely subjective and unenforceable INDC process.

In summary, claims of progress for the INDC-driven approach are incorrect and depend on the use of inappropriate baselines or an assumption of action not even pledged. But if actual discussions over emissions reductions have been reduced to the

³⁷ “India,” <http://climateactiontracker.org/countries/india.html> (accessed November 11, 2015).

³⁸ “Intended Nationally Determined Contribution of Indonesia,” UNFCCC, September 24, 2015, http://www4.unfccc.int/submissions/INDC/Published%20Documents/Indonesia/1/INDC_REPUBLIC%20OF%20INDONESIA.pdf.

³⁹ Suzanne Goldenberg, “Indonesia to Cut Carbon Emissions by 29% by 2030,” Guardian (UK), September 24, 2015, <http://www.theguardian.com/environment/2015/sep/21/indonesia-promises-to-cut-carbon-emissions-by-29-by-2030>.

⁴⁰ “Indonesia,” Climate Action Tracker, <http://climateactiontracker.org/countries/indonesia.html> (accessed November 11, 2015).

⁴¹ “Intended Nationally Determined Contribution of Brazil,” UNFCCC, September 28, 2015, <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Brazil/1/BRAZIL%20INDC%20english%20FINAL>.

⁴² Guy Edwards and Timmons Roberts, “Despite Its Heavyweight Status, Brazil’s Climate Plan Punches Below Its Weight,” PlanetPolicy (Brookings), September 30, 2015, <http://www.brookings.edu/blogs/planetpolicy/posts/2015/09/30-brazil-climate-plan-edwards-roberts>.

submission of voluntary, unenforceable, and often empty INDCs, what is the point of even meeting in Paris?

3. An Emphasis on “Climate Finance”

Negotiations in Paris will focus little on greenhouse-gas emissions and almost entirely on the more mundane subject of cash. Specifically, the developing world expects developed countries to offer more than \$100 billion per year in what is called “climate finance.”

Then-Secretary of State Hillary Clinton first announced a developed-world commitment to such enormous wealth transfers in a bid to save the Copenhagen talks in 2009.⁴³ UN Secretary-General Ban Ki-moon now insists “credible climate financing is essential” to success in Paris⁴⁴ while Miguel Cañete, the EU’s Commissioner for Climate Action, has reportedly promised not only \$100 billion per year by 2020 but increasing amounts thereafter.⁴⁵ Christiana Figueres, the Executive Secretary of the UN Framework Convention on Climate Change, wrote in an op-ed published October 30:

Crucial to that success [in Paris] and to fostering the current and future ambitions of countries will be finance – and, more specifically, support from developed countries to the aspirations of developing ones. Six years ago, rich countries pledged to provide \$100 billion to poorer countries by 2020, the date when the new agreement will come into force. Paris needs to provide certainty, clarity and confidence that this promise will be met, not least to support the climate action plans – Intended Nationally Determined Contributions (INDCs) – of the most vulnerable nations, including the least developed countries and the small island developing states.⁴⁶

What remains unclear is not only the source of this finance, but also its rationale. Figueres notes that one purpose might be to support the implementation of INDCs (though, as discussed above, those INDCs do not generally represent new action). As her phrasing implies, many justifications have been floated:

- First, developing nations suggest that developed nations owe them an “ecological debt” for the latter’s disproportionate share of past emissions. Pope Francis endorsed this argument in his encyclical on the environment.⁴⁷ This

⁴³ Lisa Friedman and Darren Samuelsohn, “Hillary Clinton Pledges \$100B for Developing Countries,” *New York Times*, December 17, 2009, <http://www.nytimes.com/cwire/2009/12/17/17climatewire-hillary-clinton-pledges-100b-for-developing-96794.html>.

⁴⁴ “100 Billion Reasons a Global Climate-Change Deal May Fall Apart,” *Bloomberg Business*, June 29, 2015, <http://www.bloomberg.com/news/articles/2015-06-29/un-leader-says-climate-talks-won-t-hit-mark-to-limit-warming>.

⁴⁵ Fiona Harvey, “No Plan B if Paris Climate Summit Ends in Failure, Says EU Climate Chief,” *Guardian (UK)*, July 6, 2015, <http://www.theguardian.com/environment/2015/jul/06/no-plan-b-if-paris-climate-summit-ends-in-failure-says-eu-climate-chief>.

⁴⁶ Christiana Figueres, “Time to Focus on Climate Finance,” *G7 G20*, October 30, 2015, <http://www.g7g20.com/articles/christiana-figueres-time-to-focus-on-climate-finance>.

⁴⁷ Pope Francis, *Laudato Si'*, May 24, 2015, http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html.

argument holds that because scientific estimates place an upper limit on the amount of carbon dioxide that humanity can ever emit, nations like the U.S. that have already emitted more than their fair share are accumulating debt payable to nations using less than their fair share. In America's case, the monetary value of the debt could reach trillions of dollars.⁴⁸

- Second, developing nations suggest that developed nations should pay them "reparations" for natural disasters caused by the climate change for which past developed-nation emissions are purportedly responsible. While many western politicians are eager in the domestic context to attribute natural disasters and their severity to climate change, they are reluctant to do so in an international context where accepting such causation could trigger enormous and unpredictable liability.⁴⁹
- Third, developing nations suggest that the funding will help them to pursue low-carbon development, deploy more renewable energy, and adapt to whatever climate changes occur. This rationale is the only one that U.S. negotiators have acknowledged as valid.⁵⁰ However, in the current negotiating framework, it remains unclear what developed nations would be receiving for their money. India, for instance, has suggested it will require \$2.5 trillion between now and 2030—to pursue its business-as-usual INDC.⁵¹

As should be clear, it makes little sense under any rationale for the developed world to offer trillions of dollars in wealth transfers as part of an agreement not likely to produce emissions reductions. But increasingly, those payments are considered the price of the agreement. Developed-world climate negotiators are pursuing a transaction in which leaders in the developed world, having staked their political capital and legacies on achieving an "agreement," must pay developing nations to sign on the dotted line.

This dynamic—where the objective of an agreement is the agreement itself—explains why a process was embraced that prioritizes empty consensus over any prospect of substantive action, why the empty commitments that followed have been celebrated as important achievements rather than condemned as inadequate, and why negotiations now center on wealth transfers.

⁴⁸ Oren Cass, "Leading Nowhere: The Futility and Farce of Global Climate Negotiations," Manhattan Institute for Policy Research, October 2015, <http://www.manhattan-institute.org/html/leading-nowhere-futility-and-farce-global-climate-negotiations-7816.html>.

⁴⁹ Ben Webster, "Britain Rejects Demands for Climate Disaster Compensation," *The Times* (UK), November 21, 2013, <http://www.thetimes.co.uk/tto/environment/article3927261.ece>.

⁵⁰ Andrew C. Revkin and Tom Zeller Jr., "U.S. Negotiator Dismisses Reparations for Climate," *New York Times*, December 9, 2009, <http://www.nytimes.com/2009/12/10/science/earth/10climate.html>.

⁵¹ *Supra* note 33.

4. Role of the Senate

The Senate has a critical role to play in this negotiation – though perhaps not the one traditionally envisioned. It is unlikely that any binding agreement will emerge from the Paris talks that would necessitate ratification as a treaty. Indeed, the negotiations have been designed to ensure countries can all reach an agreement that binds themselves to nothing.

However, developing countries are demanding clear commitments of “climate finance” and, unconstrained, developed countries desperate to produce an agreement may capitulate. Congress would then find itself positioned to serve as a scapegoat if it refuses to appropriate funds, responsible for undermining the agreement even though negotiators condemned it to ineffectiveness from the start.

The Senate, ideally together with the House of Representatives, should preemptively signal that the United States will not provide the “climate finance” under discussion. There is precedent for this approach in the Senate’s unanimous 1997 Byrd-Hagel resolution rejecting the framework of the Kyoto Acord.⁵² A clear, simple resolution rejecting enormous transfers of wealth from the United States to other countries would help to highlight the issue for the American public and could earn significant bipartisan support.

Thank you again for the opportunity to appear before the Committee. I hope my testimony will be helpful to you as you consider the appropriate role for the United States, and the Senate, in international climate negotiations.

⁵² Senate Resolution 98, 105th Congress, July 25, 1997, <https://www.congress.gov/bill/105th-congress/senate-resolution/98>.

Senator CAPITO. Thank you.
Mr. EULE.

STATEMENT OF STEPHEN EULE, VICE PRESIDENT OF CLIMATE AND TECHNOLOGY, U.S. CHAMBER OF COMMERCE INSTITUTE OF 21ST CENTURY ENERGY

Mr. EULE. Thank you, Senator Capito, Senator Carper, and members of the committee. This hearing could not be timelier. As the Framework Convention on Climate Change meeting in Paris draws closer, it is important for policymakers to take a clear-eyed view of what a new post-2020 agreement might hold.

The main points I would like to make, which are detailed in my written testimony, are as follows.

First, the Obama administration's unilateral emissions reductions commitment for Paris is unrealistic and doesn't add up. We estimate that 41 to 45 percent of the Administration's emission target remains unaccounted for; and that is assuming EPA's Clean Power Plan survives court scrutiny, a big if. Selling such an uncertain plan internationally may prove very difficult.

Second, the emission goal nations have offered are hugely unequal and will not change appreciably the rising trajectory of global emissions. While the United States, Europe, Japan, and a few others have offered large emission cuts, nearly all developing countries, particularly the large emerging economies, have offered little beyond business as usual. A recent report from the Framework Convention estimates that even in the unlikely event all country pledges are implemented to the letter, global emissions will still rise about 18 percent between 2010 and 2030, within or close to the range of where emissions were headed anyway. Given how the Framework Convention is structured, this should surprise no one.

Third, the disparity in national commitments results from the fact that most countries place a greater priority on economic development than they do on cutting emissions of greenhouse gases. More than a billion people worldwide lack access to the modern energy services that could lift them out of poverty. Coal will remain for some time the fuel of choice for electrification in developing countries. Using data from plants, we estimate that on the eve of the Paris climate talks, 1.2 trillion watts of new coal-fired power plants are under construction or planned throughout the world. That is about 3.5 times the capacity of the entire U.S. coal fleet. A carbon constrained world this is not.

Fourth, the Administration's plan will likely result in emissions from the U.S. leaking to other countries, merely moving, not reducing them. The United States has a tremendous energy price advantage over many of its competitors. Overregulation from EPA, however, could force energy-intensive industries to flee to other countries, similar to what we are seeing in Europe, where energy costs to industry are two to four times higher than here in the United States.

Fifth, developing countries will not undertake any meaningful commitments without large doses of financial aid. China, for example, has proposed that developed countries kick in 1 percent of their annual GDP from 2020 on, which in 2014 would have implied a U.S. contribution of \$170 billion. Other suggestions are equally

extravagant. Whatever the final finance provisions look like, a great deal of the U.S. share of this funding will have to be appropriated by the Congress.

Sixth, technology is the key. At its most fundamental level, reducing greenhouse gas emissions is a technology challenge. Existing technologies can make a start, but, as we have seen, they are not capable of significantly cutting emissions on a global scale and at an acceptable cost. That is why the chamber will continue to emphasize energy efficiency and policies designed to lower the cost of alternative energy rather than raising the cost of traditional energy.

Finally, there is the larger question about the real goal of the Framework Convention. The organization's Executive Secretary, Christiana Figueres, recently had this to say about the Paris deal: "This is the first time in the history of mankind that we are setting ourselves the task of intentionally, within a defined period of time, to change the economic development model that has been reigning for at least 150 years, since the industrial revolution." The same free enterprise economic model Secretary Figueres wants to discard is the same model that has produced the largest flourishing of human health and welfare in all of history. The rest of the world understands that affordable, available, and scalable energy is not the problem, it is the solution.

Given all this, it seems clear that the Paris agreement, whether it has legal force or not, should be submitted to the Congress for its approval; otherwise, it is hard to see how anything agreed to in Paris will be binding on any future administrations or congresses.

Back in 1997, the Clinton administration offered up an unrealistic U.S. goal and, disregarding clear guidance from the Senate, signed the Kyoto Protocol, a treaty it knew was political poison and therefore never bothered to submit to the Senate for its advice and consent. It now looks like the Obama administration is set to repeat the mistake of signing onto a lopsided deal and making promises future presidents and congresses may be neither willing nor able to keep.

As the late, great Yogi Berra might have said, it's daj& vu all over again. Thank you.

[The prepared statement of Mr. Eule follows:]



Statement of the U.S. Chamber of Commerce

ON: Examining the International Climate Negotiations

**TO: U.S. Senate
Committee on Environment and Public Works**

DATE: 18 November 2015

1615 H Street NW | Washington, DC | 20062

The Chamber's mission is to advance human progress through an economic, political and social system based on individual freedom, incentive, initiative, opportunity and responsibility.

The U.S. Chamber of Commerce is the world's largest business federation representing the interests of more than 3 million businesses of all sizes, sectors, and regions, as well as state and local chambers and industry associations. The Chamber is dedicated to promoting, protecting, and defending America's free enterprise system.

More than 96% of Chamber member companies have fewer than 100 employees, and many of the nation's largest companies are also active members. We are therefore cognizant not only of the challenges facing smaller businesses, but also those facing the business community at large.

Besides representing a cross section of the American business community with respect to the number of employees, major classifications of American business—e.g., manufacturing, retailing, services, construction, wholesalers, and finance—are represented. The Chamber has membership in all 50 states.

The Chamber's international reach is substantial as well. We believe that global interdependence provides opportunities, not threats. In addition to the American Chambers of Commerce abroad, an increasing number of our members engage in the export and import of both goods and services and have ongoing investment activities. The Chamber favors strengthened international competitiveness and opposes artificial U.S. and foreign barriers to international business.

Thank you, Chairman Inhofe, Ranking Member Boxer, and members of the Committee. I am Stephen D. Eule, vice president of the Institute for 21st Century Energy, an affiliate of the U.S. Chamber of Commerce. The mission of the Institute is to unify policymakers, regulators, business leaders, and the American public behind common sense energy strategy to help keep America secure, prosperous, and clean. In that regard, we hope to be of service to this Committee, this Congress as a whole, and the administration.

This hearing could not be timelier. As the international climate change meeting in Paris draws closer, it is import for policymakers to take a clear-eyed view of what a new climate change agreement might hold. Having spent many years attending and tracking these talks, both in government and the private sector, I can say there remains an air of unreality hangs over these negotiations that over time has led to unreasonable expectations about what countries will be able to deliver—including expectations about national greenhouse gas (GHG) emissions goals, technology readiness and commercial adoption, financial assistance, technology transfer, intellectual property, and loss and damage payments, issues that are among the most contentious in the international negotiations.

What I hope to do with this testimony is to strip away the rhetoric and provide an unvarnished, realistic view of the international climate change agreement now in the works and the U.S. commitment being offered.

Background

Climate change is among the most complex issues facing the international community. Negotiations are currently taking place under the United Nations Framework Convention on Climate Change (UNFCCC). The Framework Convention was adopted in 1992 and entered into force in 1994. The U.S. Senate gave its advice and consent to ratification of the agreement in 1992 by voice vote. This consent, however, came with the understanding that any future agreement pursuant to the UNFCCC that included emissions target and timetables would be subject to the Senate's advice and consent.

The ultimate goal of the UNFCCC is the "stabilization of greenhouse gas concentrations in the atmosphere at a level [undefined] that would prevent dangerous anthropogenic interference with the climate system." This goal should be "achieved within a time frame that would allow ecosystems to adapt naturally top climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner." More than 190 governments are Parties to the UNFCCC.

Since 1995, the Conference of the Parties (COP) to the UNFCCC have met annually, and in December of this year, the 21st meeting of the COP will take place in Paris, France in December with a goal of completing a new agreement.

From the very beginning, the structure of the UNFCCC has virtually guaranteed gridlock. Consider the notion of historical responsibility, which plays an oversized role in the dynamics between and among developed, emerging, and developing country Parties. Developing countries assert that as developed countries bear “historical responsibility” for most of the build-up of atmospheric carbon dioxide, they bear a greater responsibility to reduce emissions and to provide finance for reductions in developing countries.

Historical responsibility buttresses the UNFCCC principle of “common but differentiated responsibilities and respective capabilities” under which, “. . . developed country Parties should take the lead in combating climate change and the adverse effects thereof.” In other words, developing countries are not expected to do as much as developed countries, which have greater economic and technological capabilities to curb emissions. This principle of common but differentiated responsibilities is on full display in the 1997 Kyoto Protocol, which only saddles developed countries only with binding obligations to reduce emissions.

Over the years, however, it has become readily apparent that developed countries alone cannot reduce global emissions by themselves—all countries have to participate. Developing countries, however, have been reticent to take on any substantial obligations for the reasons cited above and because economic development remains their priority. Paris is supposed to be the first agreement that would bring developing countries into the fold as full partners.

The first cracks in this UNFCCC wall separating developed from developing countries appeared in the Bali Roadmap that emerged from the UNFCCC talks in Indonesia in 2007, where developing countries agreed to consider “nationally appropriate mitigation actions” that are “measurable, reportable, and verifiable.”

The Durban Platform for Enhanced Action, which was adopted at COP-17 in 2011, charged the Parties to adopt a “protocol, another legal instrument or an agreed outcome with legal force” at COP-21 and for it to “come into effect and be implemented from 2020.”

Unlike the Kyoto Protocol, which was a top-down treaty, the Paris agreement is anticipated to be a bottom-up treaty, with each country setting goals based on their unique national circumstances. These Intended Nationally Determined Contributions, or INDCs, will form the basis of the country-specific commitments under the new UN climate treaty. It is also expected that periodic review of these commitments will be instituted along with measuring, reporting, and verification to ensure the integrity and ambition of the commitments.

Despite many negotiating sessions this year, there are still many issues that need to be ironed out before an agreement is reached, including financial assistance under the UNFCCC’s Green Climate Fund, loss and damages, intellectual property and technology transfer, and a long-term global goal. These and other issues of particular interest to the business community are outlined below.

1. A Technology Challenge

As a practical matter, any long-range numeric goal makes assumptions about the pace of technology development and diffusion, an inherently unpredictable process. At its most fundamental level, reducing carbon dioxide emissions from energy is a technology challenge that, as a 2002 article in *Science* famously noted, “cannot be simply regulated away.”¹ Neither can it be negotiated away.

The development of technology and its commercial adoption are among the most important factors determining how quickly and at what cost greenhouse gas emissions can be reduced. In many developing countries, providing citizens with energy services is a much more pressing need than addressing climate change. It is a simple fact that much of the energy needed to power economic growth will likely be supplied by fossil fuels. Many developing countries have large resources of coal, natural gas, and oil, and it would be unrealistic to expect them not to use it. However, the increased use of existing and advanced technologies can limit the environmental impact of using these fuels, reduce demand for them through efficiency, and provide alternate sources of energy.

Existing technologies can make a start, but they are not capable of significantly reducing greenhouse gas emissions on a global scale and at an acceptable cost. New, and in some cases revolutionary, energy technologies, many still years if not decades over the horizon, will have to be developed and adopted commercially along with the infrastructure to support them. But there is a great deal of uncertainty about how fast, or even if, these technologies will progress.

The Chamber puts a heavy emphasis on developing new technologies because it recognizes that unless and until alternate technologies can compete with traditional fuels on cost, performance, and scalability, they will not be used commercially to a great degree. That is why the Chamber will continue to support policies designed to lower the cost of alternative energy rather than raising the cost of traditional energy. Unfortunately, the Obama Administration has adopted an approach to raise the cost of affordable energy at home and in the international negotiations. As we will see, not only does this approach jeopardize U.S. competitiveness and growth going forward, it also will have a small impact on global GHG emission trends.

2. The U.S. INDC Lacks Basic Information to Allow a Rigorous Assessment of the Goal

The Obama Administration has set a goal to cut its net greenhouse gas emissions 26% to 28% from the 2005 level by 2025, with a “best effort” to achieve 28%. Its submission to the

¹ M.I. Hoffert *et al.* 2002. “Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet,” *Science* 298. Available at: <http://www.sciencemag.org/cgi/content/abstract/298/5595/981?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=existing+technologies+can+contribute&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>.

UNFCCC is supposed to provide “information to facilitate the clarity, transparency, and understanding of the contribution.” But rather than providing a clear roadmap to 2025, the INDC leads us instead into terra incognita.

This lack of transparency is all the more disappointing because the U.S. INDC claims that, “The target reflects a *planning process* that examine opportunities under existing regulatory authorities to reduce emissions in 2025 of all greenhouse gases from all sources in every economic sector” [emphasis added]. While regulatory proposals used to support the INDC are developed in a public process, the planning process the administration undertook to develop its international commitment did not allow for any opportunity to get input from the public, the business community, other stakeholders, and the Congress. This is despite the fact that the outcome of this process is sure to have far-reaching effects on the economy and employment.

A close examination of the INDC raises more questions than it answers. Nowhere does it explain how the administration intends to achieve the unrealistic goals it has set out. In the absence of a detailed explanation of how the administration intends to meet the goal, the Congress, foreign governments, and stakeholders here and abroad have no basis on which to assess its cost or achievability.

So how does the U.S. commitment add up? It does not. According to the Environmental Protection Agency’s (EPA) most recent GHG inventory, net GHG emissions—which include sinks (e.g., removals of carbon dioxide from the atmosphere by forest growth)—were about 6.4 billion metric tons of carbon dioxide equivalent (TCO₂ eq.) in 2005 and about 5.8 billion TCO₂ eq. in 2013. To achieve a 28% reduction in 2025, emissions would have to drop to 4.6 billion TCO₂ eq. That represents a total reduction of about 1.8 billion TCO₂ eq. from the 2005 level, or 1.2 billion TCO₂ from the 2013 level.²

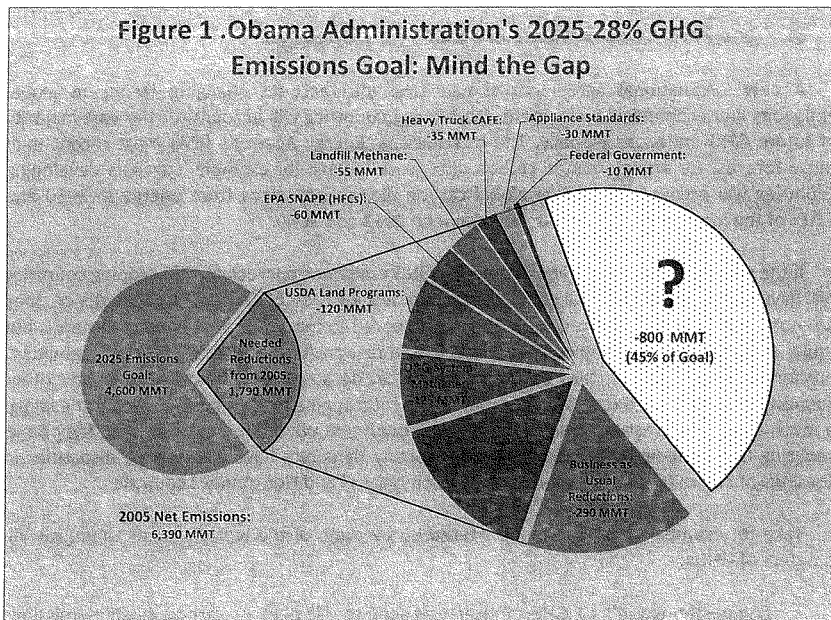
Reducing economy-wide GHG emission by such a large amount will be no easy task. Based on our analysis of the existing programs and programs announced by the administration—including programs covering existing and new fossil-fuel power plants, automobile efficiency standards and new standards for heavy trucks, methane emissions from oil and gas operations, appliance efficiency standards, hydrofluorocarbons, land use management, and other areas—we estimate that in 2025 total net GHG emissions would still be about 800 million TCO₂ eq., or 45%, short of the needed 1.8 billion TCO₂ in reductions needed to meet the President’s 28% emissions target (Figure 1). Other analysts have come to similar conclusions,³

² For more detail on this analysis, see: Institute for 21st Century Energy. 2015. “Mind the Gap: The Obama Administration’s International Climate Pledge Doesn’t Add Up.” Available at: <http://www.energyxixi.org/mind-gap-obama-administrations-international-climate-pledge-doesnt-add>.

³ For example, see: D. Bookbinder. 2015 *Testimony of David Bookbinder before the Senate Environment and Public Works Committee*. Available at: http://www.epw.senate.gov/public/_cache/files/96e1aded-05af-485a-9e23-544f82e0f4bc/bookbinder.pdf.

Conspicuous by its absence in the INDC is any reference to emissions from industry. It is hard to imagine that the administration does not intend to get at least some reductions from energy-intensive industrial sectors. Indeed, EPA’s fiscal year 2015 budget proposal notes the agency intends to begin considering new GHG regulations on the refining, pulp and paper, iron and steel, livestock, and cement sectors. None of this is detailed in the INDC.

As if these flaws are not enough, the centerpiece of the INDC, EPA’s Clean Power Plan, has serious legal vulnerabilities (at a minimum). In its *Utility Air Regulatory Group v. EPA* ruling, the Supreme Court warned the EPA that, “When an agency claims to discover in a long-extant statute an unheralded power to regulate ‘a significant portion of the American economy,’ 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’” [citations omitted].



Sources: Greenhouse gas emissions measured in million metric tons (MMT) of carbon dioxide equivalents. Excludes U.S. Territories. Estimates derived using EPA’s *U.S. Greenhouse Gas Inventory Report: 1990-2013*; Energy Information Administration’s *Annual Energy Outlook* (2015 and earlier); EPA’s Regulatory Impact Analysis for the Clean Power Plan Final Rule; the *U.S. Climate Action Report 2014*; and programs announced or planned by the Obama Administration.

In using a little-used 300-word provision of the Clean Air Act to redesign fundamentally the nation's electricity markets, EPA goes far beyond the bounds of the regulatory authority granted to it by Congress. It is no wonder, then, that the Clean Power Plan is facing substantial legal opposition, with lawsuits filed by 27 states, 24 national trade associations (including a coalition of 16 trade groups led by the U.S. Chamber), 37 rural electric cooperatives, 10 major companies, and three labor unions.

Under these circumstances, it is difficult to see how the administration proposes to sell such an unrealistic, bare-bones plan to the international community, much less to constituencies here at home. Further, because the Obama Administration has decided to defy Congress and implement its climate plan through executive action, nothing it commits to at Paris, including the promise of billions of dollars in financial assistance, will be legally binding on any future administration. The legal limbo the administration's actions have created will have real consequences for business as it tries to plan for the future.

3. The Paris Commitments are Extremely Unequal

A new international agreement should take into account changing trends in global emissions and economic development. Developing countries will account for the vast majority of future GHG emissions globally. The International Energy Agency's (IEA) most recent mid-range forecast for energy-related carbon dioxide emissions, for example, suggests developing countries will account for 70% of global carbon dioxide emissions from energy in 2030 and 170% of the increase in those emissions between 2013 and 2030.⁴

If the world truly is serious about reducing GHG emissions appreciably, developing countries will have to take on meaningful commitments, something that, based on current evidence, they are not prepared to do. Not only are they not prepared to make meaningful commitments, but under the principle of "common but differentiated responsibilities and respective capabilities" enshrined in the UNFCCC, they are not obligated to do anything without financial and other support from developed countries. Moreover, the inescapable fact is developing countries have a much greater interest in pursuing economic growth and poverty eradication than they do in reducing GHG emissions. These mutually-reinforcing dynamics have led to large disparities in the level of commitments being offered between Annex I and Non-Annex I countries.

Take for example the INDCs being offered up by some of the world's largest and growing emitters of GHGs:

- China—the world's #1 GHG emitter—pledged to: (1) peak its carbon dioxide emissions at (an unidentified level) "around" 2030; (2) reduce its carbon dioxide emissions intensity 60% to 65% from 2005 to 2030; and (3) increase its share of non-fossil fuel

⁴ IEA. 2015. *World Energy Outlook 2015*. Available at: <http://www.worldenergyoutlook.org/>.

energy consumption to “around” 20% of total demand by 2030.⁵ An examination of the Chinese commitment reveals it to be little better than business as usual. For example, International Energy Agency (IEA) historical and forecast data show that carbon dioxide emissions from China already are expected to peak around 2030 at 9.5 billion TCO₂ and that zero-emitting energy will provide 18% of total energy demand.⁶ IEA data also suggest that from 1990 to 2005, China reduced its carbon dioxide emissions intensity by 58% to 61%—essentially the same rate it is pledging for 2005 to 2030. In other words, business as usual.⁷ In addition, China announced that it would begin to institute a national cap & trade system next year. (N.B. Estimates of China’s recent past, current, and future carbon dioxide emissions will almost certainly be revised upward since it was revealed that the country has been underestimating its coal consumption by 17%.)

- India—the world’s #4 GHG—has committed to reducing its GHG emissions intensity (emissions per unit of GDP) 33% to 35% between 2005 and 2030s.⁸ We estimate that if it meets this goal, its emissions will grow from about 3 billion TCO₂ in 2010 to about 5 to 6 billion TCO₂ in 2030—at jump of at least 80%. Importantly, India’s INDC is conditional on financial and technology assistance that it estimates could run to \$2.5 trillion. (In the meantime, India announced that it intends to double domestic coal output over the next five years to fuel economic expansion.)
- The Russian Federation—the world’s #5 GHG emitter—has proposed a 25% to 30% reduction in net GHG emissions by 2030 from a 1990 baseline.⁹ Data submitted by Russia to the UNFCCC, however, show that in 2012, the country’s net GHG emissions were 50% below their 1990 level. This means Russia actually is proposing to *increase* its emissions in 2030 from 900 million to 1 billion TCO₂ eq. compared to the 2010 level.

None of this should be taken as criticism of these INDCs. Countries do not check their national interests at the UN cloakroom. Like many other developing and emerging economies, China and India will continue to use fossil fuels because they have an overriding interest in boosting growth and lifting their people out of poverty. Cutting GHG emissions will always take a backseat to these goals.

⁵ China INDC available at: <http://www4.unfccc.int/submissions/INDC/Published%20Documents/China/1/China%27s%20INDC%20-%20on%2030%20June%202015.pdf>.

⁶ ExxonMobil’s latest forecast shows Chinese carbon dioxide emissions peaking five years earlier, in 2025, at nearly 11 billion metric tons and declining thereafter. See: ExxonMobil. 2015. *The Outlook for Energy: A View to 2040*. Available at: <http://corporate.exxonmobil.com/en/energy/energy-outlook>.

⁷ To put the IEA’s emissions growth forecasts for China into perspective, the very large 413 million TCO₂ eq. reduction in U.S. power sector emissions EPA estimates its final existing power plant rule would deliver in 2030 would be offset by estimated 2030 Chinese carbon dioxide emissions in roughly two weeks.

⁸ India INDC available at: <http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf>.

⁹ Russian Federation INDC available at: <http://www4.unfccc.int/submissions/INDC/Submission%20Pages/submissions.aspx>.

While the rest of the world continues to emit with abandon, the U.S. is proposing a goal of a 26% to 28% cut in net emissions by 2025 from the 2005 level and the European Union goal of a 40% reduction in emissions by 2030 from the 1990.

Given the wide disparity in goals, it was something of a surprise, then, to read on November 3 the comments of the Executive Secretary of the UNFCCC, Christiana Figueres, asserting that when it comes to addressing global warming, “The United States is actually playing catch-up to China.” As fate would have it, on the same day Executive Secretary Figueres made this startling claim, the *New York Times* reported that China has admitted that in recent years it has been underestimating its coal usage by about 17%.¹⁰ How big an emissions bump does this represent? Well, in recent years it amounts to a rise of between 900 million and 1 billion TCO₂ eq., about equal to the annual GHG emissions of Germany. This is not a rounding error.

This is not a situation unique to China—many other countries also do not know how much carbon dioxide or other GHGs they emit. This episode should raise serious questions about China’s ability to deliver on national emissions trading system it plans to launch next year. Leaving aside the uncomfortable fact that China’s anticipated cap and trade scheme will not actually cap emissions for some time (if at all), it is fair to ask how effective such a system could possibly be given the country clearly does not seem to have a handle on how much carbon dioxide it is actually emitting.

4. The Paris Commitments Will Not Result in a Carbon-Constrained World

In light of the wide disparity in ambition between developed and developing countries noted in the preceding section, it is not surprising that the commitments proffered by developed and developing countries thus far will not curtail global GHG emissions and may not even slow their growth appreciably.

Earlier this month, the UNFCCC released a *Synthesis report on the aggregate effect of the intended nationally determined contributions*, its stab at analyzing the impact country pledges will have on global GHG emissions.¹¹ The analysis evaluated the 119 Intended Nationally Determined Contributions (INDCs), covering about 80% of global net GHG emissions, the UNFCCC received as of 1 October 2015.

The report found that even in the extraordinarily unlikely occurrence that each country fulfills its INDC to the letter—including unconditional as well as conditional elements—

¹⁰Chris Buckley. 2015. “China Burns Much More Coal Than Reported, Complicating Climate Talks.” *New York Times*. Available at: http://www.nytimes.com/2015/11/04/world/asia/china-burns-much-more-coal-than-reported-complicating-climate-talks.html?_r=0.

¹¹UNFCCC. 2015. *Synthesis report on the aggregate effect of the intended nationally determined contributions*. Available at: <http://unfccc.int/resource/docs/2015/cop21/eng/07.pdf>.

emissions in 2030 will be considerably higher (a median of about 8.6 billion TCO₂ eq.) than they were in 2010.

Based on the UNFCCC study and the INDCs submitted by developed countries, it is clear that all of the actual burden of reducing emissions would fall on Australia, Canada, Europe, Japan, New Zealand, and the United States, countries that accounted for just about 27% of total global GHG emissions in 2010. We estimate that if these countries met the goals laid out in their INDCs, their emissions would drop a combined 4.1 billion TCO₂ eq. from 2010 to 2030. If the U.S. INDC goal is reached, it would account for more than half of the 4.1 billion TCO₂ reduction for this group of advanced economies.

In the meantime, emissions from the rest of the world would jump anywhere from 8.6 to 12.1 billion TCO₂ eq. from 2010 to 2030, a range equivalent to about 1.5 to 2.1 times total U.S. emissions in 2010. Again, this assumes the INDCs are fulfilled to the letter. If not, the emission increases from the rest of the world will be even larger.

Moreover, it is questionable whether the INDCs would even slow global emissions growth appreciably. The nearby chart taken from the UNFCCC report shows (Figure 2), when taking into account the broad range of possible outcomes, it is likely that even if countries fulfill their commitments, the resulting trajectory of global GHG emissions will not be all that much different from business as usual (or the “pre-INDC scenarios in the chart).

The UNFCCC analysis is confirmation of what we noted earlier and what many of the INDCs from developing countries state plainly: The priority of most countries remains economic development and poverty eradication, and that takes energy. The International Energy Agency estimates that about 1.3 billion people lack access to modern energy services, particularly electricity. For the poor to be able capture the benefits of greater energy use and escape the cycle of poverty, energy resources and technologies must be “scalable,” that is, available in large quantities when and where they are needed and at an affordable price.

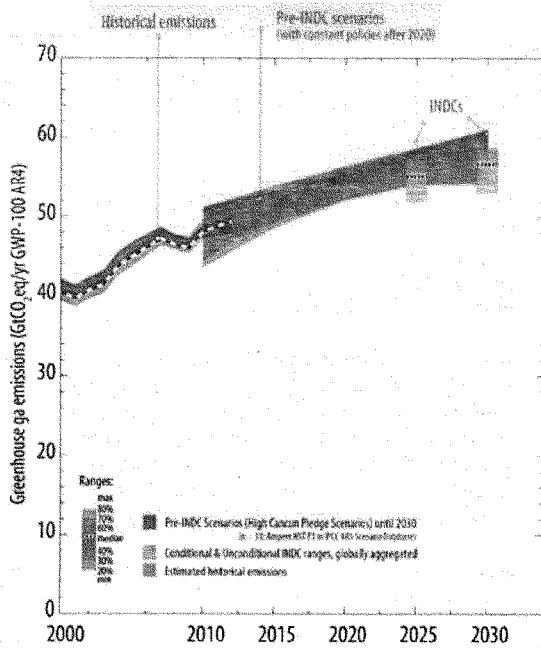
As the IEA’s Executive Director, Fatih Birol, recently noted, “The importance of coal in the global energy mix is now the highest since 1971. It remains the backbone of electricity generation and has been the fuel underpinning the rapid industrialization of emerging economies, helping to raise living standards and lift hundreds of millions of people out of poverty.”¹² That assessment is not likely to change anytime soon.

So what are countries actually doing on the eve of the Paris talks? Using data from Platts, we estimate that that nearly 1.2 terawatts—or trillion watts—of new coal-fired power plants are under construction or in the planning phase, accounting for nearly 40% of the total generating capacity of all technologies now under construction or planned (Figure 3). (Keep in mind that EPA projects that its Clean Power Plan will force the retirement of 29 gigawatts of

¹² Fatih Birol. 2015. “Coal’s Role in the Global Energy Mix: Treading Water or Full Steam Ahead?” *Cornerstone*. Available at: <http://cornerstonemag.net/coal-role-in-the-global-energy-mix-treading-water-or-full-steam-ahead/>.

coal-fired power by 2025, meaning that for every 1 gigawatt of capacity expected to retire in the U.S., more than 40 new gigawatts are under construction or planned elsewhere.¹³⁾

Figure 2.
Global emission levels resulting from the implementation of the communicated intended nationally determined contributions by 2025 and 2030 in comparison with trajectories consistent with action communicated by Parties for 2020 or earlier



Source: Intergovernmental Panel on Climate Change Fifth Assessment Report scenario database and own aggregation.

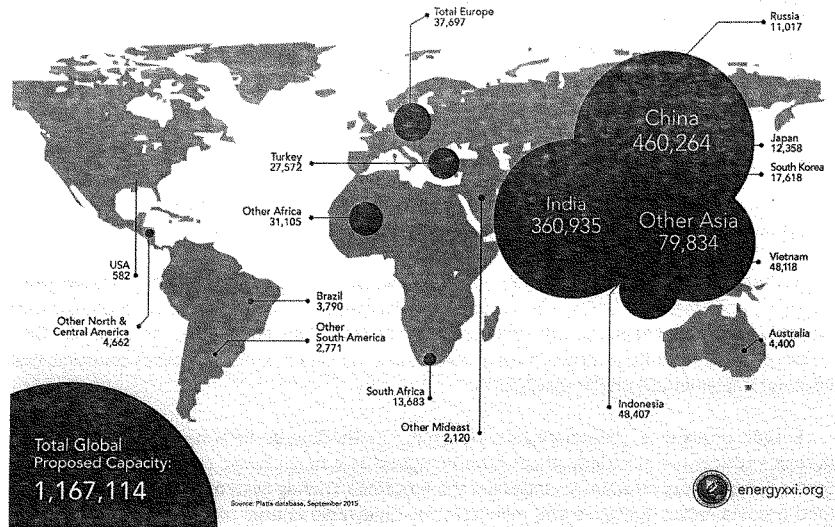
Abbreviations: AR4 = Fourth Assessment Report of the Intergovernmental Panel on Climate Change, GWP = global warming potential, INDCs = intended nationally determined contributions.

¹³ EPA. 2015. Regulatory Impact Analysis for the Clean Power Plan Final Rule. Available at: <http://www2.epa.gov/sites/production/files/2015-08/documents/cpp-final-rule-ria.pdf>.

China and India alone account for 70% of the total coal capacity under construction or planned, and Asia about 89%. The capacity of natural gas- and oil-fired power stations also is expected to grow considerably over the next few years, by about 565 billion and 50 billion watts, respectively. This building spree is not the kind of activity one would expect to see in a carbon constrained world—even green Europe is building coal plants (and is a growing market for U.S. coal exports).

Figure 3.

Coal-fired Power Plants Planned and Under Construction
Total installed capacity (megawatts)



5. Under Administration’s INDC, U.S. will Leak GHG Emissions—and Jobs and Industries—to Other Countries

It is important to note that despite these costs, EPA admits that its Clean Power Plan, the heart of the U.S. INDC, will have no discernible impact on the climate, and that all of the

benefits will come from reductions in other pollutants EPA already regulates within a margin of safety.

The administration's plan will be ineffective largely because any emissions reductions achieved will be more than offset by increases in emissions from other countries, in particular developing countries. Addressing climate change will be of considerably less interest to these countries, where the main priority of governments is poverty eradication.

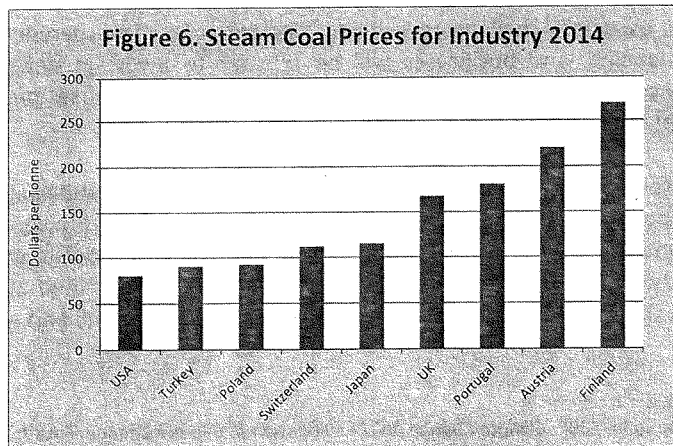
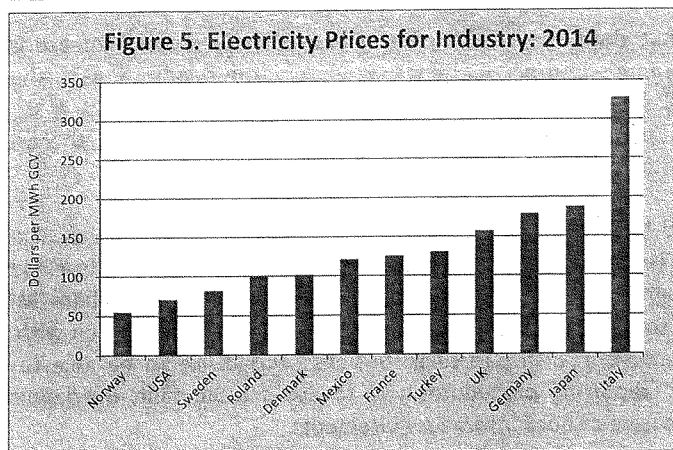
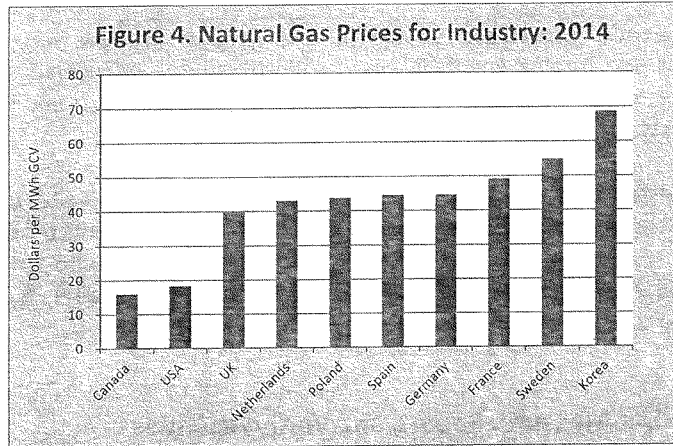
Another reason GHG emissions in these other countries would continue to grow is because of "carbon leakage" from the U.S. as energy intensive industries flee to more countries with less regulation and lower energy costs. It is well understood that America's abundance of affordable, reliable energy provides businesses a critical operating advantage in today's intensely competitive global economy. Figures 4, 5 and 6 illustrate the comparative energy advantage in natural gas and electricity prices for U.S. industry compared to its OECD competitors. Affordable and reliable fuel and electricity, supplied by a diverse mix of coal, nuclear, and increasingly natural gas, give American industry an enormous economic edge, and they are driving a manufacturing revival in areas of the country desperately in need of jobs and investment.

Unfortunately, EPA's Clean Power Plan and other burdensome EPA regulations threaten to throw away this national energy advantage. Instead of attracting foreign investment to the United States, EPA rules could repel this investment into the United States and perhaps even force U.S. companies to shift their investment focus overseas.

Because U.S. businesses compete on a global scale, the electricity and related price increases resulting from EPA's rule will severely disadvantage energy intensive, trade-exposed industries such as chemicals, manufacturing, steel, and pulp and paper. As a result, GHG emissions would not be reduced in the global sense, but simply *moved* to other countries that have not implemented similar restrictions.

Europe provides a cautionary tale. According to the Energy Information Administration, Europe's residential electricity prices have increased at a much faster rate than in the United States.¹⁴ Regulatory structures—including the Emissions Trading System, taxes, user fees, large (and unsustainable) subsidies and mandates for renewable energy technologies, and the mix and cost of fuels—all conspire to make Europe's electricity prices among the highest in the world.

¹⁴ Energy Information Administration. 2014. "European residential electricity prices increasing faster than prices in United States." Today in Energy. Available at: <http://www.eia.gov/todayinenergy/detail.cfm?id=18851>.



Source: International Energy Agency, *Key World Energy Statistics 2015*.

That continent's exorbitant energy prices, largely policy-driven, are ruining its competitiveness and turning energy-intensive industries into endangered species. More and more, we are seeing European companies fleeing sky-high energy costs and shifting production to the United States and other countries.

This is consistent with the conclusion of the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment report, which found that actions governments took to implement the Kyoto Protocol resulted in economy-wide leakage on the order of 5% to 20%, not insignificant amounts.¹⁵ Similar results could be expected in the United States as a result of implementation of the U.S. in general, and EPA regulations in particular.

6. Trust but Measure, Report, and Verify Activities

An issue that does not receive the attention it deserves is measuring, reporting, and verification of climate policies. As things stand now, the system of MRV that is likely to come out of Paris will focus not on whether a country meets its emissions goal, but on whether it implements the policies and measures designed to meet its goal. In other words, MRV is more about process than results.

Most of the burden of MRV will, as it should, fall on governments. Like other developed countries, the United States has a long history of reporting on its climate change-related activities through its national communications to the UNFCCC. Where MRV is expected to impose or lead to obligations on companies, the UNFCCC should consult with business to design reliable MRV procedures. In particular, business would like to be able to count on existing experience and reporting procedures and to avoid redundant, overlapping, ambiguous, or needlessly expensive or burdensome requirements.

MRV will be especially challenging in developing countries. Transparency is a key to open markets and planning, and businesses will be reticent to invest in developing economies without assurances that its investments in emission reduction and offset projects are real and that government activities in support of INDCs have integrity.

As the recent revelation that the Chinese have been low-balling its coal usage demonstrates, however, that there is still a lot we take for granted. If a sophisticated country like China cannot keep track of something as rudimentary as coal consumption, what can we expect from other governments with fewer resources and capacity? And even the best MRV system will fall short if it is applied to countries whose social systems and economies that do

¹⁵ IPCC Working Group III. 2007. *Climate Change 2007 - Mitigation of Climate Change*. Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Available at: <http://www.ipcc-wg3.de/assessment-reports/fourth-assessment-report/files-ar4/SPM1.pdf>.

not function under the rule of law and other legal and social norms that exist in advanced democracies.

7. Intellectual Property Rights Under Assault

The Convention also states that Annex II Parties, a sub-set of Annex I Parties that includes the United States, “shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention.”

Developing countries have used this provision deftly to justify their attempts to weaken intellectual property rights (IPR) protections, ostensibly to remove the supposed “barriers” to technology transfer raised by IPR. Compulsory licensing and a fund supported by developed countries to buy down IP are two of many proposals being bruited.

For example, one option in the most recent (11 November) draft text of the Paris agreement says that “. . . developed country Parties shall provide financial resources . . . to meet the full costs of IPRs of environmentally sound technologies, know-how and such technologies will be provided to developing country Parties *free of cost* in order to enhance their actions to address the adverse effects of climate change” [emphasis added].¹⁶ Similar optional language appears in other sections of the text, as well.

IPR serve as a fundamental catalyst of innovation, and study after study has shown that it is not a barrier to technology transfer. A weakened IPR regime such as that being proposed above would provide precious little incentive for companies to invest in advanced technologies if after years of research and development and millions or even billions of dollars invested, their inventions could be expropriated outright by companies in developing countries and manufactured and sold around the world at reduced cost. Under such a circumstance, some of the most innovative companies in the developed world would simply abandon the development of advanced energy technologies.

The United States should continue to encourage the proper environment for technology commerce, cooperation, and investment in developing countries—*e.g.*, transparent markets, the rule of law, property rights, *etc.* Developing countries must be convinced that intellectual property rights protections are in their interests as well as ours, and that technology commerce is technology transfer. The Chamber and other businesses and business groups have in the past urged U.S. negotiators to join with their colleagues from Europe, Japan, and other developed countries in declaring that any weakening of intellectual property would be unacceptable.

¹⁶ UNFCCC Ad Hoc Working Group on the Durban Platform for Advanced Action. 2015. *Draft agreement and draft decision on workstreams 1 and 2 of the Ad Hoc Working Group on the Durban Platform for Enhanced Action*. ADP.2015.11.InformalNote. Available at: <http://unfccc.int/resource/docs/2015/adp2/eng/11infnot.pdf>.

8. Climate Finance—Show Us the Money

Financing issues are among the most controversial in the UNFCCC, and they could derail a Paris agreement. Many developing country INDCs, either in whole or in part, are conditioned on financial support and technology transfer (India's INDC, for example, carries a price tag of \$2.5 trillion).

The Green Climate Fund (GCF) was proposed at COP-15 in Copenhagen in 2009, refined in subsequent meetings, and became operational in 2014. GCF aims to provide support to developing country efforts to reduce their GHG emissions and to adapt climate change. To date, about \$10.2 billion has been pledged to GCF, with about \$5.9 billion has been "announced and signed." The President affirmed a pledge of \$3 billion over four years ago during the G-20 meeting in Australia in 2014, and his administration requested \$500 million for the GCF in its fiscal year 2016 budget.

Developed countries in Copenhagen also committed to "mobilizing jointly USD 100 billion a year by 2020 to address the needs of developing countries." This is supposed to be "new and additional" money, not money moved from other funds. While many developing countries see most of this as government-to-government funding,¹⁷ developed countries have implied that most funding will come from private sector sources leveraged by government money.

Moreover, developing countries view this \$100 billion figure for 2020 as "only the starting point for the post-2020 period and not the ending point."¹⁸ Draft negotiating text¹⁹ suggests this sum should be scaled up predictably after 2020. How much? The text is silent on this, but submissions to the UNFCCC suggest some Parties are seeking quite a bit more than \$100 billion. For example, the African Group supports ramping funding up to \$600 billion by 2030.²⁰ China has proposed that, "Commitments by developed country Parties on providing finance, technology and capacity-building support to developing country Parties shall be of the same legal bindingness as their mitigation commitments," and it has called for developed countries to

¹⁷ According to the Like-Minded Like-Minded Developing Countries (LMDC) group, "Public financing could leverage private finance and other sources but should remain the primary vehicle." See: LMDC. 2014. "LMDC Views on Identification of Elements in ADP Workstream 1." Available at: http://unfccc.int/files/documentation/submissions_from_parties/adp/application/pdf/adp2-3_lmdc_workstream_1_20131118.pdf. The LMDC group consists of Algeria, Argentina, Bolivia, Cuba, China, Democratic Republic of the Congo, Dominica, Ecuador, Egypt, El Salvador, India, Iran, Iraq, Kuwait, Libya, Malaysia, Mali, Nicaragua, Pakistan, Philippines, Qatar, Saudi Arabia, Sri Lanka, Sudan, Syria, and Venezuela.

¹⁸ *Ibid.*

¹⁹ UNFCCC Ad Hoc Working Group on the Durban Platform for Advanced Action. *OpCit.*

²⁰ African Group. 2014. "ADP Intervention on Finance." Available at: http://unfccc.int/files/bodies/awg/application/pdf/adp2-5_submission_by_sudan_on_behalf_of_the_african_group_finance_20140610.pdf.

provide the GCF “at least 1% of their GDP per year from 2020.”²¹ For the U.S., 1% of GDP in 2014 works out to around \$170 billion.²²

There is also the question of how this money will be spent. For example, should U.S. funds be used to support projects that increase the efficiency, and therefore the competitiveness, of state-run foreign firms that compete against U.S. companies? These sorts of concerns may become more pronounced as the GCF increases its activities over time.

However these issues and other finance are worked out in Paris, it is clear that a significant portion of the expected funds—certainly tens if not hundreds of billions of dollars over many years—would be coming from public sources and would have to be appropriated by Congress.

9. The Long-Term Global Emissions Goals being Proposed are Unrealistic

Although every expectation is that the Paris agreement will be a bottom-up treaty, a collective long-term goal is under discussion, too. Most of the proposals are in the range of a 40% to 70% reduction in global GHG emissions from the 2010 level by 2050, with net zero emissions being achieved within a decade or two after that. Characteristic of these is the European Union’s proposal calling for a 60% cut in global GHG emissions below their 2010 level by 2050.

A global goal of such a magnitude is completely unrealistic. It would require cuts in emissions in developing countries that they are unwilling to make and developed countries would be unwilling to pay for. Even if, for example, all developed countries cut their emissions to “0” by 2050—which will not happen—total emissions from developing countries, which are expected to their combined populations grow by more than 2 billion people, would still have to be about one-third lower than they were in 2010, and so would emissions per capita.²³ But even that would not be enough. They also would have to avoid future emissions of around 30 billion TCO₂ eq. (more than five times current U.S. GHG emissions). Put another way, to reach a 60-by-50 goal even if developed countries emissions collapse to zero in 2050, all the additional economic activity in developing countries in 2050 compared to 2010—all the energy use, industrial processes, agricultural activity, *etc.*—would have to be zero-emitting or have their emissions offset in some way.

²¹ Government of China. 2014. “China’s Submission on the Work of the Ad Hoc Working Group on Durban Platform for Enhanced Action.” Available at: http://unfccc.int/files/bodies/application/pdf/20140306-submission_on_adp_by_china_without_cover_page.pdf.

²² Department of Commerce, Bureau of Economic Analysis. “Current-Dollar and ‘Real’ Gross Domestic Product.” Available at: <http://www.bea.gov/national/xls/gdplev.xls>.

²³ See, for example: Institute for 21st Century Energy. 2015. “The European Union’s 2050 Global Greenhouse Gas Emissions Goal is Unrealistic.” Available at: <http://www.energyxxi.org/european-unions-2050-global-greenhouse-gas-emissions-goal-unrealistic>.

Large developing countries understand that accepting such emissions limits would have devastating impacts on their economic progress. Despite many opportunities, large developing countries have never agreed to a binding global emissions goal of this magnitude, and they are almost certain not to do so in Paris. That is unless developed countries pledge they are prepared to foot the bill, something that, given the trillions of dollars in costs involved, developed countries simply cannot do.

Developing countries, therefore, will carry on using affordable fossil fuels to boost economic growth and lift their people out of poverty. For them, cutting GHG emissions will always take a backseat to these goals.

10. The Paris Agreement—With or Without “Legal Force”—Should be Sent to the Senate for its Advice & Consent

The Obama Administration agreed at COP-17 that “a protocol, another legal instrument or an agreed outcome with legal force” would be the outcome of the process set up by the Durban Platform. Based on recent press reports, now it is not so sure, with Secretary of State John Kerry recently telling the *Financial Times* that the Paris agreement is “definitively not going to be a treaty.”²⁴ Adding to the confusion was a subsequent State Department statement reversing course, saying, “Our position has not changed: the U.S. is pressing for an agreement that contains provisions both legally binding and non-legally binding.” It has also been suggested that while the national commitments may not be binding, UNFCCC Parties would be legally bound to make such commitments.

COPs traditionally produce two types of documents: decisions and protocols. Would a COP decision in Paris have legal force and satisfy the Durban Platform’s requirement? An analysis by Daniel Bodansky, Professor at the Sandra Day O’Connor College of Law at Arizona State University, suggests not:

In general, decisions by international institutions such as the COP are not legally binding unless their governing instrument so provides. The UN Charter provides a simple example. Article 25 of the Charter provides that member states shall carry out decisions of the Security Council, so this provision makes Security Council decisions legally binding. But otherwise, decisions by UN organs are not binding on the member states. Similarly, a COP decision could be legally binding if there is a “hook” in the UNFCCC that gives it legal force. For example, Article 4.1 of the UNFCCC requires parties to use for their greenhouse gas inventories ‘comparable methodologies to be agreed upon by the COP’. But, otherwise, COP decisions are

²⁴ Demetri Sevastopulo and Pilita Clark. 2015. “Paris climate deal will not be a legally binding treaty.” *Financial Times*. Available at: <http://www.ft.com/intl/cms/s/0/79daf872-8894-11e5-90de-f44762bf9896.html#axzz3r1YCX0pp>.

*not legally binding, so a COP decision, by itself, would not satisfy the Durban Platform's mandate that the Paris outcome have legal force.*²⁵

Certainly, the Parties have not behaved as if COP decisions are in any way legally binding.

Protocols, on the other hand, tend to be internationally-recognized as supplements to existing treaties that require ratification. The 11 November draft Paris agreement text cited earlier²⁶ certainly contemplates a ratification process similar to those for the UNFCCC itself and the Kyoto Protocol. So if the Paris agreement is intended to have more legal force than a COP decision but less legal force than a Protocol, then what exactly will it be?

At any event, an agreement of such consequence to the U.S. economy and employment that would essentially set the broad outlines U.S. climate policy for more than a decade and might call for billions of dollars in assistance should be submitted to the Congress regardless of whether it has legal force or is merely political in nature. Without the Senate, at a minimum, reviewing the Paris agreement (and both the House and Senate weighing in on the U.S. INDC), it is hard to see how anything signed by the United States in Paris will be binding, either politically or legally, on future administrations and Congresses. We went down that road with the Kyoto Protocol, and it did not work out very well.

Conclusion

Business needs a predictable environment in which to operate and plan. Unfortunately, the administration's INDC adds to the already large uncertainty surrounding a new international agreement and would result in higher energy prices for American businesses and consumers. Its INDC does not provide any guidance in how it intends to meet its goal of a 26% to 28% reduction in net GHG emissions by 2025 from the 2005 level. By our estimates, emissions reductions due to existing and proposed regulations would fall short of the administration's goal by 800 million TCO₂ eq., or 45% of the total goal. Clearly, the administration anticipates that the industrial sector will have to make up for a big chunk, but by no means all, of this shortfall. But without any detail, neither domestic stakeholders nor Parties to the UNFCCC know how this gap might be filled.

Moreover, based on what we have seen so far, large emerging economies have shown very little interest in reducing emissions in any meaningful way, certainly nothing coming close to what the administration is proposing for the United States. An agreement locking such disparities in emissions pledges into place would jeopardize America's energy advantage and

²⁵ D. Bodansky. 2015. "Legally Binding versus Non-Legally Binding Instruments." In: Scott Barrett Carlo Carraro and Jaime de Melo, eds. *Towards a Workable and Effective Climate Regime*. VoxEU eBook (CEPR and FERDI). Abstract available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2649630.

²⁶ UNFCCC Ad Hoc Working Group on the Durban Platform for Advanced Action. *OpCit*.

leak U.S. industries, their jobs, and their emissions overseas. As a result, the U.S. will see no environmental gain for a great deal of economic pain.

And to what purpose? Christiana Figueres, Executive Secretary of UNFCCC, recently had this to say about the goal of the UNFCCC: "This is the first time in the history of mankind that we are setting ourselves the task of intentionally, within a defined period of time, to change the economic development model that has been reigning for at least 150 years, since the industrial Revolution."

The same economic system the UNFCCC Secretary wants to discard is the same model that produced the largest flourishing of human health and welfare in all of human history. In the past two to three decades, in particular, there has been tremendous improvement in the lot of people throughout the world owing in large part to greater economic freedom and access to modern energy services. The rest of the world understands that affordable, available, and scalable energy is the not the problem, it is the solution.

Finally, the administration's insistence on not consulting with the Congress or with stakeholders ensures that U.S. political backing for the Paris agreement will remain weak. Back in 1997, the Clinton Administration disregarded clear guidance from the Senate, the Byrd-Hagel Resolution,²⁷ and signed the Kyoto Protocol, a treaty it knew was political poison and that it never bothered to submit to the Senate for ratification.

Judging from this latest episode in U.S. climate diplomacy, the Obama Administration looks set to repeat the mistake of signing onto a lopsided deal and making promises future presidents and Congresses may be neither willing nor able to keep. As the late, great Yogi Berra might have said, "It's déjà vu all over again."

²⁷ Senate Resolution 98. 1997. 105th Congress. Available at: <https://www.congress.gov/bills/105th-congress/senate-resolution/98/text>.

**Biography of
Stephen D. Eule
Vice President, Institute for 21st Century Energy
U.S. Chamber of Commerce**

Stephen D. Eule is vice president at the U.S. Chamber of Commerce's Institute for 21st Century Energy (Energy Institute). Mr. Eule is an experienced voice on the nexus between energy, climate change, and technology. He travels around the world to speak with business, governments, think tanks, and the media in a variety of forums.

Mr. Eule oversees the collection and analysis of data on energy and climate and the impact of technology in the energy industry. He represents the U.S. Chamber in the UN Framework Convention on Climate Change and helped found the Major Economies Business Forum on Energy Security and Climate Change, a coalition of national cross-sector business organizations from major economies for which the Energy Institute acts as secretariat. Mr. Eule also is responsible for the Energy Institute's two annual and authoritative energy security reports—the *Index of U.S. Energy Security Risk* and the *International Index of Energy Security Risk*. These risks indices represent the first and most comprehensive efforts to quantify energy security risks over time and across a wide range of measures. They have been cited by the International Energy Agency and are used by universities and think tanks across the world.

Previously, Mr. Eule was director of the Office of Climate Change Policy & Technology at the Department of Energy (DOE). There he oversaw the development of the *U.S. Climate Change Technology Program Strategic Plan in 2006*, ran President Bush's Climate VISION program, and testified before Congress on DOE climate and energy programs. Internationally, Mr. Eule represented DOE as part of the U.S. government delegations to the Intergovernmental Panel on Climate Change, the G20, and other multilateral forums. He was lead chapter author on the *U.S. Climate Action Report—2006* and contributed to other government publications.

His prior experience includes a decade working in various public policy positions. He was a subcommittee staff director on the House Science Committee and served as legislative director for Rep. Nick Smith (R-MI). In addition, Mr. Eule was an environmental analyst in the Washington, D.C., office of New Jersey Gov. Christine Todd Whitman (R-NJ). Earlier, he worked for eight years as an Orkand Corporation consultant to the Energy Information Administration and worked at the Heritage Foundation.

Mr. Eule earned a Master of Arts degree in geography from The George Washington University and a Bachelor of Science degree in biology from Southern Connecticut State College.

**United States Senate
Committee on Environment and Public Works**

**Hearing on November 18, 2015
“Examining the International Climate Negotiations”**

Questions for the Record

**Stephen D. Eule
Vice President
Institute for 21st Century Energy
U.S. Chamber of Commerce**

Senator Whitehouse:

1. Your testimony states the Chamber of Commerce is the world’s largest business federation representing the interests of more than 3 million business of all sizes, sectors, and regions, as well as state and local chambers and industry associations. While the Chamber had membership in all 50 states. The Chamber’s international reach is substantial as well. However, the attached letters and pledges from businesses and financial institutions indicate their support for strong climate action, particularly at the international negotiations being held in Paris. I would like to ask a question of the Chamber of Commerce, either through you or some other personage of the Chamber’s choosing:
 - How does the Chamber’s relentless opposition to any climate action represent the views of the companies on these letters who are chamber members?

The U.S. Chamber has been remarkably consistent for more than a decade and has established principles for policies that would significantly curtail greenhouse gas emissions must:

- Preserve American jobs and the competitiveness of U.S. industry.
- Promote the accelerated development, demonstration and cost-effective deployment of climate-friendly technologies to reduce, avoid or sequester greenhouse gas emissions to address energy security and sustainability objectives.
- Reduce barriers to the development, financing, regulation, storage and use of domestic climate-friendly fuel sources (expanded R&D of alternative energy sources such as clean coal, natural gas, nuclear energy, wind, hydropower, and biofuels).
- Be an international, economy-wide solution with minimal impact on industry and regional economies, which includes developing economies.
- Work to facilitate the transfer of climate change technology to emerging economies.

The Chamber's opposition to using the Clean Air Act to regulate greenhouse gas emissions also is a longstanding view that has the broad support of the business community. It is clear that the Clean Air Act was not designed for, and is ill-suited to, regulating greenhouse gases. Judging by EPA's reckless new rules—especially its attempt to use a little-used 300-word section of the Clean Air Act to hijack longstanding state-level authorities and regulate the entire U.S. power sector from Washington—the Chamber was not wrong in this judgment, which is why we are challenging these rules in court. Indeed, we have been crystal clear over the years that a durable climate policy must include the input and consent of Congress. We have also supported policies and legislation to enhance energy efficiency and lower the costs of alternative sources of energy. Those views have not changed.

The Chamber is not alone in its deep concern about the new EPA rules on existing power generating stations. Far from it. The Chamber has been joined by 106 other companies, cooperatives, utilities, and trade and industry groups in filing suit against the EPA rule. In addition to these businesses and business groups, other petitioners filing suit against EPA's rule include 27 states (number 28, Nevada, recently filed a brief in support of the other states), two state entities, one local government, eight unions, six think tanks, and seven individuals. On top of this, 34 of your U.S. Senate colleagues and 171 members of the House of Representatives joined together to contest the legality of EPA's rule.

Perhaps the best demonstration of the incredible breadth of business opposition to the rule, however, comes in the form of an amicus brief filed by 166 state and local Chambers in support of the petitioners. They include:

1. Texas Association of Business
2. Pennsylvania Chamber of Business and Industry
3. Ohio Chamber of Commerce
4. Alaska Chamber of Commerce
5. Arizona Chamber of Commerce and Industry
6. Arkansas State Chamber of Commerce/Associated Industries of Arkansas
7. Associated Industries of Missouri
8. Association of Commerce and Industry
9. Bakersfield Chamber of Commerce
10. Beaver Dam Chamber of Commerce
11. Billings Chamber of Commerce
12. Birmingham Business Alliance
13. Bismarck Mandan Chamber of Commerce

14. Blair County Chamber of Commerce
15. Bowling Green Area Chamber of Commerce
16. Bullitt County Chamber of Commerce
17. Business Council of Alabama
18. Campbell County Chamber of Commerce
19. Canton Regional Chamber of Commerce
20. Carbon County Chamber of Commerce
21. Carroll County Chamber of Commerce
22. Catawba Chamber of Commerce
23. Central Chamber of Commerce
24. Central Louisiana Chamber of Commerce
25. Chamber Southwest Louisiana
26. Chamber630
27. Chandler Chamber of Commerce
28. Colorado Association of Commerce and Industry
29. Colorado Business Roundtable
30. Columbus Area Chamber of Commerce
31. Dallas Regional Chamber
32. Davis Chamber of Commerce
33. Detroit Regional Chamber of Commerce
34. Eau Claire Area Chamber of Commerce
35. Erie Regional Chamber & Growth Partnership
36. Fall River Area Chamber of Commerce & Industry
37. Fremont Area Chamber of Commerce
38. Georgia Association of Manufacturers
39. Georgia Chamber of Commerce
40. Gibson County Chamber of Commerce
41. Gilbert Chamber of Commerce
42. Grand Junction Area Chamber
43. Grand Rapids Area Chamber of Commerce

44. Great Lakes Metro Chambers Coalition
45. Greater Flagstaff Chamber of Commerce
46. Greater Green Bay Chamber of Commerce
47. Greater Irving-Las Colinas Chamber of Commerce
48. Greater Lehigh Valley Chamber of Commerce
49. Greater Muhlenberg Chamber of Commerce
50. Greater North Dakota Chamber of Commerce
51. Greater Orange Area Chamber of Commerce
52. Greater Phoenix Chamber of Commerce
53. Greater Shreveport Chamber of Commerce
54. Greater Summerville/Dorchester County Chamber of Commerce
55. Greater Tulsa Hispanic Chamber of Commerce
56. Greater West Plains Area Chamber of Commerce
57. Hartford Area Chamber of Commerce
58. Hastings Area Chamber of Commerce
59. Hazard Perry County Chamber of Commerce
60. Illinois Manufacturers Association
61. Indiana Chamber of Commerce
62. Indiana County Chamber of Commerce
63. Iowa Association of Business and Industry
64. Jackson County Chamber
65. Jax Chamber of Commerce
66. Jeff Davis Chamber of Commerce
67. Johnson City Chamber of Commerce
68. Joplin Area Chamber of Commerce
69. Kalispell Chamber of Commerce
70. Kansas Chamber of Commerce
71. Kentucky Association of Manufacturers
72. Kentucky Chamber of Commerce
73. Kingsport Chamber of Commerce

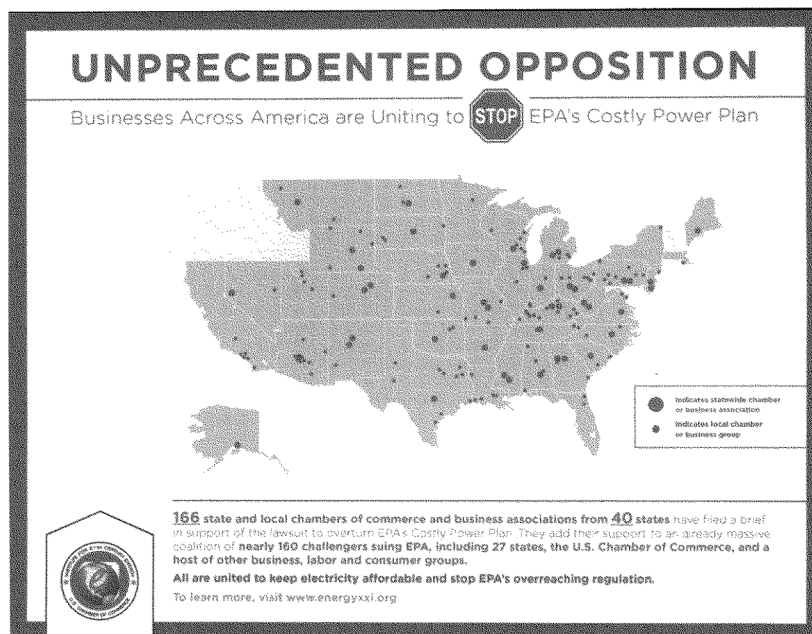
74. Kyndle, Kentucky Network for Development, Leadership and Engagement
75. Latino Coalition
76. Lima-Allen County Chamber of Commerce
77. Lincoln Chamber of Commerce
78. Longview Chamber of Commerce
79. Loudoun Chamber of Commerce
80. Lubbock Chamber of Commerce
81. Madisonville-Hopkins County Chamber of Commerce
82. Maine State Chamber of Commerce
83. Manhattan Chamber of Commerce
84. McLean County Chamber of Commerce
85. Mercer Chamber of Commerce
86. Mesa Chamber of Commerce
87. Metro Atlanta Chamber of Commerce
88. Metropolitan Milwaukee Association of Commerce
89. Michigan Chamber of Commerce
90. Michigan Manufacturers Association
91. Midland Chamber of Commerce
92. Milbank Area Chamber of Commerce
93. Minot Area Chamber of Commerce
94. Mississippi Economic Council—The State Chamber of Commerce
95. Mississippi Manufacturers Association
96. Missouri Chamber of Commerce
97. Mobile Area Chamber of Commerce
98. Montana Chamber of Commerce
99. Montgomery Area Chamber of Commerce
100. Morganfield Chamber of Commerce
101. Mount Pleasant/Titus County Chamber of Commerce
102. Myrtle Beach Chamber of Commerce
103. Naperville Area Chamber of Commerce

104. Nashville Area Chamber of Commerce
105. National Black Chamber of Commerce
106. Nebraska Chamber of Commerce and Industry
107. Nevada Manufacturers Association
108. New Jersey Business & Industry Association
109. New Jersey State Chamber of Commerce
110. New Mexico Business Coalition
111. Newcastle Area Chamber of Commerce
112. North Carolina Chamber of Commerce
113. North Country Chamber of Commerce
114. Northern Kentucky Chamber of Commerce
115. Ohio Manufacturers Association
116. Orrville Area Chamber of Commerce
117. Oshkosh Chamber of Commerce
118. Paducah Area Chamber of Commerce
119. Paintsville/Johnson County Chamber of Commerce
120. Pennsylvania Manufacturers Association
121. Port Aransas Chamber of Commerce/Tourist Bureau
122. Powell Valley Chamber of Commerce
123. Putnam Chamber of Commerce
124. Rapid City Area Chamber of Commerce
125. Rapid City Economic Development Partnership
126. Redondo Beach Chamber of Commerce
127. Roanoke Valley Chamber of Commerce
128. Rock Springs Chamber of Commerce
129. Salt Lake Chamber of Commerce
130. San Diego East County Chamber of Commerce
131. San Gabriel Valley Economic Partnership
132. Savannah Area Chamber of Commerce
133. Schuylkill Chamber of Commerce

134. Shoals Chamber of Commerce
135. Silver City Grant County Chamber of Commerce
136. Somerset County Chamber of Commerce
137. South Bay Association of Chambers of Commerce
138. South Carolina Chamber of Commerce
139. South Dakota Chamber of Commerce
140. Southeast Kentucky Chamber of Commerce
141. Southwest Indiana Chamber
142. Springerville-Eagar Chamber of Commerce
143. Springfield Area Chamber of Commerce
144. St. Louis Regional Chamber
145. State Chamber of Oklahoma
146. Superior Arizona Chamber of Commerce
147. Tempe Chamber of Commerce
148. Tennessee Chamber of Commerce and Industry
149. Tucson Metro Chamber of Commerce
150. Tulsa Chamber of Commerce
151. Tyler Area Chamber of Commerce
152. Upper Sandusky Area Chamber of Commerce
153. Utah Valley Chamber
154. Victoria Chamber of Commerce
155. Virginia Chamber of Commerce
156. Wabash County Chamber of Commerce
157. West Virginia Chamber of Commerce
158. West Virginia Manufacturers Association
159. Westmoreland County Chamber of Commerce
160. White Pine Chamber of Commerce
161. Wichita Metro Chamber of Commerce
162. Williamsport/Lycoming Chamber of Commerce
163. Wisconsin Manufacturers & Commerce

- 164. Wyoming Business Alliance
- 165. Wyoming State Chamber of Commerce
- 166. Youngstown Warren Regional Chamber

As this list and the map below show, this broad-based opposition is scattered among 40 states, from north to south and from coast to coast. So as you can see, a broad coalition of the U.S. businesses community supports the U.S. Chamber in its opposition to EPA's unprecedented abuse of the Clean Air Act. Finally, as is the case in many organizations, Chamber members participate with the understanding that they may not always agree with all of the positions taken by it or its other members, but all members have the opportunity to share their perspective on issues and advocate for actions that advance their priorities.



Senator CAPITO. Thank you.
Mr. WASKOW.

**STATEMENT OF DAVID WASKOW, DIRECTOR, INTERNATIONAL
CLIMATE INITIATIVE, WORLD RESOURCES INSTITUTE**

Mr. WASKOW. Good morning and thank you, Senator Capito and Senator Carper. My name is David Waskow and I am the Director of the International Climate Action Initiative at the World Resources Institute, a non-partisan, nonprofit environmental think tank.

My testimony this morning makes three main points. First, taking action on climate change can bring substantial economic benefits and is in the national interest of the United States. A growing body of evidence shows that economic growth can in fact go hand-in-hand with efforts to reduce emissions of greenhouse gases, and recent experience of the national and State levels demonstrates that we can achieve both, a prosperous, low carbon future by harnessing key drivers of economic growth such as more efficient use of energy and natural resources, smart infrastructure investments, and technological innovation.

Businesses have recognized the economic value of action as well. More than 80 major global companies, including a number of U.S. companies such as Dell, Coca-Cola, General Mills, and Procter & Gamble, have recently committed to set emission reduction targets in their own supply chains that are in line with science.

Taking this action is also essential because, if nations fail to come together to combat climate change, the U.S. will suffer billions of dollars of damage to agriculture, forestry, fisheries, and coastal areas; and a recent report from the CAN Military Advisory Board of retired, high-ranking military officers, highlighted the growing threats to national security from the effects of climate change as well. It is thus in our national interest to act at home and to work with other countries to achieve an international agreement where all countries act together and where the most severe impacts in the United States can be avoided.

My second theme: the U.S. emissions reduction target announced this past March is in fact achievable; ambitious, but achievable. We can meet this target using existing Federal laws combined with action by the States. Well-designed policies can accelerate recent market and technology trends in renewable energy, energy efficiency, alternative vehicles, and in other areas to meet the 26 to 28 percent below 2005 pledge by 2025. WRI's recent report, "Delivering on the U.S. Climate Commitment," shows several pathways to get there.

We can achieve this target while generating multiple co-benefits and maintaining economic growth. For example, the Clean Power Plan will result in reduced exposure to particulate pollution and ozone, and EPA estimates that these health and other benefits are worth \$32 billion to \$54 billion.

And then, third, leadership by the United States is paying significant dividends, helping to spur greater action by all countries around the world. In the lead-up to the Paris agreement, more than 160 countries, 119 of them developing countries, have submitted national climate plans, representing over 90 percent of glob-

al emissions. Countries like China, where reductions in coal use are already taking place, are taking unprecedented action.

These national climate plans will deliver significant reductions in emissions. The International Energy Agency estimates a shift in global average temperature rise to 2.7 degrees Celsius, down from almost 4 degrees given business as usual policies. It is not enough yet, but it is a significant step.

Moreover, the agreement will be reached between all parties, all countries at the climate summit in Paris and is a major step forward in meeting U.S. objectives in this venue. Most important, this will be a universal agreement applicable to all. Based in and implementing the U.N. Framework Convention on Climate Change, which was ratified by the Senate in 1992 by voice vote, the Paris agreement will involve action to reduce emissions by all countries, both developed and developing, and its structure based on nationally determined plans has enabled broad-based participation and sets a new pathway for international action.

The agreement will also include vital provisions on transparency and accountability, and it should ensure that all countries continue to move forward in a regular and timely way toward a commonly understood goal. And, finally, it can help mobilize the investment needed for low carbon and climate-resilient economies from an array of countries, including developing countries, and from the private sector, and it can address the serious climate-related impacts experienced around the world, especially by the most vulnerable countries.

To conclude, the actions that countries are taking around the world, along with the international framework for those efforts, should be viewed as a significant success for the United States and its leadership role. Meeting the global challenge of climate change requires global solutions with action by all. The world is now on the cusp of an international agreement that will realize that vision.

Thank you.

[The prepared statement of Mr. Waskow follows:]

TESTIMONY OF DAVID WASKOW

DIRECTOR, INTERNATIONAL CLIMATE ACTION INITIATIVE, WORLD RESOURCES INSTITUTE
HEARING BEFORE THE U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS:

“Examining the International Climate Negotiations”

NOVEMBER 18, 2015

My name is David Waskow, and I am Director of the International Climate Action Initiative 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 three main themes. First, the United States can achieve a low-carbon future and provide global leadership by harnessing key drivers of economic growth. Second, the U.S. has set an ambitious but achievable emissions reduction target for 2025 in its Intended Nationally Determined Contribution. Third, the leadership the U.S. is demonstrating at home is paying significant dividends, helping to spur greater action by all countries around the world, both developed and developing.

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.

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.¹

Other countries also recognize the benefits of acting on climate change. In the lead-up to the Paris climate summit, more than 160 countries have put forward national climate action plans (known as

Intended Nationally Determined Contributions, or INDCs) that both address climate change and can generate better growth for their economies.²

Businesses have recognized the economic value of action. More than eighty major global companies, including eighteen U.S. companies – including Dell, Coca-Cola, General Mills, and Procter & Gamble – have committed to setting emissions reductions targets in line with science.³ And recognizing the global nature of their operations, more than 80 U.S. companies – including Alcoa, Bank of America, Cargill, Coca-Cola, General Motors, Microsoft, PepsiCo, UPS, and Walmart – recently signed a pledge in support of a strong international agreement and committed to significant actions in their own supply chains.⁴ Six major U.S. banks and investors also recently signed a statement supporting strong international action in order to set clear expectations and market signals.⁵

Taking action is essential because 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 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*,⁶ 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.

If nations fail to combat climate change together, 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. A recent report from the CNA Military Advisory Board – composed of retired high-ranking military officers – also highlighted the increased threats to national security from the effects of climate change.⁷ 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 and where the most severe impacts in the U.S. can be avoided.

Second, the U.S. has set an ambitious but achievable emissions reduction target for 2025 in its INDC. WRI research finds that the United States can meet this target using existing federal laws combined with actions by the states. The United States 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. 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.

The United States 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. From a benefit-cost perspective, EPA estimates that just the air pollution co-benefits of the Clean Power Plan are worth \$25-\$62 billion, far more than the estimated \$7-9 billion in compliance costs.⁸ Adding in global climate benefits increases total benefits to \$55-\$93 billion.

Third, the leadership the U.S. is demonstrating at home is paying significant dividends, helping to spur greater action by all countries around the world, both developed and developing. The national climate plans (INDCs) that countries have submitted for the 2015 climate agreement represent action by a wide diversity of countries. Of the more than 160 countries that have submitted national plans, 119 of them are developing countries.⁹ The historic Joint Announcement on Climate Change by the United States and China last year, along with the recent Joint Presidential Statement, also demonstrate the tremendous shift in action by countries around the world.¹⁰

The national climate plans will deliver significant reductions in emissions. Analyses of the INDCs come to the conclusion that the implementation of INDCs would contribute to significant reductions of global GHG emissions compared to business as usual (approximately 3-8 gigatons of greenhouse gas emissions reduced in 2030). The International Energy Agency's Energy and Climate Change Report estimates that the path set by the INDCs would be consistent with an average global temperature increase of around 2.7 degrees Celsius (3.6 Fahrenheit) by 2100,¹¹ compared to an almost 4 degrees Celsius temperature increase given business as usual (BAU) policies.¹²

Moreover, the agreement that will be reached between all countries at the climate summit in Paris will be a major step forward in meeting U.S. objectives on climate change internationally. The agreement will be universal and applicable to all, will ensure transparency, and will be durable and effective. Building on and implementing the United Nations Framework Convention on Climate Change (UNFCCC), which was ratified by the Senate in 1992 by voice vote, the agreement will mark a critical step forward by involving action to reduce emissions by all countries, both developed and developing. Its structure, based on nationally-determined plans, has enabled broad-based participation and buy-in from all countries and sets a new pathway for international action.

The agreement will also include vital provisions on transparency and accountability to provide assurance that all countries are following through in meeting their targets. The agreement must also be durable, able to accommodate countries' evolving development and economic circumstances and ensure that all countries continue to move forward in a regular and timely way toward a commonly understood objective. Finally, it must be an effective agreement, driving the finance and investment needed for low-carbon climate resilient pathways from an array of countries and actors, including the private sector, while also meeting the need to address the serious impacts experienced by all countries, and especially the most vulnerable.

The action that countries around the world are taking, along with the international framework to support that broad-based action, should be viewed as a significant success for the United States and its

leadership role. Meeting the global challenge of climate requires global solutions, including actions by all. The world is now on the cusp of an international climate agreement that will concretize that vision.

My testimony is organized as follows: Section I discusses why the United States can take meaningful climate actions while growing the economy overall and why U.S. leadership on climate change is essential. 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 describes the national climate plans prepared by many countries and the benefits for the United States of the 2015 international agreement. Section V offers some concluding comments on climate policy.

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.¹³

As WRI research in our recent report *Seeing Is Believing: Creating a New Climate Economy in the United States*¹⁴ and real world experience have shown, 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.¹⁵

The movement toward a low-carbon economy is already 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.¹⁶ 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.

Businesses have recognized the economic value of action. More than eighty major global companies, including eighteen U.S. companies – including Dell, Coca-Cola, General Mills, and Procter & Gamble – have committed to setting emissions reductions targets in line with science.¹⁷ More than 80 U.S. companies – including Alcoa, Bank of America, Cargill, General Motors, Microsoft, PepsiCo, UPS, and Walmart – recently signed a pledge in support of a strong international agreement and committed to significant actions in their own supply chains.¹⁸ Six major U.S. banks and investors also recently signed a statement supporting strong international action in order to set clear expectations and market signals.¹⁹

In the context of meeting the U.S. 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.²⁰ 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.²¹ Adding in global climate benefits increases total benefits to \$55-\$93 billion.

To get the full economic picture, one must also assess the cost of the impacts of climate change. Failure to reduce emissions will increase economic, social, and environmental risks for the United States and all nations.²² With global GHG emissions still on the rise,²³ 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*,²⁴ 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 2014.²⁵ Fourteen of the fifteen hottest years on record have occurred since 2000.²⁶ In the United States, some regions are experiencing a higher frequency of flooding, heavier precipitation events, and more frequent heat waves and wildfires.²⁷

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.²⁸ 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.^{29,30} 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.

Moreover, a recent report from the CNA Military Advisory Board – composed of 16 retired three- and four-star military officers – highlighted the increased threats posed to national security by the effects of climate change, including massive population displacement, conflicts due to food and water scarcity, and health catastrophes.³¹ These are not only security threats, but also present substantial potential costs to our military and humanitarian relief agencies.

U.S. leadership is critical to the success of the global efforts necessary to avoid billions of dollars in damaging costs to our country. That leadership is paying off as countries have submitted their INDCs and as we move toward an agreement in the international climate negotiations that culminate in Paris.

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.³² 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.

Opportunities for cost-effective emission reductions are arising across many sectors of the economy. For instance, the capital costs of wind and solar photovoltaic systems continue a rapid downward trend.³³ For example, Texas has seen wind generation multiply 12-fold since 2002, and solar generation in the state has more than doubled since 2011.³⁴ 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.³⁵ 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 (CO₂) emissions.³⁶ Technological progress on many fronts promises to create further opportunities, from creating climate-friendly refrigerants to breakthroughs in electric and fuel cell vehicles.³⁷

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.³⁸

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.³⁹ 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.⁴⁰ In 2013, carbon dioxide (CO₂) 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.⁴¹ 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 2000.⁴² 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 capacity⁴³—well below their design capacity of 85 percent. Less coal generation would bring not only reductions in CO₂ emissions, but also would likely bring reductions in a variety of harmful pollutants, including sulfur dioxide (SO₂), 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 CO₂ 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 CO₂ emissions by 44 percent below 2012 levels.⁴⁴ 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 12.5 percent of total generation in 2013 – nearly half of which came from non-hydropower sources.⁴⁵ Renewables represented 85% of the increase in power generation in 2014.⁴⁶ 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.⁴⁷ 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”.⁴⁸
- 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.⁴⁹
- 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).⁵⁰ 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.⁵¹ 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.⁵² This is partly because of improvements in renewable energy forecasting and sub-hourly supply scheduling, as well as recent increases in transmission infrastructure.^{53,54} 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.⁵⁵

Over the longer term, however, as renewable penetration continues to increase with expected declines in equipment costs, the United States would benefit from expanded transmission⁵⁶ and increased system flexibility. This could be done, for example, through increased grid storage, distributed generation sources, and demand response.⁵⁷

Nuclear power provides zero-carbon baseload generation. In 2013, it produced 20 percent of total U.S. electric generation⁵⁸ and as of mid-2014, three new nuclear plants were under construction, the first new plants since 1996.⁵⁹ However, several nuclear reactors closed in 2013⁶⁰ 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).⁶¹ Continued retirements could prompt an increase in fossil baseload generation and lead to an overall increase in CO₂ 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.

EPA's Clean Power Plan (CPP), finalized in August 2015, will build on and accelerate many of these positive trends noted above by establishing CO₂ emissions standards for existing power plants under section 111(d) of the Clean Air Act. These standards 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 CO₂ emissions by about 28-29 percent below 2005 levels by 2025 and by 32 percent by 2030.⁶² The CPP also offers huge health benefits at four to nine times the amount of compliance costs. In total, the standards are expected to result in \$32 to \$54 billion in health benefits and global climate benefits per year by 2030, far outweighing the costs of \$5.1 to \$8.4 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 SO₂ and NO_x 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).⁶³ And studies have also shown that a more rapid decarbonization of the power sector in the post-2020 time period is technically possible as well as legally defensible.⁶⁴

3. 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.^{65,66,67} State efficiency portfolios regularly save customers over \$2 for every \$1 invested, and in some cases up to \$5.⁶⁸ 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.^{69,70} 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.⁷¹ 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.⁷² 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.⁷³ 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 Energy Guide), 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.⁷⁴ 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 2035.⁷⁵
- 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.⁷⁶ 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),⁷⁷ 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.⁷⁸ 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.⁷⁹

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 agreement with 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.^{80,81}

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.⁷⁴ 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.⁸² 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.⁸³ 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.⁸⁴ 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.⁸⁵ 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.⁸⁶

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).⁸⁷ 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.⁸⁸

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, CO₂ 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.⁸⁹ 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.⁹⁰ 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.⁹¹ 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.⁹² 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.⁹³ 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 CO₂ 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.⁹⁴ 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.⁹⁵ 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.⁹⁶ Total U.S. industrial sector emissions peaked at 1.9 billion metric tons of CO₂ 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.⁹⁷ 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.⁹⁸ 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.⁹⁹ In 2014, total U.S. industrial sector emissions amounted to 1.5 billion metric tons CO₂, which covered 27 percent of total U.S. energy-related CO₂ emissions.¹⁰⁰

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.¹⁰¹ Given that the vast majority of U.S. emissions increases to 2040 are expected to come from industry and manufacturing sector growth,¹⁰² 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.¹⁰³ 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 2030.¹⁰⁴ 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).¹⁰⁵ 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 2020.¹⁰⁶ 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;¹⁰⁷ and research grants such as Advanced Research Projects Agency-Energy¹⁰⁸ and DOE's Advanced Manufacturing Office¹⁰⁹ 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.¹¹⁰ It is also a potent greenhouse gas, with at least 34 times the global warming power of carbon dioxide.¹¹¹ 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.¹¹² 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.¹¹³ 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.¹¹⁴

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.¹¹⁵ 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.¹¹⁶ 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.¹¹⁷ 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.¹¹⁸

EPA rulemakings have taken the first steps by indirectly reducing methane emissions in this sector, and recently proposed methane standards for new and modified oil and gas infrastructure¹¹⁹ 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.¹²⁰ 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.¹²¹ For example:

- Coca-Cola uses CO₂ in 1 million HFC-free coolers and aims to purchase only CO₂-based equipment by 2015.¹²² Because of its transition to CO₂-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.¹²³

- 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.¹²⁴
- Fifteen car companies, including General Motors, Ford, and Chrysler, are moving forward with HFO-1234yf,¹²⁵ a new low-GWP refrigerant for personal vehicle air conditioners that has a GWP 99.9 percent lower than the HFC it replaces.¹²⁶ An estimated 1 million cars on the road worldwide already use this low-GWP refrigerant.¹²⁷ This number is expected to grow to nearly 3 million by the end of 2014.¹²⁸

However, some low-GWP replacements have relatively high upfront costs, require the replacement of old equipment, or require equipment redesign.¹²⁹ Thus, there is little reason to believe that the U.S. market will rapidly move to these alternatives without new rules or other incentives.

The United States (with Canada and Mexico) has advocated for the past several years for an amendment to the Montreal Protocol that would phase down the use of HFCs globally. Agreement was finally reached in early November at the 27th Meeting of the Parties to the Montreal Protocol to negotiate the terms of this amendment. These negotiations will be conducted during 2016 through a series of additional meetings, with the HFC amendment to be adopted in November 2016.¹³⁰ However, to help reduce the use of HFCs domestically pending this amendment, EPA has started to implement measures that address high-GWP HFC use in personal vehicles and in pickups, vans, and combination tractors.¹³¹ In February 2015, EPA finalized rules through the Significant New Alternatives Program (SNAP) program to approve low-GWP alternatives¹³² and in July 2015, EPA finalized rules to move some higher-GWP HFCs out of the market for various applications.¹³³ In October 2015, EPA proposed a rule that will help capture, reclaim and recycle more HFCs from existing equipment to reduce the amount of new HFCs produced.¹³⁴

Opportunities exist to make HFC reductions beyond those finalized 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 continue using the SNAP program to jump start the removal of high-GWP HFCs from the market when low-GWP alternatives become available. However, it will be important for EPA to ensure that new alternatives are both safe and efficient.

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*.¹³⁵ 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

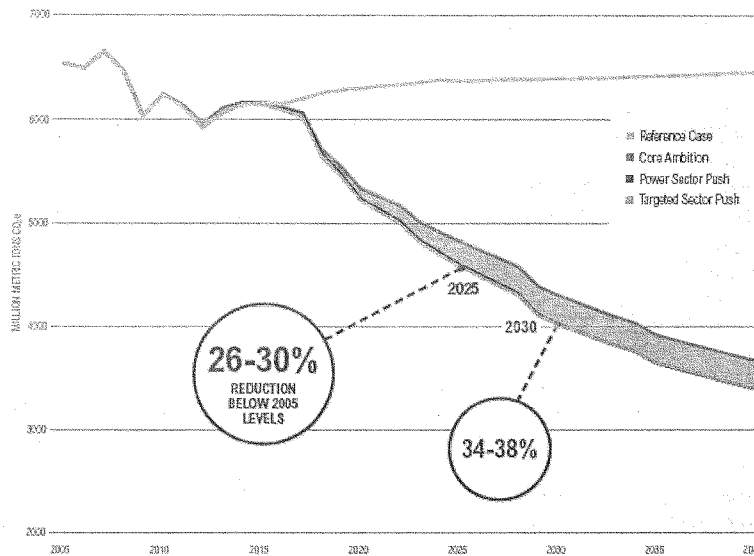


Figure 1 depicts net GHG emissions under three low-carbon pathways we modeled in our analysis that could be pursued using existing federal laws and additional state action. The “Core Ambition” pathway reflects the EPA’s Clean Power Plan (CPP), in addition to emission abatement opportunities across other sectors of the economy. (The modeling is based on the CPP as proposed, however, the reductions projected in 2025 for the final rule are nearly the same.) “Power Sector Push” builds on Core Ambition by assuming that states and utilities go beyond the CPP to take advantage of cost-effective energy efficiency resources and continued decreases in renewable energy costs. “Targeted Sector Push” assumes that the CPP, 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. International Action

A. Intended Nationally Determined Contributions (INDCs) and National Climate Actions

The leadership shown by the United States has paid substantial dividends internationally. In the lead-up to the Paris climate summit and the 2015 international climate agreement, we have witnessed an unprecedented level of commitment to climate action by a wide array of countries, both developing and developed. As of November 12, 2015, 161 countries, including all major economies, have submitted national climate plans for the 2015 climate agreement.¹³⁶ These plans, known as Intended Nationally Determined Contributions (INDCs), are from countries representing more than 90 percent of global greenhouse gas (GHG) emissions.¹³⁷ This unprecedented effort indicates countries' increased seriousness in addressing climate change.¹³⁸

The recently released UNFCCC INDC synthesis report finds that these INDCs represent a much greater breadth of countries than those submitted in 2010,¹³⁹ when only 100 countries submitted plans in association with the Copenhagen Accord and the Cancun Agreement.¹⁴⁰ We are also witnessing an extraordinary effort from developing countries in the lead up to the Paris negotiations. In 2010, only 33 developing nations announced a national climate plan.¹⁴¹ As of November 12, 2015, 119 developing countries – including 41 least developed countries – have submitted an INDC, through which they outline their plans to mitigate emissions and adapt to a changing climate. Only seven least developed countries (LDCs) have yet to submit an INDC.¹⁴²

The effect of these plans on climate policies will be considerable. Of the plans submitted, those from at least 117 countries include a greenhouse gas emissions target, usually expressed as a percent reduction by a certain year. By contrast, of the countries with pledges adopted for 2020 targets in association with the Copenhagen Accord and the Cancun Agreement, only 61 included greenhouse gas emissions targets, only about half of those with such targets in the current INDCs.¹⁴³

Countries are also using their INDCs to outline significant policies and actions that support the deployment of clean energy and help countries adapt to the effects of climate change. In the plans submitted, at least 102 countries include plans to scale up clean energy between 2020 and 2030, as they look for ways to limit greenhouse gas emissions while sustaining economic growth, boosting energy security and providing energy access to the billions of people who lack it now.¹⁴⁴ More than half of these plans include specific targets for increasing renewable energy supply.¹⁴⁵

In addition to addressing mitigation, the plans from at least 109 countries include adaptation,¹⁴⁶ describing activities and goals in vulnerable sectors like water, agriculture and human health. Most countries clearly identify existing gaps, barriers and needs associated with adapting to their local climate change impacts, which begins to outline a roadmap for global efforts to build capacity, develop and share technology, and scale up adaptation finance.¹⁴⁷

As a whole, INDCs not only address climate change, but also address domestic goals such as sustainable economic growth and poverty reduction. Importantly, the INDCs signal a new phase of climate policy, in which climate action is strongly rooted in domestic policies and national development and economic agendas and aligned with country priorities.¹⁴⁸

1. Developing Countries' Plans and Actions

The climate actions of major developing countries are particularly worth noting. Last year's U.S.-China Joint Announcement on Climate Change was an historic agreement that included unprecedented actions by China. China committed to reach a peak in its carbon dioxide emissions around 2030 and make best efforts to peak earlier, and to increase the non-fossil fuel share of its energy use to around 20 percent by 2030.¹⁴⁹ China's INDC, submitted in June 2015 for the Paris climate agreement, formalized these targets and also set additional targets to reduce the carbon intensity (carbon emitted per unit of GDP) of its economy by 60 to 65 percent from 2005 levels by 2030 and to increase its forest stock by around 4.5 billion cubic meters.¹⁵⁰ In addition to national targets, eleven cities and provinces from across China committed to reach a peak in their carbon emissions before the national goal to peak around 2030.¹⁵¹ This group comprises a quarter of China's urban carbon emissions, roughly equivalent to the total annual carbon emissions of Japan or Brazil.¹⁵²

China has made significant progress in decoupling emissions from economic growth in recent years and is on track to exceed the carbon intensity and energy intensity targets in its 12th Five Year Plan.¹⁵³ These are key steps to achieving China's commitment to reduce its carbon intensity by 40 to 45 percent from 2005 levels by 2020.¹⁵⁴

China's 2030 targets are in line with even stronger efforts. A 2014 study by MIT and China's Tsinghua University found that a scenario with emissions leveling off between 2025 and 2035 and slowly declining after that involves stronger measures well beyond current policies, including a rising price on carbon.¹⁵⁵ Stronger steps will also be needed to achieve the non-fossil target. China will need to install 800-1,000 gigawatts (GW) of non-fossil fuel electricity generation capacity to achieve its 2030 non-fossil energy target, greater than its current coal-fired capacity and almost the total current electricity generation capacity of the United States.¹⁵⁶

Expert projections¹⁵⁷ of a peak in China's carbon emissions and an increased share of non-fossil energy are supported by several major building blocks: scaling up non-fossil energy, limiting coal use,¹⁵⁸ improving energy efficiency, placing a price on carbon, and rebalancing the economy from heavy industry toward services.¹⁵⁹ China is already taking significant action in each of these areas.

China led the world with nearly a third of global investment in renewable energy in 2014,¹⁶⁰ is the world leader in installed wind power capacity,¹⁶¹ and has set targets to roughly double its 2014 wind capacity to 200 gigawatts and more than triple its 2014 solar capacity to 100 gigawatts by 2020.¹⁶² China has banned new coal plants in three key industrial regions¹⁶³ and many provinces have targets to reduce

coal use.¹⁶⁴ China has been strengthening and expanding policies to increase energy efficiency across its economy, including targets for the efficiency of coal plants,¹⁶⁵ energy-saving targets for industrial enterprises,¹⁶⁶ building energy codes,¹⁶⁷ and fuel economy standards.¹⁶⁸ President Xi Jinping recently announced that in 2017 China will launch a national emissions trading system,¹⁶⁹ which has the potential to be a powerful instrument to reduce emissions over time.¹⁷⁰ Finally, China is seeking to shift away from its old growth model driven by investment in energy-intensive industry toward a new model driven by consumption, services, and advanced manufacturing,¹⁷¹ which should have an emissions reduction benefit.¹⁷²

China is working on including additional steps in its upcoming 13th Five Year Plan, to be released early next year.¹⁷³ Signs of a recent decline in China's coal use¹⁷⁴ and other trends have led some experts to predict that China's coal use may have already reached its structural peak (controlling for cyclical factors)¹⁷⁵ and that China's emissions will likely peak before 2030, consistent with the government's stated aim to make best efforts to peak early.¹⁷⁶

Other major developing countries have also taken important steps forward. In its INDC, Brazil has set a target of reducing emissions by 37 percent below 2005 levels by 2025,¹⁷⁷ becoming the first major developing country to commit to an absolute reduction of emissions from a base year. Brazil also plans to increase the share of renewables (other than hydropower) in the power supply to at least 23 percent by 2030. This will increase Brazil's renewable electrical capacity (excluding hydropower) by an estimated 48 gigawatts, more than quadrupling 2012 levels.¹⁷⁸ The country also has set a target to achieve zero illegal deforestation by 2030 in the Brazilian Amazon. Over the past decade, the rate of deforestation in the Brazilian Amazon has already dropped by 70 percent compared with the previous decade, keeping 3.2 billion metric tons of carbon dioxide (CO₂) emissions out of the atmosphere.¹⁷⁹ This is equivalent to taking all U.S. cars off the road for three years.¹⁸⁰

India has set goals to substantially increase its renewable energy capacity to 175 gigawatts by 2020, including increasing its solar capacity to 100 gigawatts—a twentyfold increase from current levels of 4 gigawatts—and increasing its wind power capacity to 60 gigawatts.¹⁸¹ The solar target is more than half the total global installed capacity of 181 gigawatts of solar energy in 2014.¹⁸² In its INDC, India builds on this targets by committing to increase its non-fossil fuel power sector capacity to 40 percent by 2030. India's INDC also commits to reducing the greenhouse gas intensity of its economy (greenhouse gases per unit of GDP) by 33-35% below 2005 levels by 2030. India will also create an additional carbon sink of 2.5 to 3 billion tons of carbon dioxide through additional tree cover.¹⁸³

Additional major developing countries have submitted INDCs that indicate a peak date for the absolute level of emissions. Mexico was the first developing country to release its INDC and plans to reduce its greenhouse gas emissions by 22 percent and its black carbon (soot) by 51 percent by 2030 relative to BAU levels.¹⁸⁴ The INDC indicates that the policy is expected to lead to a peak in emissions by 2026. South Africa joins China and Mexico in stating intended peaking years for emissions. South Africa's INDC provides a target to peak national greenhouse gas emissions between 2020 and 2025 and decline in absolute terms beginning no later than 2035.

2. Effect of INDCs on Global Temperature

Several recent studies have shown that the INDCs submitted will make a significant difference in reducing global emissions in comparison to current policy trajectories. All of the studies find that the INDCs collectively reduce global emissions relative to the current trajectory, though additional effort will be needed to limit the global temperature increase to a rise of less than 2 degrees Celsius (3.6 degrees F) above pre-industrial temperatures, the globally agreed goal for limiting climate change.¹⁸⁵

The International Energy Agency's Energy and Climate Change Report¹⁸⁶ concludes that full implementation of INDCs would contribute to 4-8 gigatons (GtCO₂e) of greenhouse gas emissions reductions by 2030. The report estimates that the path set by the INDCs would be consistent with an average global temperature increase of around 2.7 degrees Celsius by 2100. That contrasts with the Agency's projections of an almost 4 degrees Celsius temperature increase by 2100 given business as usual (BAU) policies.¹⁸⁷

The Synthesis Report of the INDCs conducted by the UNFCCC estimates that the implementation of INDCs would result in emissions in 2025 that are 2.8 gigatons (and up to 5.5 gigatons) of greenhouse gas emissions (GtCO₂e) lower than current policy trajectories and emissions in 2030 that are 3.6 gigatons (and up to 7.5 gigatons) lower. The synthesis report does not present the effect of INDCs on global temperature.¹⁸⁸

The reports come to a similar conclusion that the implementation of INDCs would contribute to significant reductions of global greenhouse gas emissions (approximately 3-8 GtCO₂e in 2030). Although the collective reductions of the INDC emissions targets are not yet sufficient to achieve the 2 degrees Celsius goal, progress has already been made. The INDCs represent approximately one third of the emissions reductions needed to meet the 2 degrees Celsius goal relative to current trajectories, and half of the reductions needed relative to the business as usual policies in place in 2010.¹⁸⁹ While more needs to be done in the coming years, the INDCs are an important first step in transitioning to a low-carbon economy and limiting global temperature increase. This will assist in avoiding some of the most costly impacts in the United States and in other countries.

B. International Agreement

The leadership role played by the United States has helped to catalyze not only broad-based action by other countries, but also the momentum toward an international agreement that achieves a key set of aims for the United States.

First, and most important, the agreement is applicable to all countries. The Paris agreement will build on and implement the existing United Nations Framework Convention on Climate Change (UNFCCC), which was ratified by the Senate in 1992, and will mark a critical step forward by involving action to reduce emissions by all countries, both developed and developing.

The universality of the agreement is exactly what the United States has been seeking for many years in the international climate negotiations and should be viewed as a major success. It will be an agreement with a structure that removes previous question marks about action by China and other countries and puts in place clear pathways for action by all countries. This shift to a universal system is also the result of a process in the negotiations to generate national climate plans, the INDCs, at the national level in accordance with their national circumstances.¹⁹⁰ This sets a strong foundation for countries to achieve what they have set out in their INDCs.

Second, the Paris agreement is a critical opportunity to enhance the existing system of transparency and accountability to enable greater clarity and enhance trust about whether and how countries are fulfilling their INDCs. Following the UNFCCC Conference of Parties (COP) in Copenhagen in 2009 and the Conference of Parties in Cancun in 2010, all countries are required to track and report their emissions through a system referred to as Measurement, Reporting and Verification (MRV), with some differences for developed and developing countries in timelines and exact reporting requirements.¹⁹¹ The Paris agreement can strengthen this system and ensure that developed and developing converge to the same MRV requirements over time (including through the use of capacity building support for developing countries to implement the requirements).

A robust system of transparency is very much in line with the values of openness and accountability that are so fundamental and deeply imbedded in the United States. It is essential to making sure that other countries are carrying out what they have said they will do. The MRV system also offers an opportunity to identify challenges that developing countries with limited capabilities may be facing and to work with them to address those barriers.

Third, it is vital that the Paris agreement is durable, designed not only for circumstances as they exist in 2015, but also for years to come. In part, the agreement must be flexible enough to accommodate evolving national circumstances, particularly as countries' capabilities continue to grow. Beyond that, the agreement must also ensure that all countries continue moving forward over time, regularly returning to review, revisit and update their national climate plans. This is essential to making this agreement universal over the long-term, ensuring that countries across the board continue to move forward in a regular and timely way, while also providing an opportunity to consider whether countries are doing their part to take adequate action. Establishing a long-term global goal for action to reduce emissions can also help to ensure that all countries, not just some, are expected to move toward a common objective over time.

Fourth, the Paris agreement is an opportunity to effectively expand the scope of finance and investment needed to meet this challenge, bringing many new actors into the mix. Public funding remains essential, particularly to address the serious impacts of climate change on the poorest countries. But the substantial investment needed to shift our economies to low-carbon and climate resilient pathways also requires mobilizing and shifting the broader private sector financing that is so necessary to making progress.

Moreover, developing countries with greater capabilities are increasingly stepping up to play a meaningful role in climate finance. Chinese President Xi's recent commitment in the Joint Presidential Statement with President Obama that China would provide more than \$3 billion in climate finance was a game changer.¹⁹² Some developing countries have also now contributed to the Green Climate Fund, a central international funding mechanism.¹⁹³ The Paris agreement can reflect this shift and the key role of finance from developing countries that are ready to provide it.

Acting together with these other countries and private sectors investors, U.S. engagement to mobilize climate finance is a sensible investment. Especially by enabling vulnerable countries to build resilience to changing weather patterns, sea level rise, and extreme weather events, international climate change investments can help counter security threats that otherwise would have to be confronted with more costly interventions. The impacts of climate change must also be addressed to avoid undermining or reversing development gains in poor countries, especially those in vulnerable regions like Sub-Saharan Africa. An assessment by the World Bank illustrates how climate change increasingly threatens health and livelihoods of vulnerable populations, magnifying existing challenges to poverty alleviation.¹⁹⁴

And, fifth, the Paris agreement can help catalyze action to address the impacts of climate change that are already being felt, especially in the most vulnerable and poorest countries. This is a challenge that affects us all – whether it is increased water scarcity and drought, vulnerable coastal areas facing sea-level rise, or growing risks to agricultural productivity. All countries need to work together to address these challenges, and the Paris agreement is a critical opportunity to catalyze collective action to build resilience to climate impacts. The United States has always stood with and supported the most vulnerable and poorest countries in tackling their challenges and should continue to do so today.

Meanwhile, there is more that will happen in Paris beyond the bounds of the international agreement itself. A major platform for actors other than national governments – including businesses and cities and states – will highlight the many actions and initiatives that are already underway to advance a low-carbon and climate resilient economy. Effective action on climate change cannot rest only on the actions of governments or agreements among them – it will depend on everyone playing a part.

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.

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 share, since no nation is immune to the impacts of climate change and no nation can meet the challenge alone. U.S. leadership has already paid substantial dividends as we witness the wide variety of countries coming forward with their national climate plans and as we see the development of an international climate agreement that is universal, transparent, durable and effective.

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.

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

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¹¹⁰ 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>.

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Senator CAPITO. Thank you.
Ms. JACOBSON.

**STATEMENT OF LISA JACOBSON, PRESIDENT, BUSINESS
COUNCIL FOR SUSTAINABLE ENERGY**

Ms. JACOBSON. Thank you, Senator Capito. Thank you, Senator Carper and members of the committee.

The Business Council for Sustainable Energy is a broad-based industry association and we represent companies and other trade associations in the energy efficiency, renewable energy, and natural gas sectors. Since its founding in 1992, the Council has been advocating for policies at the State, national, and international levels that increase the use of commercially available clean energy technologies, products, and services.

As an important backdrop to my testimony, the Council would like to share some of the findings from the 2015 "Sustainable Energy in America Factbook." The Factbook was researched and produced by Bloomberg New Energy Finance, and commissioned by the Council. It is a quantitative and objective report intended to be a resource for policymakers with up-to-date, accurate market information. Its goal is to offer important benchmarks on the contributions that sustainable energy technologies are making in the U.S. energy system today. It also provides information on finance and investment trends.

The 2015 edition of the Factbook points to the dramatic changes underway in the U.S. energy sector over the past several years. Traditional energy sources are declining, while natural gas, renewable energy, and energy efficiency are playing a larger role. These changes are increasing the diversity of the Country's energy mix, improving our energy security, cutting energy waste, increasing our energy productivity, and reducing air pollution and greenhouse gas emissions.

The Factbook also shows that the U.S. economy is becoming more energy productive and less energy intensive. By one measure, U.S. gross domestic product per unit of energy consumed, productivity has increased by 54 percent since 1990. Between 2007 and 2014, total energy use fell by 2.4 percent, while GDP grew by 8 percent. This was driven largely by advances in energy efficiency in the transportation, power generation, and building sectors. Of note, energy-related carbon dioxide emissions decreased by 9 percent in the 2007 and 2014 time period.

BCSE members in the energy efficiency, natural gas, and renewable energy sectors offer readily available, low carbon and zero carbon energy solutions. This portfolio of technologies can be used today to provide reliable, affordable, and clean energy options for public and private sector customers. In 2014, U.S. investment in clean energy technologies reached \$51.8 billion, and these sectors are providing hundreds of thousands of well-paying jobs in this Country.

The Council will bring a delegation of its members to attend the COP 21 as business observers. This organization has consistently engaged in the international climate change process since the early 1990's. BCSE participates in this process to offer information on deployment trends, technology costs, as well as policy best prac-

tices. Council members view the climate change negotiations as a valuable forum to share information on policy frameworks and to help inform the policy choices of countries looking to reduce greenhouse gas emissions and deploy clean energy options.

Further, Council members view the outcomes of the international climate change negotiations as important signals to the market that countries are serious about investing in low carbon solutions. These signals will serve to reduce the uncertainty that can stall private sector investment.

U.S. Government leadership and engagement in the international climate change process supports U.S. business interests and expands clean energy business opportunities outside our borders. Further, U.S. leadership increases the ambition of other nations and helps showcase U.S. technology innovations and policy frameworks. It also helps protect U.S. business interests, such as protection of intellectual property rights.

The Council's coalition calls for governments to deliver a clear, concise, and durable climate change agreement at COP 21. With over 91 percent of global emissions and 90 percent of global population covered by the intended, nationally determined contributions of 161 countries, nations are showing a collective commitment to spur investment, innovation, and deployment of clean technologies in countries around the world.

The Council believes that a well-structured Paris agreement can facilitate higher levels of investment over time. But as we look toward the next several decades, even higher levels of investment will be needed. We need to be focused in the trillions, not the billions of dollars in investment. The world energy markets cannot afford any backtracking at this critical time, and the business community is increasingly considering climate change and its impacts as part of its corporate strategies.

Thank you.

[The prepared statement of Ms. Jacobson follows:]

Lisa Jacobson, President

Business Council for Sustainable Energy

Testimony before the Senate Environment and Public Works Committee

Hearing on “Examining the International Climate Change Negotiations”

November 18, 2015

Chairman Inhofe, Ranking Member Boxer, and Committee Members, thank you for the opportunity to testify today.

My name is Lisa Jacobson, and I serve as the President of the Business Council for Sustainable Energy (BCSE).

The Business Council for Sustainable Energy is a broad-based industry trade group representing companies and associations in the energy efficiency, natural gas and renewable energy industries. Its membership includes independent electric power producers, investor-owned utilities, public power, commercial end-users, equipment manufacturers, project developers as well as service providers for energy and environmental markets.

Since its founding in 1992, the Council has been a leading industry voice advocating for policies at the state, national and international levels that increase the use of commercially-available clean energy technologies, products and services.

Through my testimony, I will address the Council’s engagement in the international climate change process, the contributions that clean energy technologies are making to reduce US greenhouse gas emissions and what the coalition seeks out of a Paris climate change agreement in December.

As an important backdrop to my testimony at this hearing, the Council would also like to share some of the findings from the 2015 edition of the *Sustainable Energy in America Factbook*.¹ The *Factbook* was researched and produced by Bloomberg New Energy Finance and commissioned by the Business Council for Sustainable Energy. It is a quantitative and objective report, intended to be a resource for policymakers with up to date, accurate market information. Its goal is to offer important benchmarks on the contributions that sustainable energy technologies are making in the US energy system today. It also provides information on finance and investment trends in clean energy resources.

The 2015 edition of the *Sustainable Energy in America Factbook* points to the dramatic changes underway in the US energy sector over the past several years. Traditional energy sources are declining, while natural gas, renewable energy and energy efficiency are playing a larger role.

These changes are increasing the diversity of the country’s energy mix, improving our energy security, cutting energy waste, increasing our energy productivity and reducing air pollution and greenhouse gas emissions.

BCSE and its Engagement with the International Climate Change Negotiations

BCSE members in the energy efficiency, natural gas and renewable energy sectors offer readily-available low-carbon and zero-carbon energy solutions. This portfolio of technologies can be used today to provide reliable, affordable and clean energy options for public and private sector customers. In 2014, US investment in clean energy technologies reached \$1.8 billion and these sectors are providing hundreds of thousands of well-paying jobs.

The Council will bring a delegation of its members to attend as business observers to the 21st Conference of the Parties (COP 21) of the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, France this December. The organization has consistently engaged in the international climate change process since the early 1990s.

¹ 2015 edition of the *Sustainable Energy in America 2013 Factbook*, February 2015, <http://www.bcse.org/sustainableenergyfactbook>

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The BCSE participates in this process to offer clean energy business expertise to the negotiators and stakeholders, providing information on deployment trends, technology costs as well as policy best practices.

BCSE members view the climate change negotiations as a valuable forum to share knowledge on policy frameworks and to help to inform the policy choices of countries looking to reduce greenhouse gas emissions and deploy clean energy options.

Further, BCSE members view the outcomes of the international climate change negotiations as important signals to the market that countries are serious about investing in low-carbon solutions. These signals will serve to reduce the uncertainty that can stall private sector investment. The scope and scale of the intended nationally-determined contributions of 161 countries under consideration at COP 21, will spur new investment and continue low-carbon investment trends that are already occurring.

US government leadership and engagement in the international climate change process supports US clean energy business interests and expands clean energy business opportunities outside our borders. US leadership increases the ambition of other nations and helps showcase US technology innovations and policy frameworks. BCSE is especially pleased that the upcoming negotiations in Paris will create new forums for sub-national actors, including state and local government officials as well as the private sector to showcase their efforts to reduce emissions and adapt to climate change.

Unlocking Investment, Innovation and Clean Energy Deployment – A Road Map to a Meaningful Paris Climate Change Agreement

The coalition of clean energy industries represented by the Business Council for Sustainable Energy calls for governments to deliver a clear, concise and durable climate change agreement at the COP 21 of the UNFCCC in Paris, France in December 2015.

With over 91% of global emissions and 90% of the global population covered by the intended nationally-determined contributions (INDCs) ² of 161 countries, nations are showing a collective commitment to spur investment, innovation and deployment of clean energy technologies in countries around the world. While the unconditional INDCs are estimated to deliver only 42% of the emissions reductions needed to reach the 2°C pathway,³ the Council believes that a well-structured Paris agreement can facilitate higher levels of ambition over time.

Of note, in 2014, global investment in clean energy topped \$310 billion, proving that the low-carbon transformation of the energy sector is well underway. This transformation is driven by falling technology costs, business innovations and supportive policy frameworks. But as we look toward the next several decades, even higher levels of investment will be needed. The International Energy Agency estimates that \$500 billion annually by 2020 and \$1 trillion annually by 2030 will need to be invested in low-carbon energy in order to keep global warming below 2°C and avoid the worst effects of climate change.⁴ The world energy markets cannot afford any backtracking at this critical time.

² Climate Action Tracker, climateactiontracker.org/indcs.html, November 12, 2015.

³ Climate Advisors, "Climate Diplomacy After Paris: Opportunities for US Leadership," November 2015.

⁴ International Energy Agency, *Energy Technology Perspectives 2012: How to Secure a Clean Energy Future* (Paris: 2012).

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The key elements of a Paris agreement and supporting decisions include:

- **Participation by all countries** to address climate change.
- **A clear and durable structure** that provides transparent and predictable schedules for the monitoring, review and evaluation of emissions mitigation target and timetables, with a built-in mechanism to adjust country goals and actions as needed over a longer time horizon.
- **Continued international climate finance** support by donor countries, both to meet existing commitments and to expand public-private finance mechanisms in a post-2020 environment.
- **Protection of innovation systems** that enable the deployment of existing clean-energy solutions and creation of next generation low-carbon technology solutions. When the private sector makes investment decisions in a country, it assesses a potential market based on the existence of stable policies, sound infrastructure, and effective legal frameworks that encourage competition and innovation and that protect intellectual property rights (IPRs).
- **Recognition of the role of market-based mechanisms** as cost-effective cooperative tools for countries to meet mitigation and development objectives, accompanied by an accounting system to protect environmental integrity and to avoid double-counting of emissions reductions.
- **Recognition of the role of the private sector** and the need for public-private partnerships to deliver the technology solutions and investment capital needed to transform the energy sector and help close the ambition gap between national targets and a 2°C pathway. The preparations for COP 21 in Paris have made new inroads toward recognizing the necessity and importance of the contributions of the private sector, cities, states and other non-state actors in addressing climate change. These actors and their contributions should be recognized in the new global framework that governs climate action into the future.

The Changing US Energy Landscape

The 2015 edition of the *Sustainable Energy in America Factbook* points to the dramatic changes underway in the US energy sector over the past several years. Traditional energy sources are declining, while natural gas, renewable energy and energy efficiency are playing a larger role.

These changes are increasing the diversity of the country's energy mix, improving our energy security, cutting energy waste, increasing our energy productivity and reducing air pollution and greenhouse gas emissions.

Behind this change are a portfolio of new energy innovations, technologies, and applications. These include: newly applied techniques for extracting natural gas from shale rock formations; lower-cost and higher-efficiency photovoltaic panels for converting sunlight to electrons; highly efficient, natural gas end-use applications; natural gas vehicles and battery and fuel cell electric vehicles; and 'smart meters' that allow consumers to monitor, modulate, and cut electricity consumption, among others.

The *Factbook* looks at a broad spectrum of sustainable energy technologies and provides data on a wide range of clean energy industries including natural gas, renewable energy sources (including solar, wind, hydropower, geothermal, biomass, biogas and waste to energy – but excluding liquid biofuels), stationary fuel cells and other distributed technologies, as well as energy efficiency.

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The *Factbook* shows that the US economy is becoming more energy productive and less energy intensive. By one measure—US gross domestic product (GDP) per unit of energy consumed—productivity has increased by 54% since 1990. Between 2007 and 2014, total energy use fell 2.4%, while GDP grew 8%. This was driven largely by advances in energy efficiency in the transportation, power generation and buildings sectors.

BETWEEN 2007 AND 2014:

- Total energy use fell 2.4%, while GDP grew 8%.
- Energy productivity of the US economy has increased 11%, and specifically, 1.4% from 2013 to 2014.
- Annualized electricity demand growth has been zero.
- Energy-related carbon dioxide emissions have decreased by 9.2%.

While energy demand has fallen more steeply than it has in at least 50 years, the use of natural gas and renewable energy has increased. Natural gas provided the US with 28% of its total energy supply in 2014 of which 27% was used to produce electricity via natural gas-fired power plants. This was up from just 22% of electricity from gas-fired power plants in 2007. Renewable energy in 2014 was 9.7% of total US energy mix whereas electrical generation from renewable resources increased from 8.3% to 12.9% between 2007 and 2014.

The Role of Domestic Electricity Sector Policy in Deploying Clean Energy Technologies

The US power sector is undergoing rapid changes and clean energy technologies in the energy efficiency, natural gas and renewable energy sectors are playing a larger role in the electricity mix.

These changes have been happening due to a range of factors, including cost reductions in certain sectors, technology and business innovations and supportive policy frameworks.

The final Clean Power Plan that regulates carbon emissions from existing power plants was released in August 2015. The structure of the regulation reflects the direction that US power markets are taking and, as it is implemented, will provide investment certainty to inform future decisions.

While the BCSE favors a legislative approach to addressing greenhouse gas emissions, the release of the Clean Power Plan was a historic development and demonstrates federal leadership to address global climate change.

It is important to note that the Clean Power Plan provides flexibility to states to implement the standard. This flexibility will allow states to meet their targets with a broad portfolio of affordable and reliable technologies, including an array of energy efficiency, natural gas and renewable energy solutions. In addition, states can consider the use of carbon capture utilization and storage (CCUS) as well as carbon capture and sequestration (CCS) technologies for compliance if they have carbon utilization and sequestration capacity.

The Clean Power Plan also offers an opportunity for constructive partnership and dialogue between state policy-makers and the private sector, with clear opportunities to explore state-specific or multi-state options for compliance.

The Business Council for Sustainable Energy and its members are engaging in stakeholder processes for state plan development and understand that state plans must match clean energy solutions to each state's unique circumstances. To assist the development of state plans, the Council, in partnership with Bloomberg New Energy Finance (BNEF), released state specific factsheets that discuss the energy landscape in Minnesota, Nevada,

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Pennsylvania and Virginia.⁵ The factsheets also consider deployment trends and technology costs of various technology and resource options. In all of these states, BNEF finds a foundation that positions these states well to meet the Clean Power Plan targets, based on the policy and market conditions already in place.

BCSE will continue to engage with EPA and states as plan development continues. We will also work with state and federal policymakers to adopt policies that provide certainty for low and zero carbon investments in the US.

Clean Energy Businesses Take Action to Address Climate Change

The US business community is increasingly considering climate change impacts in its energy and corporate strategies. Clean energy companies, including several Council members, have recently announced new pledges to reduce greenhouse gas emissions as well as other climate-friendly sustainability initiatives.

BCSE members making recent pledges include: Calpine, ENER-G Rudox, Ingersoll Rand, Johnson Controls, Kingspan Insulated Panels – North America, PG&E, Qualcomm Incorporated, and Schneider Electric.

Council member efforts as well as other US company actions show that addressing climate change is becoming a mainstream business issue.

The private sector is going to be a key partner in delivering the innovation, investment and technologies that will help the US and other countries meet their mitigation targets. By leading by example and showing what is possible, these American companies are adding to the global momentum for a positive outcome at the Paris negotiations for a new international climate change agreement.

⁵ Please see the BNEF state factsheets for Minnesota, Nevada, Pennsylvania and Virginia at: [State Energy Factsheet: Nevada](#); [State Energy Factsheet: Pennsylvania](#); [State Energy Factsheet: Minnesota](#); [State Energy Factsheet: Virginia](#)

Senator CAPITO. Right on the dot there. Very good. Thank you very much.

I will begin with the questions, and I want to start with Mr. Ku, Professor Ku, because there are two questions that I would like to get to in my 5 minutes, and the first one is the legally binding issue, whether this is a treaty, whether it is a sole executive agreement. So it is kind of a two-part question.

Some have argued that the Senate approved emissions reductions when it ratified the U.N. Climate Framework in 1992. But didn't the Bush administration then, in 1992, State that amendments to that Framework, especially ones establishing targets and timetables, should be presented as new treaties and have separate consents?

So that is my one question: Was the intent in 1992 that any further targets that were established would be part of an approval process with Senate consent?

And then I am going to ask you the next question. You can answer once.

On the sole executive agreement issue, it is stated that those have been used to justify the authority for COP 21. Would you say that those are typically used in narrow and limited circumstances? And do you believe that COP 21 would be considered a narrow and limited circumstance?

So I want to dig down on the legality issue.

Mr. KU. OK. Thank you, Senator.

On the first issue, I think that the U.N. Framework Convention was a framework convention, it was to set up a framework for further negotiations and a process, but did not in fact and should not be read as authorizing new agreements without having to go through the normal process. So it is my view that convention does not authorize, it requires any new agreement for legally binding emissions to go back to the Senate.

In fact, I think in 1992 the Senate, as part of the process for approving the U.N. FCC, actually asked the Bush administration whether future protocols to the treaty would require Article II, meaning going back to the Senate, and the Bush administration said if the new protocol contains legally binding emissions, targets, or timetables, then they would send that back to the Senate.

So that is essentially a promise by the executive branch that we will come back to the Senate. It is the type of thing that should be respected as inter-branch dialog, and I think it is one of the reasons why I think an agreement with legally binding emissions targets and timetables should be sent back to the Senate for its approval.

On the second question of sole executive agreement just quickly, sole executive agreement is typically done in pretty narrow circumstances. The format typically is Article II treaties or Congress specifically authorizes the President to make an executive agreement in a particular area like trade, like the TPP or something like that. A sole executive agreement is when the President just acts under his own authority, and I think that is not so much that it is unusual, but it is narrow and relatively narrow.

I don't think that in this circumstance, I think the President could say, well, I agree to every year report on what we are doing,

and that would be something that he could do as a sole executive agreement. I don't think he could commit the United States to reduce emissions by a certain amount, by a certain year, in a sole executive agreement; I think he would either have to get Congress to approve that through new legislation or I think the best way to do it is to go back to the Senate for approval as a treaty.

Senator CAPITO. Thank you.

Mr. Cass, you mentioned a giant transfer of wealth. Obviously, the President is going to go to this negotiation with no money and a green climate fund that has been appropriated by the Congress. What kind of effect will that have, do you think, in terms of future commitments that the United States is supposedly making if this Congress won't appropriate any money? There is no guaranty that future congresses would. At the same time, I am certain the world community is counting on the United States to bring the money to the table.

What comments would you have on that?

Mr. CASS. Well, I think probably everyone, including negotiators from other countries, understand that the President cannot appropriate money on his own. I think the larger concern is that, faced with the choice of Paris collapsing without an agreement or saying, yes, I will go find a way to get the money, U.S. negotiators will say we will find a way to get the money and essentially shift the onus back to Congress and say, look, the world has come together on this agreement; you, if you do not appropriate the money, will be at fault for the agreement failing.

So to preempt that I think it is actually very important that Congress act first and say to the world, let's be clear, we will not appropriate that kind of money; don't come back with an agreement that requires it because that should not be the lynchpin of an agreement that does not even include significant emissions reduction.

Senator CAPITO. All right, thank you.

Senator Carper.

Senator CARPER. Thanks so much.

Again, our thanks to all of you for being with us. Some of you this is the first time we have met you; others we have known for some time. New or old, we are happy to have this chance to spend this time with you.

Just a word on leadership, if I can. I think that leadership is probably the most important ingredient of any organization I have ever been part of or led; I don't care if it is the Navy, military, business, this place, sports team, college, hospital, school. Leadership is the most important thing. And leadership is demonstrated in a variety of ways. I always said that great leaders are those who look at a problem and say what is the right thing to do; not the easy thing, not the expedient thing, but what is the right thing to do. And the right thing to do is to provide leadership in this instance.

Leadership is staying out of step when everyone else is marching to the wrong tune, including some with whom I serve. We lead by our example. It is not by do as I say, but do as I do. That is why it is important for us to actually set an example and encourage others to lead. I find in my life and my experience a lot of time they do.

Leaders should be aspirational. It has been said that leaders are purveyors of hope.

As I listen to this testimony today, I heard some testimony that was doom and gloom, and, frankly, I heard some testimony that was aspirational and uplifting; and I know you can probably figure out where those came from. Leaders just don't give up. Leaders don't give up. You know you are right, you are sure you right, we don't give up.

I would just say you don't need a tutorial on leadership, but it is the most important thing here and every place I have ever worked or served.

I want to talk a little bit about acid rain. We are in a party of the Country where we deal with sea level rise on the East coast, Mid-Atlantic, Northeast as well. Twenty, thirty years ago we had a big problem with acid rain. You may remember that. And a lot of folks said, well, we can never afford. President Herbert Walker Bush said we have this idea, we call it cap and trade, and we are going to try to reduce sulfur dioxide emissions and the effect of acid rain. People said, oh, you can't do that; it will kill the economy.

Well, guess what? As I recall, as I recall, what we finally did, putting in place, implementing the plan that he proposed, we achieved our goals in half the time and one-third of the cost. Imagine that. And we spurred a lot of innovation; innovation that turns to economic products and technologies that we can export all over the world.

I remember sitting here in this room about 10 years ago. George Voinovich and I were leading the Clean Air subcommittee of EPW and we had testimony on mercury reductions and how much mercury we could release from coal-fired plants. My recollection is we had somebody say, oh, we could never do that, it would cripple the economy, that is just impossible.

We had one witness, Lisa, sitting right where you are sitting today, and the guy who was representing all the association technology companies and he said, we can do this. We were talking about 80 percent reductions in mercury emissions. He said, we can do this. In fact, he said, I think we can maybe even do better than that in the timeframe that you are talking about.

Well, guess what? We did. And we didn't do 80 percent reductions; we did 90 percent. And we created technology innovation that we have been able to sell all over the world. And if we are smart about it, all these coal plants you all are talking about in China, they can actually have the kind of technology that we have put in or prepared to put into new coal-fired plants here.

Lisa, I am going to ask you to just take a minute and just give us a comment on one of the things we have heard from our first three witnesses that you think needs to be rebutted or at least addressed. Would you do that, please?

Ms. JACOBSON. Thank you. I think on the INDC topic.

Senator CARPER. INDC stands for?

Ms. JACOBSON. Yes. So they are the commitments that other nations have brought forward. The Council, in our experience in discussing with other countries and what is expected in COP 21, we did not expect that those would be legally binding commitments. There may be other aspects of the treaty that have more legal

force. As we all know, that topic is one that has not yet been resolved.

But just the fact that that scope and scale of countries have come forward with greenhouse gas mitigation and adaptation plans in any shape or form is a major breakthrough, and, as companies, we see that as an important market signal and then we can respond to that. We can look at the experience in the U.S., where States, local governments, or the Federal Government have made policy frameworks that signal low carbon investment, and then we come in, roll up our sleeves, and say how can we get that done, very similar to the comments that you made about control technologies for mercury.

We have innovation and we have investment capital to bring to the table, and when we see 160 countries say I want to consider my energy policies and I want to consider low carbon solutions, we will step up and work with them through public-private partnership and through investment to help them reach their goals. So when we look at the INDCs, we see business opportunities for U.S. companies and we see jobs in the United States.

Senator CARPER. Thank you so much.

Thank you, Madam Chair.

Senator CAPITO. Thank you.

Senator ROUNDS.

Senator ROUNDS. Thank you, Madam Chair.

I want to just give everybody an opportunity to comment on one particular part of this, and the part that I am concerned with is any time we have a leader who steps forward and says we want to make some changes, in the United States, this is a case of where you have to bring Congress with you; and it seems as though everything works out better if you have a bipartisan effort to get something done.

What I am concerned about is that there has been a little bit of a discrepancy in terms of the discussion here today among our panelists with regard to what occurred in 1992 with the UNFCCC or the United Nations Framework Convention on Climate Change. I am just curious, for each of you, if you could give us your brief thought process. Did that particular Framework, as agreed to by the Senate by a voice vote, did that provide the opportunity for the President today to step in and to have a binding agreement for this Country to reduce levels with regard to climate change issues?

I know that there was specific language placed within the provisions of the ratification agreement as put forth by the Senate Foreign Relations Committee when it was presented to the Senate in 1992, but I would like your thoughts to see if we would all agree or disagree, or where the discrepancy might be with regard to how that would be interpreted today.

If we could, I will just go down the line and simply ask each one of the members here if you would give me your thoughts, if you would care to.

Mr. KU. As I said, I think that it is pretty clear from the approval of the Senate they were worried about giving, when they approved it, that that would be an implicit authorization for a new agreement which didn't come back to them. So I would read it as requiring a promise by the President to come back if I have legally

binding emissions reduction targets and timetables. And I don't know that there are that many people who disagree with that. That was sort of an understanding when the Senate approved the UNFCCC.

Mr. CASS. I would agree with Professor Ku that certainly anything legally binding with respect to emissions targets would need to be approved by Congress or the Senate.

Mr. EULE. I would agree with that as well, and I would just remind everybody that in the Kyoto Protocol, which had legally binding targets and timetables, the expectation was that that would have to go to the Senate for its advice and consent.

Mr. WASKOW. On the original UNFCCC, it obligates all countries to take steps to reduce emissions in order to avoid dangerous climate change. In the present instant, I think what is important to keep in mind is the Administration's position, which they have stated as being that they are seeking an agreement that is consistent with existing U.S. law, and also one that does not have legally binding provisions having to do with mitigation obligations on emission reductions. So I think that sets in a critical way the framework for thinking about what is happening in the current negotiations, along with the fact that in fact all countries essentially are stepping up to put their mitigation plans, as well as adaptation plans, on the table.

Senator ROUNDS. But does that mean that for legally binding changes or limitations that you believe they would also have to come back to the Senate for that ratification?

Mr. WASKOW. I wouldn't presume to know exactly what the legal outcome of the agreement would be and what the implications of that would be for Senate ratification. I think, however, the Administration has made clear how it is looking at the mitigation obligations or the mitigation provisions in particular, and that those should be non-legally binding. And in that instance, assuming that the agreement is consistent with existing U.S. law, and I think Professor Ku would agree with this, the law would suggest that the Administration, the President can enter into an agreement under those circumstances.

Senator ROUNDS. Ms. Jacobson.

Ms. JACOBSON. Thank you. I mean, I think the Framework Convention on Climate Change was a catalyst for significant policies at the local, State, and national level that aimed to address climate change, greenhouse gas emissions, and adaptation. I think it will depend what comes out of this agreement in Paris to how Congress will engage, but I think, no matter what, congressional engagement is a positive and constructive part of our Country, thinking about how it is going to manage energy and climate change concerns.

So our organization urges and is, first of all, very pleased that there will be delegations, and have been every single year, from Congress, both members, Senators, and staff that come to the negotiations; and also we look forward to engagement with Congress in the present time, as well as after Paris, to assess what has been agreed to and to provide any oversight functions it feels is necessary. So we welcome that.

Senator ROUNDS. Thank you.

One more real quick question. This is for Mr. Eule. Mr. Eule, Secretary of State John Kerry recently told the Financial Times that the Paris agreement is definitively not going to be a treaty. Responding to criticism from European counterparts, the State Department quickly backtracked the statement by saying, our position has not changed. The U.S. is pressing for an agreement that contains provisions both legally binding and non-legally binding, while the exact legal form of a COP 21 agreement remains unclear.

Do you believe that there is a role for the Senate in assessing these policies that stand to have broad-reaching economic and employment consequences?

Mr. EULE. Absolutely, Senator. As I said in my testimony, I think whether the treaty is legally binding or not legally binding shouldn't make a difference. A treaty that really extends into every nook and cranny of the U.S. economy I think should go to the Senate and to the House for approval.

Senator ROUNDS. That would follow, then, with what we would find under the State Department Circular 175, in which they lay out eight items identifying what is the differences between a binding and non-binding item required for treaty, or that they would expect to be under a treaty provision?

Mr. EULE. Yes, Senator, I would agree with that.

Senator ROUNDS. Thank you.

Thank you, Madam Chair.

Senator CAPITO. Thank you.

Senator MERKLEY.

Senator MERKLEY. Thank you very much, Madam Chair.

I appreciate the testimony and I appreciate this discussion because the impacts of global warming are extensive and current, certainly on the ground in Oregon, where we see growing damage from pine beetles because the winters are warmer. We see extensive increases in forest fires. The season has gotten longer, the fires have gotten more extensive, destroying natural resources. We have had a huge loss of snow pack in the Cascades, affecting not only our streams, making them warmer and smaller, but affecting our agriculture, with an extensive three worst-ever droughts in a period of 15 years in the Klamath Basin. Even the oyster industry is having troubles because the ocean is 30 percent more acidic than it was before the industrial revolution.

There is certainly no great mystery over the legal status of this. An executive agreement under authority of a ratified treaty and under authority of current U.S. domestic law, with non-binding emission targets and binding responsibilities to report on progress. We can play with this extensively and try to divert attention from the core issue, but let's not. Let's address the core issue. Let's look at the fact that there are enormous economic consequences, that global warming is a huge assault on our rural resources, huge devastation to our agriculture, to our fishing, and to our farming. So this is something that the U.S. must exert leadership on, and bringing together the nations of the world to be able to put forward their vision of how we can collectively take this on is an important act of the collective international community.

It has been said that we are the first generation to be feeling the impacts of global warming and the last generation that can do

something about it because of the fact that it is so much harder as the momentum builds in the warming feedback loops. So we have a moral obligation to act. And certainly many of the major corporations that make up the U.S. Chamber of Commerce are coming forward on their own to say that this is an important objective, that they are deeply committed to making change; and I hope their voice will start to be heard in key forums around the world and take us forward.

I just want to note that in the conversation it is often said, well, we really need to have developing nations participate. Well, now we have developing nations participate. It has been asserted, I believe, Mr. Ku or Mr. Cass, in your testimony, they were saying, well, China is not doing very much. China has pledged in the next 15 years to deploy as much renewable energy and electricity as all the electricity generated in the United States by coal, by gas, and by renewable efforts. That is a massive, massive deployment in a very short, in a decade and a half, and represents an extraordinary change in their disposition and their sense of responsibility.

I would also like to note that the Senate Appropriations Committee did act. They acted on an amendment, an amendment that was put forward and had bipartisan support to say the United States should provide funds to the Green Climate Fund; that this is certainly part of the equation, because developing nations around the world could say we are not going to act until the per person footprint of the United States is equal to our footprint, which is much, much smaller. They could say that. But if they say that, our planet is doomed.

So they have courageously come forward and said we understand that this is something that has to have every nation involved but, you know what, we haven't produced much carbon and the carbon that the developed nations have produced is having a big impact on us, so can you help us out a little bit to address these issues. And that certainly is a reasonable proposition to put forward. So I commend the U.S. Senate Appropriations Committee for having voted in full committee to provide some assistance in that regard.

I want to just invite David to ask to address whether we can wait another 30 or 40 or 50 years to take action and expect not to have catastrophic consequences.

Mr. WASKOW. Thank you for the question. Not acting increases the cost of action. The longer that we delay in acting will increase the cost of action because we will have infrastructure lock-in and other dynamics that will make it increasingly difficult to in fact shift to low carbon economies.

We do have the opportunity and I think we in fact are on the trajectory, as Lisa and others have said, of moving very rapidly toward that low carbon economy. The price of solar panels, for example, has fallen 75 percent in the last 5 years.

Senator MERKLEY. And we can create hundreds of thousands of jobs in doing so?

Mr. WASKOW. And we are in fact creating. There are 100,000 jobs in Texas alone related.

Senator MERKLEY. Thank you. My time has expired, but I do want to welcome Sam Adams, former mayor of Portland, who works with the World Resources Institute on Climate Change and

did a tremendous amount as mayor of Portland to take the city forward in this regard.

Senator CAPITO. Thank you.

Senator SESSIONS. Thank you.

This is an invaluable hearing. I think it is very clear the President does not have the power to unilaterally bind the United States in these kind of agreements.

There is a bipartisan agreement and support, and we have made a lot of progress together on things like reducing pollution, which often means improving coal use. We have made progress on automobile mileage. We have had strict requirements on that and so far the automobile industry has done that. We haven't made the progress we should have made on nuclear power, in my opinion. That has the greatest potential over time. So we have electric cars and other ideas that could become reality. Solar panels are getting more competitive and maybe can play a larger role in time to come.

But the American people are not sold on this, and neither am I. The idea that we have to spend billions, even trillions of dollars on CO2 as a result of the concern of global warming is what is not being sold effectively and is not being accepted by the American people. Maybe I will show a couple of charts in just a second here.

This is polling data, the Gallup Poll earlier in the year, in March, that shows 18 issues, and the last one on the minds of the American people as an important issue was climate change. And I think the data shows that we are not seeing the kind of increases in temperatures that were projected. If you take the objective satellite data compared to the red line here, which is the average of 32 computer models, over 100 runs of those models shows that the temperature would increase at a rather dramatic rate. I thought a number of years ago we may actually be seeing that, but the blue dots and the light green dots represent the climate temperatures actually occurring according to satellite and balloon data.

So, in essence, I'm just saying that the projections of disaster aren't coming true, and Dr. Pilke testified here from the University of Colorado or Colorado State in which he said that we are not seeing more hurricanes, not seeing more tornadoes, we are not seeing more droughts, and we are not seeing more floods. So that is part of the background of where we are.

All right, Dr. Eule, the Green Climate Fund proposal and Copenhagen commitment is a commitment of developing countries to provide \$100 billion a year by 2020 to address the needs of developing countries. Do you know what the United States' share of that likely would be? Has that been discussed?

Mr. EULE. I don't think it has been discussed. The Administration has proposed a \$3 billion amount that would go to the Green Climate Fund, but that is pre-2020.

Senator SESSIONS. Well, we pay about 25 percent of the U.N.

Mr. EULE. Right. If we are about 25 percent of the United Nations, actually, when you take a look at the countries that are responsible for providing funds to the Green Climate Fund, it is the countries that are in what is known as Annex 2. It is a small subset of developed countries. And the U.S. accounts for about 45 percent of the emissions from those countries. So, in reality, we could be on the hook for about \$45 billion of that.

Senator SESSIONS. Forty-five?

Mr. EULE. Yes.

Senator SESSIONS. And that would be annually?

Mr. EULE. That would be annually. Now, you have to remember \$100 billion was just a starting point. You know, a group of developing countries have said that should rise up to \$600 billion. The Chinese have said it should be 1 percent of the GDP of developed countries, which the U.S. share of that would mean about \$170 billion.

Senator SESSIONS. We are pushing on 18 trillion GDP, so 1 percent of that is \$180 billion a year?

Mr. EULE. That is right. It is a large amount of money even by Washington standards.

Senator SESSIONS. I would agree. An African group is insisting on ramping up the funding to \$600 billion a year by 2030?

Mr. EULE. That is right.

Senator SESSIONS. Well, my time is about up, so I think we made the concerns pretty clear here. Yes, let's do the things that make sense; let's look for the efficiencies and anti-pollutants, which I don't consider CO2 to be a pollutant. Plants need to grow.

And I think if we work on that, Madam Chair, in a bipartisan way, we will also get reduction in CO2 and we will also get reduction in pollutants and we will benefit. But to impose these kinds of costs on the economy, when I think there is no realistic expectation the other countries that sign it will meet their requirements is not wise.

Senator CAPITO. Senator Markey.

Senator MARKEY. Thank you, Madam Chair, very much.

The world is going to gather in Paris in 2 weeks, and the central objective is to deal with the dangerous human interference with the climate system, and countries from around the world are coming in order to make their commitments. One hundred sixty countries that actually are responsible for 90 percent of global carbon pollution have already made climate pledges in advance of the Paris talks, and we are positioned to have a very successful outcome from this huge international meeting. I believe that the United States can meet our goals.

President Obama has made them at different times before this huge summit. That is because our fuel economy standard to go to 54.5 miles per gallon That is the largest single reduction in greenhouse gases in history of any country. That is still on the books. The President's Clean Power Plan will dramatically reduce emissions from that sector as well. We have energy efficiency standards and we have massive deployment of wind and solar all across our Country that is unleashing business opportunity.

So I guess I go to you first, Mr. Waskow. Do you agree that the Paris agreement includes meaningful emissions reduction pledges from all the countries, including developing countries, in your opinion?

Mr. WASKOW. Thank you. As I mentioned, there are more than 160 countries, 119 of them developing countries that have put forward their plans. We are seeing significant actions in many of them. I would just note, for example, in the case of India, that their domestic plans are to increase renewable energy to 175 gigawatts

total by 2022, and 100 gigawatts of that would be in solar energy; and that is more than half the current global solar installed capacity. That would then ramp up.

Senator MARKEY. That is 170,000 megawatts of renewable electricity.

Mr. WASKOW. That is right.

Senator MARKEY. So that is incredible. And China is making a comparable kind of commitment, even larger in terms of its deployment, by the year 2030.

Do you anticipate that an agreement reached in Paris will include procedures for reporting, monitoring, and verifying those pledges?

Mr. WASKOW. The underlying U.N. Framework Convention in fact has provisions for countries to provide information about their emissions to report on their inventories. This agreement will build on that. We already had progress forward in the Copenhagen and Cancun agreements about increasing the degree of transparency. This agreement, I think, will increase that to an even greater degree and have convergence between developed and developing countries in terms of the requirements that they face in terms of transparency.

Senator MARKEY. Thank you. Has America's leadership been the key to bringing all the other countries to the table? Has the fact that we have made this commitment to reduce by 26 to 28 percent by 2025 been the forcing mechanism that says to China and to India and to other countries you too must do something?

Mr. WASKOW. I think our actions have been noted around the world. I think that when one goes to the negotiations, one has a sense that countries see what we are doing. And I think one of the underpinnings, in fact, of this agreement is the work that the United States has done with China in particular to move forward.

Senator MARKEY. I think you are right. Honestly, you can't preach temperance from a bar stool, so we had to put up our commitments, and that is what the problem was back in Kyoto; we weren't putting up what we were going to be doing. So here we have that and we have had a response from countries all around the world.

In the business community I think they are looking forward to this, are they not, Ms. Jacobson, so that there can be a signal that is sent to the business community that they can rely upon, that there is going to be an investment atmosphere that is going to unleash hundreds of billions, trillions of dollars into this renewable energy sector?

Ms. JACOBSON. Very much. And energy efficiency and other clean generation options. I mean, what the business community needs is a clear, sustained market signal to drive investment. Right now we are seeing investment sitting on the sidelines because there is not enough clarity. The United States has made tremendous progress in providing clarity over the last several years in terms of its domestic policy agenda in the energy sector. We need to see that in more countries, and we believe that the Paris discussions and the outputs from the conference are going to create a stronger investment signal in other countries outside of ours.

Senator MARKEY. What would it mean if we extended the wind and solar tax breaks for 15 years in this Country, in terms of the climate for investment?

Ms. JACOBSON. We have seen, just looking at the ITC and the production tax credit experienced just in the last five or 6 years, you can see when we had a sustained investment policy for the ITC we saw investment and deployment increase dramatically. And when we didn't have that clarity in other tax provisions for clean energy, things dropped off. So it is a very clear spotlight on what the power of policy certainty can provide to the investment of this community.

Senator MARKEY. Thank you. We are going to have 300,000 jobs in wind and solar by the end of next year; 65,000 coal miners. So you can see how this is a growth trajectory that if we kept these tax incentives on the books, the clean power plan and the fuel economy standards, we would revolutionize our own Country, but give the leadership to the rest of the world; and be able to export these technologies, by the way, around the rest of the world.

I thank you for all of your help here today.

Ms. JACOBSON. Thank you.

Senator MARKEY. Thank you, Madam Chair.

Senator CAPITO. Thank you.

It is my understanding that we have had a vote that has been called, so what I am going to do is step away from the chair while Senator Boozman questions; make my vote really quickly and then get back so we can keep continuing with the hearing. Thank you.

Senator BOOZMAN.

[Presiding.] Mr. Eule, as you know, it was revealed earlier this month that China's coal consumption is 17 percent higher than was previously reported. This confirms what many of us have been saying: we can't trust China to keep track of carbon emissions and play by the rules. I have said many times that one of my major concerns is when we impose expensive carbon mandates here and force the price of electricity to necessarily skyrocket. It just forces our manufacturers to close, and their competitors in China will grow and emit even more into our atmosphere.

Mr. Eule, is China the only country that has problems keeping up with its own CO₂ and GHG emissions?

Mr. EULE. No, it is not. And when you take a look at the error that the Chinese made, we are not talking about a rounding error here; this is a huge error, equivalent to about the GHG emissions from Germany. So what is going on in China is going on in a lot of other countries in the world that just don't have a handle on how much greenhouse gas emissions they are actually emitting.

Senator BOOZMAN. If China can't accurately account for its emissions, should we expect them to actually deliver on setting up a complex and sophisticated national emissions trading system?

Mr. EULE. Quite frankly, I don't see how they can do that. I mean, part of an emission trading system is the idea of trust; that when you purchase a ton of CO₂ allowance, that actually represents a ton of CO₂ emissions. And right now we don't have that confidence, and I am not so sure in the next year or so, when Chinese expect to roll out their emission trading, I am not so sure that confidence can be instilled in such a short period of time.

Senator BOOZMAN. Thank you.

Mr. Cass, you highlighted in your testimony that the COP 21 negotiations will focus little on greenhouse gas emissions and almost entirely on climate finance, specifically on motivating developed countries like the U.S. to offer more than \$100 billion per year starting in 2020 through the green climate slush fund. Of course, thankfully, Congress is not going to provide that money. But for those countries that might put a few dollars into this fund, is there any indication of how these funds would be used?

Mr. CASS. Thank you, Senator. I think one of the open questions right now is exactly that, which is what does this funding look like. The Green Climate Fund actually just announced its first set of grants, and it was sort of a hodgepodge of small dollar grants to build resilient infrastructure, potentially some investments in the direction of clean energy.

But there frankly, at this point, is no clear guidance on how the money would be spent, and I think, most importantly, we know from our experience with foreign development aid that sending large amounts of money to developing countries even to, say, build a school is enormously challenging and rarely produces the desired result. Sending that money to build a revolutionary electricity grid where none has existed I think is doubtful to work very well.

Senator BOOZMAN. No, that was my next question. We are really talking about countries that really have trouble with governance; lots of corruption, money not putting to good use. So, again, I guess your testimony is that that would be very, very difficult to manage.

Mr. CASS. I think it is, and I think we take for granted, as we develop green infrastructure and renewable energy in the United States, that we have all the existing infrastructure to build off of and that we are adding a few percentage points to an enormous baseload of reliable energy. And now we are trying to do that in a developing world that has no such baseline, and this is exactly why the developing world doesn't want to go in that direction, because it is not the right way to develop.

Senator BOOZMAN. What level of oversight would be assigned to the global fund? Is there any oversight in place?

Mr. CASS. There is an elaborate U.N. style structure of oversight over the Clean Climate Fund, with boards and committees and guidelines. In practice, how the money comes and goes I think will likely look more like what we have seen from other U.N. efforts than what we are used to domestically.

Senator BOOZMAN. Right. Thank you.

Senator BOOKER.

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

So there clearly is a crisis, and I am glad I didn't hear anybody sort of denying that we don't have a climate problem. And the data and the facts speak for themselves. Just over the past week, scientists reported that global carbon dioxide concentrations have exceeded, perhaps permanently, the 400 parts per million threshold and carbon dioxide levels are now substantially higher than at any point in the last 800,000 years. Global temperatures have now exceeded about 1 degree Celsius above the pre-industrial age, with 2014 being the warmest year on record. These are facts. 2015 actually is on pace to be even warmer than 2014.

And this is something that is not just heralded by the scientists around the globe, but also important global organizations. Earlier this month, The World Bank announced that due to currently projected sea level rise and an uptick in extreme weather, climate change could force an additional 100 million people on the planet Earth into poverty by 2030.

So in the face of global crises, it seems that I hear in Washington over and over again that America must lead, that our leadership is important. Indeed, as we see with the war on terror, people calling again and again for American leadership. Well, clearly this global crisis is another case where we must lead. America has led throughout the decades in generations past, from the space race, which has yielded billions and billions of dollars in economic benefit to the United States, to even important global issues like mapping the human genome.

So in the face of this need for American leadership, in the face of these facts about a global crisis, it is important to me that there are actually things that Paris can do and will do, if not the least of which is increasing communication, transparency, and greater levels of accountability for nations, as well as corporations. But critical to me, I mentioned the space race, is this understanding that leadership has its benefits and this crisis has its cost. The U.S. historically providing leadership to help solve global crises is something I am proud of, and this is an occasion where we must rise again. By exercising leadership, the United States economy can benefit, and it can benefit in astonishing ways, with trillions of dollars of new investments, increased jobs, and, most importantly, as I am seeing on the coast of New Jersey, we can avoid the social costs.

A recent NYU report finds that a global agreement to limit temperature increases to 2 degrees Celsius will provide \$10 trillion in direct benefits to the United States. I know the costs both to the local communities in New Jersey, from our fisheries to the storms and the weather changes, but the opportunity, the upside for this leadership is profound.

So I would like to ask questions first to David Waskow. Mr. Waskow, in your opening statement you mentioned some of the potential economic benefits. This is something that is often not talked about. People keep talking about the costs, the costs, the costs, but the upside is pretty extraordinary. So if you could elaborate for me about what our Country, what the United States of America could see when it comes to economic benefits, job benefits from reducing carbon emissions.

Mr. WASKOW. Sure. The benefits are quite extraordinary, as I mentioned. The EPA has estimated that the benefits of the Clean Power Plan themselves, from health benefits and others, are \$32 billion to \$54 billion by 2030. That, in itself, is substantial and noteworthy.

In addition to that, key actions that we can take, such as in energy efficiency, provide economic benefits, the evidence is that for every dollar invested in energy efficiency, you get at least two back. And the appliance efficiency measures that the Administration has put in place since 2009 alone would bring consumers \$450 billion in benefits by 2030.

Senator BOOKER. No, I appreciate that. And as somebody who had to run a city, I saw a triple bottom line when it came to dealing with energy efficiency and trying to deal with global issues. We not only are able to reduce our expenditures by doing environmental retrofits where we were able to lower our carbon footprint, but we created jobs for our community and began to deal with the crisis in urban places like epidemic asthma rates.

Ms. Jacobson, a similar question for you is can you describe some of the potential economic opportunities for the United States that would result from strong international agreement in Paris? And, please, you have 30 seconds. There is a ferocious chairman here and I want to stay on his good side.

Ms. JACOBSON. I think I will just go back to my point on energy productivity and looking at what productivity gains our economy has achieved as we have also reduced our greenhouse gas emissions. It shows that you can reduce emissions, you can cut energy waste, you can create jobs, and you can improve the competitiveness of the U.S. economy at the same time. So these things make economic sense.

Senator BOOKER. Thank you very much.

Mr. Chairman, I would like to note that I finished before my time expired.

Senator BOOZMAN. Senator Wicker.

Senator WICKER. You surely did; three, two, one. Let me just make a statement, because we do have a vote and many other things to get to, so I will not have a chance to do a question.

I want to put in the record at this point, Mr. Chairman, a peer reviewed article by Dr. Bjorn Lomborg of Copenhagen Consensus Center, entitled, "Impact of Current Climate Proposals." Could I put that in the record at this point?

Senator BOOZMAN. Without objection.

[The referenced information follows:]

Impact of Current Climate Proposals

Bjorn Lomborg

Copenhagen Consensus Center

Abstract

This article investigates the temperature reduction impact of major climate policy proposals implemented by 2030, using the standard MAGICC climate model. Even optimistically assuming that promised emission cuts are maintained throughout the century, the impacts are generally small. The impact of the US Clean Power Plan (USCPP) is a reduction in temperature rise by 0.013°C by 2100. The full US promise for the COP21 climate conference in Paris, its so-called Intended Nationally Determined Contribution (INDC) will reduce temperature rise by 0.031°C. The EU 20-20 policy has an impact of 0.026°C, the EU INDC 0.053°C, and China INDC 0.048°C. All climate policies by the US, China, the EU and the rest of the world, implemented from the early 2000s to 2030 and sustained through the century will likely reduce global temperature rise about 0.17°C in 2100. These impact estimates are robust to different calibrations of climate sensitivity, carbon cycling and different climate scenarios. Current climate policy promises will do little to stabilize the climate and their impact will be undetectable for many decades.

Survey Article

The goal of any climate policy is to reduce the very real problem of global warming. Mitigation policies focus mostly on reducing greenhouse gas emissions, thereby reducing climate change. The most prominent indicator of climate change is temperature rise. Here I define *impact* of a mitigation climate policy as its reduction in temperature rise.

To evaluate a mitigation climate policy it is crucial to know the impact of this policy. The classic article to assess a mitigation policy is Wigley (1998), which estimated the impact of the Kyoto Protocol on temperature rise and sea level rise. However, a Web of Science search does not indicate any numerical impact reviews of later significant policy proposals.¹ Thus, this article will produce an update of Wigley (1998) for the most important new climate policies, including the Intended Nationally Determined Contributions (INDCs) submitted in advance of the Paris COP21 negotiations.

Methodology

The current paper will use the same basic methodology as Wigley (1998). First, Wigley identifies the policy to be analyzed (the Kyoto Protocol). Second, he identifies the baseline of emissions – what would have happened had there been no Kyoto Protocol. Third, he makes a number of extrapolations of the Kyoto policy throughout the 21st century. Fourth, he runs the baseline and the Kyoto emissions through a climate model, evaluating the impact of the Kyoto climate policy in terms of temperature rise reduction and sea level rise reduction. Fifth, he does a sensitivity analysis by running the scenarios through more and less CO₂-sensitive models.

When identifying the climate policies to be analyzed, we can identify the most important in terms of CO₂ reduction from the recent overview of the INDCs by Boyd, Turner and Ward (2015). Here they find the reductions of the US, the EU and China to constitute 75–81 per cent of all reductions in 2030. The updated analysis provided below finds a pretty similar total reduction from the US, the EU and China, although the US reductions are much lower and the EU reductions much higher than found in Boyd, Turner and Ward (2015). Finally, the analysis includes the totality of all the INDC promises, including the remaining 22 per cent from Canada, South Korea, Russia, Japan etc.

There are a vast number of potential baselines. We need both a global baseline and a policy-relevant baseline, e.g. for the EU or China. For a global baseline, Wigley (1998) uses the original Intergovernmental Panel on Climate Change (IPCC) business-as-usual (BAU) scenario, IS92a. This has since been superseded by two newer scenario collections, the Special Report on Emissions Scenarios (SRES) from 2000 and the Representative Concentration Pathways (RCP) from 2011, neither of which have a simple BAU scenario. Indeed, the RCP scenarios are predominantly climate science focused, and do not have any consistent socioeconomic design (van Vuuren et al., 2011). For the most recent IPCC report, AR5, the literature holds about 250 BAU scenarios (UNEP, 2014, p. 34). The choice of global BAU scenario determines the *absolute* temperature. Since we are interested in the *difference* between a BAU scenario and the similar BAU scenario with a policy emission reduction, the global BAU scenario decision matters little. Here I use the RCP8.5, which is regarded as a worst-case scenario. Sensitivity analysis shows that the results change little



when using other scenarios like RCP6 and SRES A1B, which are better-case outcomes. The median of the main AR5 BAU scenarios used below lie right in between RCP8.5 and RCP6 (see supplementary information).

For the BAU scenarios for the US, the EU, and China, I use the official baseline for the US Energy Information Agency (EIA) (EIA, 2015a), and the median of the latest two big socioeconomic studies of the EU (Energy Modeling Forum 28; Knopf et al., 2013) and of China (Asia Modeling Exercise (Calvin et al., 2012)).

To predict the actual emission reductions up to the formal end-point of the Kyoto Protocol, Wigley assumes all actors do everything they promise without any other adverse effects. Kyoto promised to cut the emissions of industrialized countries (the Annex B) by 2008–2012 by 5.2 per cent below 1990-level emissions. Wigley supposes that industrialized emissions decline linearly towards 5 per cent below 1990-level by 2010, resulting in an annual emission of 2.7Gt CO₂ below the baseline. He also implicitly assumes no carbon leakage – that some industries responsible for significant emissions in the EU and the US shift to non-Kyoto countries like China. Research indicates that the size of the carbon leakage could be anywhere from 5–40 per cent (Bernstein, Montgomery and Rutherford, 1999; Felder and Rutherford, 1993; Burniaux and Martins, 2012; Elliott et al., 2010; Paltsev, 2001) and could even sometimes be as high as 130 per cent (Babiker, 2005). That means that instead of Kyoto reducing 2.7Gt CO₂ per year, emission increases elsewhere would reduce the global reduction to 1.6–2.6Gt CO₂ and possibly even lead to increased emissions. A recent study estimates the actual leakage at 40 per cent (Aichele and Felbermayr, 2014).

In the following I will describe assumptions that make temperature rises drop more as optimistic, and the opposite assumptions pessimistic. It is clear that Wigley (1998) made two optimistic assumptions here: both assuming that all actors will do what they promise (which of course did not happen with the Kyoto Protocol) and assuming no carbon leakage, which also did not happen. However, I will nevertheless make similar assumptions below, underlining that the results here are inherently optimistically skewed.

Wigley also made assumptions about what happens after the policy end-point of 2010, since this is crucial for the climate impact. He suggests three scenarios. The first scenario expects that the annual 2.7Gt CO₂ reduction will be honored in perpetuity (i.e. emissions will start rising after 2010, but constantly 2.7Gt below what the baseline would have expected). The second scenario assumes that industrialized countries' emissions will remain constant after 2010, which means ever stronger emission cuts from the baseline, cutting 7.9Gt CO₂ annually by 2100. The third scenario somewhat arbitrarily assumes that Annex B countries would reduce their emissions even further after 2010 by 1 per cent per year, leading to

emission reductions by the end of the century of 16Gt CO₂ annually, 74 per cent below the expected emissions.

These scenarios are heavily skewed towards an optimistic interpretation. The first scenario assumes that the political promise of the Kyoto Protocol would be continued for nine decades after it formally runs out, which clearly did not happen. However, the other two scenarios are essentially analyses of other political agreements beyond the Kyoto Protocol. The second scenario assumes that the Kyoto Protocol was binding not only in 2010, but forever. The third scenario assumes an entirely different treaty with very significant reduction promises all the way to 2100.

For analysis of political promises, I propose we should analyze just that policy not any later follow-on policies. Moreover, we should analyze it with an optimistic and a pessimistic scenario. Thus, for the Kyoto Protocol, this approach would suggest an optimistic scenario like Wigley's first scenario, where the treaty countries would maintain their reduction promises infinitely. The pessimistic scenario would still assume the countries live up to their promises by 2010, but then falter after that and eventually return to the baseline emissions. Notice, both scenarios still assume that the promised policy will be carried out without carbon leakage, only with different policy intensity after the promise runs out. This means that the results can be understood as the outcome of the promised policy, where the likelihood of that policy actually being implemented can be separately assessed.

In the supplementary information, I also contrast the results with two unrealistically optimistic scenarios, one assuming ever higher reductions with the optimistic reduction rate extended throughout the century and one assuming a complete cessation of emission increases.

For the following analyses we need to make assumptions about the longer-term promises. When for instance the EU promises to cut its emissions by 40 per cent in 2030, this is already very far away. Promises of what will happen in 2050 (80 per cent reduction in both the EU and the US) or promises for the G7 to entirely decarbonize by 2100 are not as much actual policies but more political hand waving. Thus, for this paper, I will investigate policies that have practical political implications soon and have a verifiable outcome by 2030, but not policies that promise actions only or mostly starting after 2030. Of course, policies that can be evaluated by 2030 will still impact emissions long after 2030, and hence affect the temperature trajectory all the way to the end of the century.

Wigley then runs the baseline scenario and the three Kyoto scenarios with a standard simple climate model used by the IPCC. We will here use MAGICC 6.3 (Meinshausen, Raper & Wigley, 2011). This is the latest version of a simple climate model used in all the five IPCC assessment reports from 1990–2014.²

Wigley also assumes that only reductions in CO₂ (not other greenhouse gasses) are used to achieve the target. As is standard, I use the IPCC conversion of non-CO₂ emissions according to their 100-year global warming potential (IPCC, 2013, p. 1302).

Wigley uses 2100 as his end-point, although climate change of course will continue into the following centuries. He finds that with his central climate sensitivity estimate the baseline temperature increases from 0 in 1990 to 2.07°C by 2100, but with the constant 2.7Gt CO₂ reduction the temperature by 2100 is 1.99°C. Thus the temperature rise reduction by 2100 from the constant Kyoto scenario is 0.08°C. Here we will say the impact of the optimistic Kyoto Protocol scenario is a temperature rise reduction of 0.08°C.

As a sensitivity analysis he estimates the impact with almost half and almost double the climate sensitivity and finds that the impact remains at the same relative level (same proportion of temperature reduction of the total temperature rise).

In the following, I use the methodology outlined above to assess the impact on the climate of policies including the main INDC commitments in preparation for COP21. I will use the default values of MAGICC as the standard run (with a climate sensitivity of 3°C). Sensitivity analysis shows that different assumptions of climate sensitivity and of carbon cycle model do not substantially change the outcome (see supplementary information).

US Clean Power Plan

The US Clean Power Plan (USCPP) was published on 3 August 2015 and requires the US power sector to reduce its CO₂ emissions by 32 per cent below 2005 levels by

2030.³ This is equivalent to a reduction per annum of 773Mt CO₂ below 2005-levels by 2030. Since the power sector contributes 38 per cent of all US energy-related CO₂ emissions, 773Mt CO₂ is a 14 per cent reduction of total US 2015 emissions.⁴ Here we estimate the climate impact of this policy.

The US has an official baseline until 2040 from the EIA (EIA, 2015a). Its reference case from the 2015 Annual Energy Outlook explicitly excludes the impact of the USCPP or other actions beyond current policies to limit or reduce CO₂ emissions.⁵ The EIA estimates that the power sector CO₂ emissions in 2005 were 2,415Mt, which dropped significantly to 2,054Mt in 2015 and in the reference case will increase to 2,177Mt by 2030. The impact of the USCPP is to reduce that annual emission in 2030 to 1,642Mt (32 per cent below 2005 levels). By 2030 that amounts to a 535Mt reduction, see Figure 1.

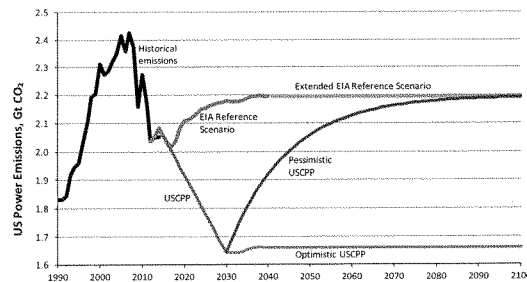
Since much of the promised reduction has already occurred, only the reduction that comes from 2016–2030 can be considered the impact of USCPP.

The baseline scenario runs to 2040 and almost stabilizes. Here we will assume that power emissions would have remained stable at 2040 level for the rest of the century.

For the USCPP emission reductions after 2030, an optimistic extrapolation would expect that the reduction remains constant across the century at 535Mt below the baseline scenario. The pessimistic scenario sees the promise slowly evaporating after 2030, here modeled as a halving of the emission reduction every decade.

The pessimistic interpretation implies that there is a real cost involved in limiting CO₂ emissions and when the restriction is lifted, the system will trend back towards higher emissions. The optimistic interpretation

Figure 1. US power emissions 1990–2100.



Note: US historical power emissions 1990–2014 (EIA, 2015c), EIA baseline 2012–2040 and extension to 2100 (EIA, 2015b, table 18), optimistic and pessimistic USCPP reductions (see text).

implies that there is essentially no onwards cost after 2030 for keeping the system permanently at the new, lower CO₂ emission level. It seems likely that the real outcome lies somewhere in-between.

Some might argue that given a successful completion of the US CPP emission path, this will inspire further political action both domestically and internationally. However, the past experience of e.g. the Kyoto Protocol, does not seem to suggest this is a generally valid point. Clearly, strong action from some parties can make it easier for others to engage in more ambitious climate policies, but likewise it can make it easier for others to free-ride. While the EU climate policies likely inspired Norway, Japan and earlier Australia, it is clear that it did not get many of the other participants onboard (Canada, the US, later Australia, along with most other countries).

Climate impact of US CPP

We estimate the climate impact of the US CPP as the difference in temperature outcome in MAGICC from unrestricted RCP8.5 emissions across the century with the lower emissions that would occur with an optimistic or pessimistic US CPP scenario. So in the optimistic scenario, we would see a gradual reduction of annual RCP8.5 emissions by 535Mt CO₂ by 2030, continued throughout the century, as depicted in Figure 1. As seen in Figure 2, the temperature reduction for the pessimistic scenario is 0.004°C by 2100 and for the optimistic scenario 0.013°C, with an average of 0.008°C.

Sensitivity on scenario and climate models

When run in an RCP6 world, the temperature reductions from the US CPP are of the same magnitude, but about 18 per cent higher at 0.015°C and 0.004°C, a result that

is consistent across the investigated scenarios below (see supplementary information). In the following we will only look at RCP8.5.

When run across all available climate models and carbon cycle settings in MAGICC, the differences are very slight for all policies (see supplementary information). Thus, we will in the following just use the default setting for MAGICC.

US proposed Paris reduction

Following up on its promise to reduce emissions by 17 per cent from 2005 in 2020, the US has promised in its INDC for Paris to reduce its CO₂ equivalent emissions 26–28 per cent below 2005 levels by 2025 (USINDC, 2015). According to the IEA, this means that the US is projected to deliver the largest absolute reduction in energy-related CO₂ emissions of any country in the world from 2013 to 2025 (IEA, 2015, p. 43).

The US is very clear in its submission that this is a one-point promise in 2025: 'The US target is for a single year: 2025.'

The emission promise is based on net CO₂ equivalents including land use change and forestry, from 6.44Gt in 2005 to 4.63Gt in 2025, see Figure 3. As in (Wigley, 1998), I will assume that CO₂ reductions alone are used to achieve the reduction. Again, I will use the EIA reference case as baseline (it only measures fossil fuel CO₂ emissions, so it is about 7 per cent too low, adjusted here to the latest 2013 data). Like before, we assume flat emissions from 2040 onwards.

Notice, earlier baseline scenarios like the Energy Modeling Forum for the US (known as EMF24 (Fawcett et al., 2014)) estimate a somewhat steeper increase in emissions across the first half of the century, to a large extent because they do not include the shale gas boom, which

Figure 2. Global temperature anomaly from 2000–2100 with baseline RCP8.5, and optimistic and pessimistic US Clean Power Plan (US CPP) run on MAGICC, enlarged insert at right-hand corner.

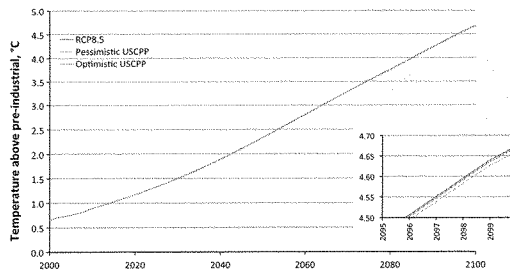
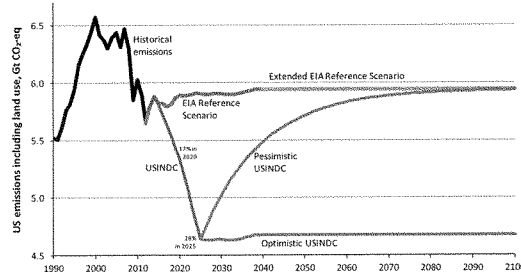


Figure 3. US greenhouse gas (GHG) emissions including land use, 1990–2100.



Note: Historic emissions 1990–2013 (EPA, 2015, Table E5-2), adjusted baseline scenario 2012–2040 (EIA, 2015a), extended baseline to 2100, and optimistic and pessimistic USINDC emission reductions (see text).

has reduced and will likely continue to reduce CO₂ emissions. An average of the six EMF24 baseline scenarios sees just CO₂ emissions by 2030 at 6Gt against the EIA’s estimate of 5.5Gt. Thus, using these older scenarios would implicitly credit climate policies with future emission reductions that in reality came from the shift towards gas caused by the shale gas revolution. This is even more pronounced in the baseline scenario from Boyd, Turner and Ward (2015), which envision CO₂-equivalent emissions of 6.8Gt by 2030 compared to the approximately 5.9Gt from the EIA. This is why the current study finds a significantly lower emission reduction from the USINDC than does (Boyd, Turner and Ward, 2015).

We will assume the US reaches the promised 17 per cent reduction in 2020 and the maximal 28 per cent in 2025. From then on, the pessimistic scenario sees a

return to the baseline, and the optimistic scenario sees the numerical reduction continued forever.

Climate impact of USINDC

Given that the USINDC reduction is about 1.26Gt, delivered faster and is more than twice as large as the reduction in the USCPP, the temperature impact is also more than twice as large. As with the USCPP, we estimate the climate impact of the USINDC as the difference in temperature outcome in MAGICC from unrestricted RCP8.5 emissions across the century with the lower emissions that would occur with an optimistic or pessimistic USINDC scenario.

Figure 4 shows that the pessimistic scenario results in a temperature reduction of 0.008°C by 2100, and the

Figure 4. Global temperature anomaly from 2000–2100 with baseline RCP8.5, and optimistic and pessimistic US Paris promise (USINDC), run on MAGICC.

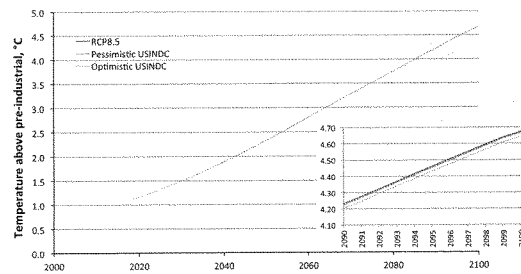
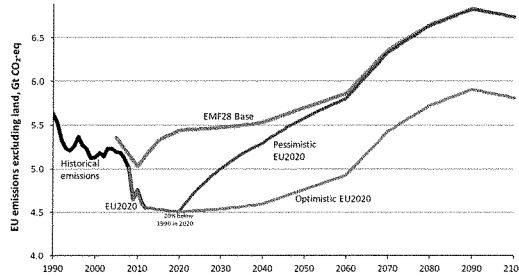


Figure 5. EU28 GHG emissions excluding land use, 1990–2100.



Note: Historic emissions 1990–2012 ((EEA, 2014; with data from EEA, 2015)), baseline emissions 2005–2100 from EMF28 (Knopf et al., 2013) with optimistic and pessimistic EU 20 per cent reduction by 2020 (see text).

optimistic scenario reduce temperatures by 0.031°C, at an average of 0.020°C. This means that the additional impact of the US Paris promise (beyond the USCPP) is 0.011°C (0.004–0.019°C).

EU 2020 policy

The EU decided in 2007 and legislated in 2009 to reduce its greenhouse gas emissions excluding land use to 20 per cent below 1990-levels by 2020.⁶ Here I will look only at the largest EU grouping, the EU28. As is evident in Figure 5, the EU was already in 2012 very close to reaching its target for 2020, having reduced its emissions to 19.25 per cent below 1990-levels.

For the baseline, we use the median of the 14 baselines in the latest Energy Modeling Forum for the EU (the so-called EMF28 (Knopf et al., 2013)) with data from (IIASA, 2015).⁷ This median baseline scenario has slightly higher emissions than the EU historical data in 2005, expected some reduction in emissions in 2010 from the global recession, but saw a quick return to increasing emissions by 2015 onwards. As before, we estimate the optimistic EU2020 as an indefinite continuation of the absolute reduction achieved by 2020, and the pessimistic EU2020 as a halving of the absolute reduction each decade after 2020.

Figure 6 shows that the pessimistic EU 2020 policy results in a temperature rise reduction of 0.007°C, and

Figure 6. Global temperature anomaly from 2000–2100 with baseline RCP8.5, and optimistic and pessimistic EU 2020 policy, run on MAGICC.

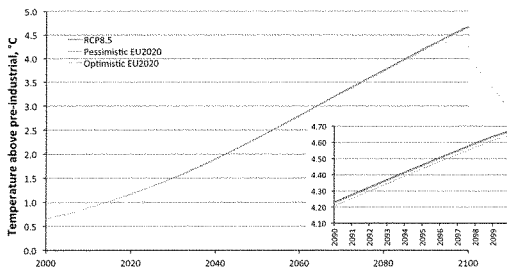
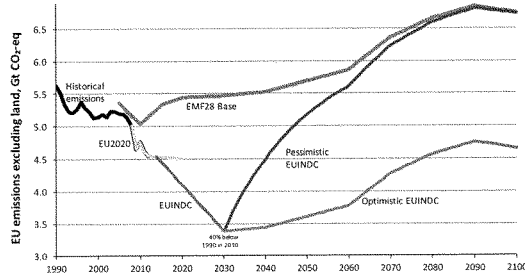


Figure 7. EU28 GHG emissions excluding land use, 1990–2100.



Note: Historic emissions 1990–2012 (IEA, 2014; with data from EEA, 2015), baseline emissions 2005–2100 from EMF28 (Knopf et al., 2013) with optimistic and pessimistic EUINDC, promising 40 per cent reduction by 2030 (see text).

the optimistic scenario sees a temperature rise reduction of 0.026°C, with a 0.016°C average.

EUINDC 2030 policy

EU promises in its INDC to reduce its emissions to below 40 per cent under 1990 emissions (EUINDC, 2015). It made the decision in late 2014⁴, so I model the emission reductions beginning in 2015, as seen in Figure 7.

Notice that this promise is going to be a lot harder than the first 20 per cent promise. A large part of early EU28 reduction came from the collapse of Eastern Europe with the Soviet Union in the 1990s (the EU15 reduction is much smaller), and because of the sharp reduction from the 2008 financial crisis. In order to live

up to the 40 per cent reduction promise, the IEA estimates that the EU will have to reduce its energy-related CO₂ emissions almost twice as fast as what has been observed since 2000 (IEA, 2015, p. 47).

We are comparing here the EU climate policy with a baseline not even attempting the full 20 per cent reduction by 2020. That means the total emission cut is much larger than the one estimated by Boyd, Turner and Ward (2015).

The impact as run on MAGGIC is shown in Figure 8. The temperature reduction by 2100 is 0.053°C in the optimistic scenario and 0.017°C in the pessimistic scenario, with an average of 0.035°C. The added impact of the EU 40 per cent reduction over the EU2020 is 0.019°C.

Figure 8. Global temperature anomaly from 2000–2100 with baseline RCP8.5, and optimistic and pessimistic EU Paris promise (EUINDC), run on MAGICC.

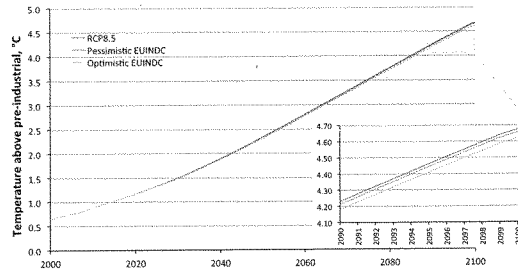
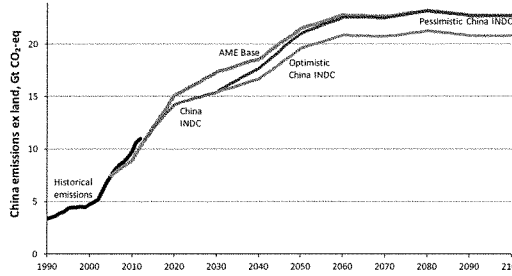


Figure 9. China GHG emissions excluding land use, 1990–2100.



Note: Historic emissions 1990–2012 (CAIT WRI, 2015), baseline emissions 2005–2100 from Asia Modeling Exercise (Blanford, Rose and Tavoni, 2012) with optimistic and pessimistic China INDC (see text).

China 2030 INDC policy

China's INDC has made two significant promises (China INDC, 2015). One is a promise to peak its emissions around 2030. That is a promise, which will only start having a policy impact around and after 2030, which falls outside the 2030 time limit for policy promises set in this article.

The other promise seeks to reduce China's CO₂ intensity by 60–65 per cent, compared to 2005. Unlike China's 2020 promise to reduce its CO₂ intensity by 40–45 per cent, which was likely to be achieved even in the absence of climate policies (Calvin et al., 2012, s258; Calvin, Fawcett and Kejun, 2012, s311), this promise will likely lead to real emission cuts.

As baseline emissions, we will use the median of the Asia Modeling Exercise (Blanford, Rose and Tavoni, 2012), which involved 18 models. Using the median for GDP

estimates, we find that without policy change, China will only reduce its CO₂ intensity by 54 per cent by 2030. Reducing it to 60 per cent will require a further 1.9Gt CO₂ emissions cut by 2030, being implemented linearly from 2016, as shown in Figure 9.

Figure 10 shows the China INDC impact run on MAGICC. By 2100, it will result in a reduction in temperature rise of 0.048°C in the optimistic case and 0.014°C in the pessimistic case, with an average of 0.031°C.

Total impact of Paris COP21

Boyd, Turner and Ward (2015) estimate the current total INDC emission cut by 2030 of between 5.3–7.5Gt CO₂-equivalent, whereas (CAT, 2015) estimates a reduction of 1–8Gt, implying a 4.5 Gt midpoint. The UNFCCC Synthesis report from October 30 finds an emission

Figure 10. Global temperature anomaly from 2000–2100 with baseline RCP8.5, and optimistic and pessimistic China Paris promise (China INDC), run on MAGICC.

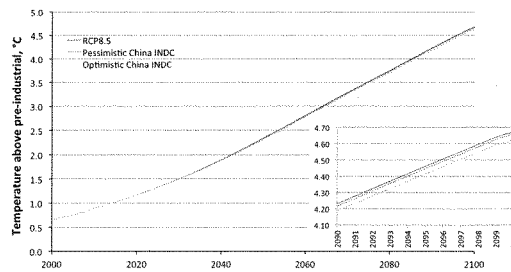
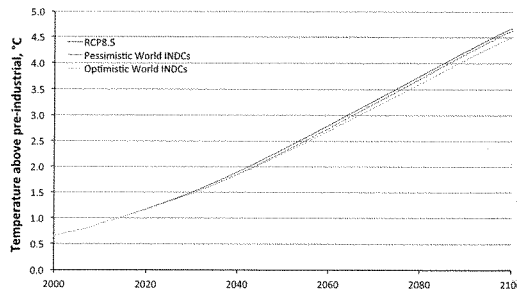


Figure 11. Global temperature anomaly from 2000–2100, from baseline RCP8.5, and optimistic and pessimistic global Paris promises (Global INDCs) (see text), run on MAGICC.



reduction of 0–7.5Gt CO₂, with a best estimate of 3.6Gt CO₂ (UNFCCC 2015, p10).

Taking the larger estimate of Boyd, Turner and Ward (2015), they find that the EU, the US and China contributes 4–6.1Gt or 75–81 per cent. This fits well with the current article’s find of a 2030 reduction from the EU, the US and China of 5.3Gt CO₂-equivalent. Assuming that EU/US/China constitutes 78 per cent of the total reduction by 2030, we estimate that the rest of the world (RoW) will reduce emissions by a total of 1.5Gt, leading to a global emission reduction of 6.8Gt.

Taking the emission reductions from the US (Figure 3), the EU (Figure 7) and China (Figure 9) along with an emission reduction of 1.5Gt from all other countries, phased in linearly across 2016–2030, we obtain a global 2030 reduction of 6.2–6.8Gt (the smaller number is for the pessimistic scenario, where the US reductions maxes out already in 2025).

The optimistic scenario expects the 6.8Gt emission reduction to continue throughout the rest of the century, whereas the pessimistic scenario expects the EU, the US, China and the RoW to halve their emission reduction after their maximum every decade.

The impact of the total, global emission cuts implied by all the submitted INDCs as run on MAGICC is shown in Figure 11. The temperature reduction by 2100 is 0.17°C in the optimistic scenario and 0.05°C in the pessimistic scenario, with an average of 0.11°C.

Conclusions

Based on climate model simulations, the emission cuts that have been proposed by the US, the EU, China and the RoW will reduce temperature increases by the end of the century, but almost all of the expected warming will still take place by 2100.

Table 1. Impact of climate policies, optimistic and pessimistic, for RCP8.5, using MAGICC, summary of finds described throughout the text

Change in temperature		
°C year 2100	Pessimistic	Optimistic
US INDC	0.008	0.031
US CPP	0.004	0.013
EU INDC	0.017	0.053
EU 2020	0.007	0.026
China INDC	0.014	0.048
RoW INDC	0.009	0.036
Global INDCs	0.048	0.170

Because the climate policy impacts from individual countries are almost additive, they can be almost perfectly partitioned as is evidenced in Table 1. This shows that in the optimistic case, the EU and China each reduce mean global temperature by 2100 of about 0.05°C, and the US and the RoW each reducing a bit more than 0.03°C.

As Wigley (1998) found for the Kyoto Protocol, the emissions reductions promised until 2030 will do little to stabilize the climate and their impact will be undetectable for many decades. This clearly indicates that if we want to reduce climate impacts significantly, we will have to find better ways than the ones currently proposed.

Notes

1. Searched topic for ‘temperature reduction EU 2020 climate policy’ and similar for ‘EU 2030 climate policy’, ‘US Clean Power Plan’,



- 'US 2025 emissions reduction' and 'China peak emissions,' which gave no relevant papers.
- https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch8s8-8-2.html, http://unfccc.int/adaptation/nairobi_work_programme/knowledge_resources_and_publications/items/5430.php, http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policy-makers.pdf [Accessed 9 August 2015].
 - <http://www2.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants>, <http://www.epa.gov/airquality/cpp/fs-cpp-by-the-numbers.pdf> [Accessed 11 August 2015].
 - Using EIA's 2015 Annual Energy Outlook data for 2015.
 - P. 26: 'As noted above, the AEO2015 cases do not assume implementation of EPA's proposed Clean Power Plan or other actions beyond current policies to limit or reduce CO₂ emissions.'
 - http://ec.europa.eu/clima/policies/strategies/2020/index_en.htm [Accessed 3 September 2015].
 - Notice that only two of the 14 scenarios continue from 2060–2100, so this part is less robust. Since we only look at the difference, this matters little.
 - http://ec.europa.eu/clima/news/articles/news_2014102401_en.htm [Accessed 21 August 2015].
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trade-offs across a wide range of issue areas, latest working with 82 economists to identify the costs and benefits for the UN's 2030 Global Goals.

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Figure S1. Global CO₂-equivalent emissions from 1990–2012, along with RCP2.6, RCP4.5, RCP6 and RCP8.5, 2005–2100. Included are also the 25 scenarios used here from EMF 27 and AME, along with their median (thick black).

Figure S2. Temperature difference between global policy and RCP8.5 for all possible climate sensitivity options in MAGICC for climate model (GISS, GFDL, MIROC etc.) and carbon cycle (Bern, Climber, Hadley etc.).

Figure S3. Annual global emissions, RCP8.5, the optimistic global INDC policy, optimistic extended global INDC assuming constant emission reduction rate forever, and a constant cap of global emissions at 2016 level.

Figure S4. Global temperature anomaly from 2000–2100, with baseline RCP8.5, optimistic global INDC policy, optimistic global INDC emission reduction rate extended forever and emissions held constant at 2016-level, run on MAGICC.

Table S1. Sensitivity of impact of climate policies, from RCP8.5 and RCP6

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Senator WICKER. I also would like to put into the record a press release issued by the Copenhagen Consensus with regard to that peer reviewed study.

Senator BOOZMAN. Again, without objection.
[The referenced information follows:]

PRESS RELEASE – EMBARGOED FOR TUESDAY, 10 November

CONTACT: David Lessmann, david@copenhagenconsensus.com, +1-917-832-1435

Research Reveals Negligible Impact of Paris Climate Promises

Lomborg shows Paris commitments will reduce temperatures by just 0.05°C in 2100

A new peer-reviewed paper by Dr. Bjorn Lomborg published in the *Global Policy* journal measures the actual impact of all significant climate promises made ahead of the Paris climate summit.

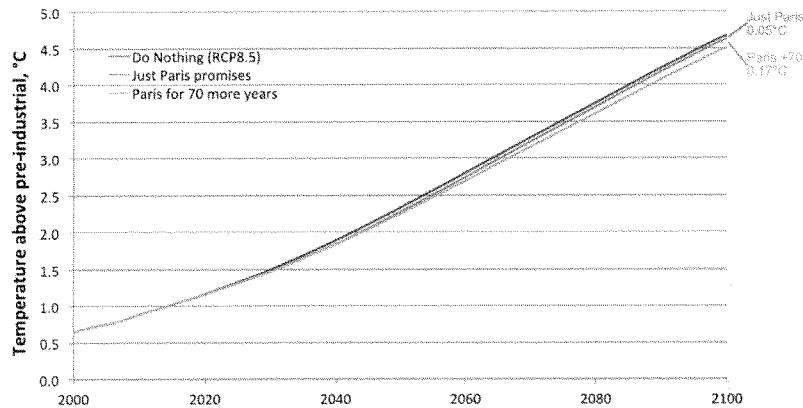
Governments have publicly outlined their post-2020 climate commitments in the build-up to the December's meeting. These promises are known as "Intended Nationally Determined Contributions" (INDCs).

Dr. Lomborg's research reveals:

- The climate impact of **all Paris INDC promises** is miniscule: if we measure the impact of every nation fulfilling every promise by 2030, **the total temperature reduction will be 0.048°C (0.086°F) by 2100.**
- Even if we assume that these promises **would be extended for another 70 years**, there is still little impact: if *every nation fulfills every promise* by 2030, *and continues to fulfill these promises faithfully until the end of the century, and there is no 'CO₂ leakage' to non-committed nations*, the entirety of the Paris promises will **reduce temperature rises by just 0.17°C (0.306°F) by 2100.**
- **US climate policies**, in the most optimistic circumstances, fully achieved and adhered to throughout the century, will **reduce global temperatures by 0.031°C (0.057°F) by 2100.**
- **EU climate policies**, in the most optimistic circumstances, fully achieved and adhered to throughout the century, will **reduce global temperatures by 0.053°C (0.096°F) by 2100.**
- **China climate policies**, in the most optimistic circumstances, fully achieved and adhered to throughout the century, will **reduce global temperatures by 0.048°C (0.086°F) by 2100.**
- **The rest of the world's climate policies**, in the most optimistic circumstances, fully achieved and adhered to throughout the century, will **reduce global temperatures by 0.036°C (0.064°F) by 2100.**

Overview in Celsius and Fahrenheit by the year 2100

Change in temperature			Change in temperature		
year 2100	Just Paris	Paris +70 years	year 2100	Just Paris	Paris +70 years
US INDC	0.008	0.031	US INDC	0.014	0.057
<i>US CPP</i>	<i>0.004</i>	<i>0.013</i>	<i>US CPP</i>	<i>0.007</i>	<i>0.023</i>
EU 2030 INDC	0.017	0.053	EU 2030 INDC	0.031	0.096
<i>EU 2020</i>	<i>0.007</i>	<i>0.026</i>	<i>EU 2020</i>	<i>0.012</i>	<i>0.046</i>
China	0.014	0.048	China	0.025	0.086
RoW INDC	0.009	0.036	RoW INDC	0.016	0.064
Global	0.048	0.170	Global	0.086	0.306

Figure

The global temperature change from pre-industrial, for the Do Nothing (RCP8.5) scenario, for the global promises for Paris and for Paris extended for 70 more years, as run on MAGICC.

Comments from Dr. Bjorn Lomborg

What does this mean for the Paris Summit?

Dr. Lomborg said: “Paris is being sold as the summit where we can help ‘heal the planet’ and ‘save the world’. It is no such thing. If all nations keep all their promises, temperatures will be cut by just 0.05°C (0.09°F). Even if every government on the planet not only keeps every Paris promise, reduces all emissions by 2030, and shifts no emissions to other countries, *but also* keeps these emission reductions throughout the rest of the century, temperatures will be reduced by just 0.17°C (0.3°F) by the year 2100.

And let’s be clear, that is very optimistic. Consider the Kyoto Protocol, signed in 1997, never ratified by the US, and eventually abandoned by Canada and Russia and Japan. After several renegotiations, the Kyoto Protocol had been weakened to the point that the hot air left from the collapse of the Soviet Union *exceeded* the entire promised reductions, leaving the treaty essentially toothless.

The only reason Kyoto goals were almost achieved was the global 2008 recession. Moreover, emissions were shifted from one country to another. The EU, the most climate-engaged bloc, saw an increase in its emission imports from China alone equaling its entire domestic CO₂ reductions. In total, 40% of all emissions were likely shifted away from the areas that made promises.

Negotiators in Paris are trying to tackle global warming in the same way that has failed for 30 years: by making promises that are individually expensive, will have little impact even in a hundred years and that many governments will try to shirk from.

This didn’t work in Kyoto, it didn’t work in Copenhagen, it hasn’t worked in the 18 other climate conferences or countless more international gatherings. The suggestion that it will make a large difference in Paris is wishful thinking.”

What should countries do instead?

Dr. Lomborg said: "Instead of trying to make fossil fuels so expensive that no one wants them – which will never work – we should make green energy so cheap everybody will shift to it."

The [Copenhagen Consensus on Climate](#) project gathered 27 of the world's top climate economists and three Nobel Laureates, who found that the smartest, long-term climate policy is to invest in green R&D, to push down the price of green energy.

Subsidizing inefficient renewables is expensive and doesn't work. The IEA estimates that we get 0.4% of our energy from wind and solar PV right now, and even in optimistic scenarios the fraction will only rise to 2.2% by 2040. Over the next 25 years, we'll spend about \$2.5 trillion in subsidies and reduce global warming temperatures by less than 0.02°C.

Copenhagen Consensus has consistently argued for a R&D-driven approach. Fortunately, more people are recognizing that this approach is cheaper and much more likely to succeed – including the [Global Apollo Program](#) which includes Sir David King, Lord Nicholas Stern, Lord Adair Turner and Lord John Browne.

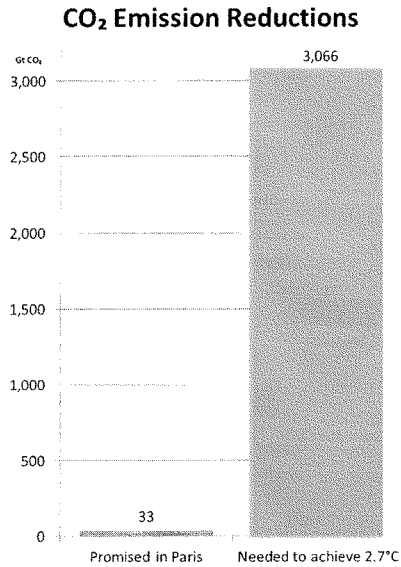
You describe a 0.05°C reduction, but the UN Climate Chief, Christina Figueres, said Paris could lead to a 2.7°C rise instead of 4°C or 5°C. Why?

Christiana Figueres quote: "The INDCs have the capability of limiting the forecast temperature rise to around 2.7 degrees Celsius by 2100, by no means enough but a lot lower than the estimated four, five, or more degrees of warming projected by many prior to the INDCs."

Dr. Lomborg said: "That entirely misrepresents the world's options. The 2.7°C comes from the International Energy Agency and essentially assumes that if governments do little in Paris and then *right after 2030* embark on incredibly ambitious climate reductions, we could get to 2.7°C."

That way of thinking is similar to telling the deeply indebted Greeks that just making the first repayment on their most pressing loans will put them on an easy pathway to becoming debt-free. It completely misses the point.

Figueres' own organization estimates the Paris promises will reduce emissions by 33Gt CO₂ in total. To limit rises to 2.7°C, about 3,000Gt CO₂ would need to be reduced – or about 100 times more than the Paris commitments (see figure below). That is not optimism; it is wishful thinking.



Background about the Paper:

What does the paper do?

The peer-reviewed paper takes the greenhouse gas emission reduction commitments (INDCs) and runs a climate model with and without them. The paper uses the MAGICC climate model, which has been used across all five IPCC reports and was *co-funded* by the US EPA. It is run with standard parameters. Sensitivity analysis shows that different assumptions of climate sensitivity, carbon cycle model or scenario do not substantially change the outcome.

The paper uses the same basic methodology of [Tom Wigley](#), who analyzed the Kyoto Protocol in a much-cited [paper in 1998](#). As with Wigley, the approach:

- Identifies the baseline of emissions
- Extrapolates the climate policy throughout the 21st century
- Runs the baseline and emissions through a climate model, evaluating the impact of the climate policy in terms of temperature rise reduction.
- Performs a sensitivity analysis across models and scenarios.

The Lomborg paper uses the best baselines for the three major emission reducers (China, EU and US makes up almost 80%) and estimates the impact of the rest, including Canada, South Korea, Russia, Japan etc. from Boyd, Turner, and Ward (2015). The UNFCCC says in their summary report that the CO₂ equivalent reductions are between 0 and 7.5Gt with a 3.6Gt best estimate. Almost all models find similar numbers. This paper uses 6.8Gt, which is a very optimistic estimate for Paris.

Where is the paper published?

The peer-reviewed paper is published in the upcoming issue of Global Policy journal (November 2015). It will be accessible online on 10 November 2015 under this link:

<http://onlinelibrary.wiley.com/doi/10.1111/1758-5899.12295/full>

Senator WICKER. Let me just say this. Mr. Lomborg and I have not always seen eye-to-eye on the causes of climate change, but he has, I think, released a very important peer reviewed study. And, of course, I look on the Internet and I see the first thing that happens when you challenge the status quo is that there is a chorus of people saying that the data is wrong and faulty and should be disregarded.

But here is what Dr. Lomborg tells us about the Paris promises. He basically says this: if Paris accomplishes everything they want to, and if you use their own projections, if we measure the impact of every nation fulfilling every promise by the year 2030, the total temperature reduction will be 0.048 degrees Celsius. In other words, by the end of this century, if everything they say is correct, we will have accomplished a change in degree Celsius of less than five-hundredths of a degree Celsius.

My friend from New Jersey may or may not be correct about the problem, but the question is we spend all this money and divert it from all of these other areas. What are we going to get for it in addressing this problem? And this peer reviewed study says you are going to get less than five hundredths of a degree by the end of the century.

The United Kingdom is diverting \$8.9 billion from its overseas budget, going to turn it over to climate change. We are going to divert almost \$9 billion and get five-tenths of a degree Celsius?

I think the people of the world who answer public opinion polls are correct. When asked where action-related climate change ranks out of 16 categories, they rank it dead last. I think the people that are most disadvantaged in this world would rather have us use money to improve education, to increase electricity availability, to fight malaria.

Malnourishment claims at least 1.4 million children's lives per year. Yet we are taking money away from programs that do that. We are taking money that could be used for malnourishment and putting it on something that is going to give us less than five hundredths of a degree.

1.2 billion people live in extreme poverty. Think of what the United Nations could do with the money that we are going to put, if it is \$100 billion or whatever. Think of what we could do to help people in poverty, to help children who are dying, dying from malnutrition. Two point six billion human beings on this planet lack clean drinking water and sanitation. We could prevent 300,000 deaths a year if we took this money and put it on malaria.

So I just say I hope this Congress, I hope this Senate will act with caution. I hope the representatives of the American people act with caution when they go to Paris. And I hope whatever is done, I hope we make it clear, and the word should go out from this hearing and from this capital that whatever is agreed to by the people representing the United States of America in Paris should come back to this Congress for debate, for consultation, and for approval or disapproval by the Congress.

Thank you, Madam Chair.

Senator CAPITO.

[Presiding.] Thank you.

Senator Gillibrand.

Senator GILLIBRAND. Thank you, Madam Chairwoman.

Ms. Jacobson, in your written testimony you wrote that the U.S. business community is increasingly considering the climate change in its energy corporate strategies and that companies are pledging to reduce greenhouse gas emissions and are implementing other climate change initiatives. Can you discuss with the committee some examples of how companies are embracing the move to lower our carbon emissions and promote greater sustainability? And have they used efforts to combat climate change as an opportunity to innovate and grow?

Ms. JACOBSON. Thank you for the opportunity to speak to this. Several Business Council for Sustainable Energy members made recent pledges this fall related to greenhouse gas mitigation and other compatible, sustainable energy initiatives. These include Calpine, ENER-G Rudox, Ingersoll Rand, Johnson Controls, Kingspan Insulated Panels, PG&E, Qualcomm, and Schneider Electric. This really shows them plus their peers. In the recent announcements, as was mentioned by David, there were over 80 companies that came together, representing, I believe, \$3 trillion investment, and they provide hundreds of thousands of jobs in this Country and offer their technologies, products, and services in a competitive and effective way globally.

They see this as a mainstream business issue, and the range of tools vary, but they may be things like energy management practices, setting targets for reducing their energy use, working through their supply chains. Some even put carbon pricing into their investment decisions. And they are doing this because they get economic benefit from doing so.

The last decade, through tools like the Carbon Disclosure Project and other initiatives, track how businesses have really evolved in the way they have responded to the call from their customers and from shareholders to consider sustainability initiatives and to reduce greenhouse gas emissions. We also now are seeing companies take it to the next level and look at what science and policymakers are doing in terms of their own trajectories for greenhouse gas emissions and matching them in their corporate strategies.

So it is a mainstream issue and companies are responding in different ways, but I think the essential piece is that companies are responding.

Senator GILLIBRAND. Can you please describe the importance of reaching an international agreement in Paris to the business community that you work with? And what effect do you think the global commitment to reduce greenhouse gases will have on the ability of U.S. companies that have already embraced sustainability to compete internationally?

Ms. JACOBSON. Well, I think the second question first. The U.S. has a path forward. It has it at the State level, it has it at the local policy level, and we have it at the Federal level through the investments we are making in energy research, development, and deployment through things like the Clean Power Plan. We already have a roadmap. Other countries where we compete for customers and to invest need to be on a similar roadmap.

And what the International Climate Change Agreement does is it brings to light, it provides transparency on not only what we do,

but what other governments are doing. So that sends a very strong signal to investors of where to place their capital. In the energy sector, these are long-lived investments; they are decades-long investments. And right now, with a lack of clarity in many parts of the world, capital is sitting on the sidelines, and that is not good for U.S. firms and it is not providing the job creation opportunities that U.S. firms would like to provide here at home.

Senator GILLIBRAND. Thank you.

Mr. Waskow, in your testimony you State that the leadership shown by the United States has paid substantial dividends internationally. Can you please elaborate on how the United States leadership has spurred action by other countries, and what changes have we seen from the lead-up to the Copenhagen meeting in 2010?

Mr. WASKOW. Thank you. The leadership that the United States is showing has really had ramifications sort of rippling outwards, I think, and the underpinnings of that leadership really has been the agreements that the United States has entered into or arranged with China. Beginning a year ago, with the joint announcement by the two countries, where each put forward what its climate plans for the coming decade and, in China's case, for the coming decade and a half will be, that really laid the ground for an understanding that action was going to be international in scope, when the two major emitters, the two largest emitters came forward in that way.

And what we saw coming out of that, I think, was in fact a ripple effect that turned into a wave of action internationally. And we have now seen all major emitters, as part of that 160-plus set of countries with national climate plans, come forward with their plans, and we have seen actions, as I mentioned the Indian renewables target, for example, that have come forward. India has gone even beyond those 2022 numbers to commit that it would have 40 percent of its energy supply from non-fossil sources by 2030. And we have seen this happen in any number of countries.

This is very different from the Copenhagen situation. We have seen a doubling of countries that have put forward plans that have greenhouse gas emissions targets in them, as opposed to general actions, and we are seeing a plethora of renewable energy plans as well. We have analyzed the national climate plans, the INDCs, to look at renewable energy in particular. Just the eight largest emitters have put plans in place for more than 8,000 terawatt hours of renewable energy by 2030. This is about 20 percent more than what they would have done under business as usual.

So we are seeing something that is really remarkable.

Senator GILLIBRAND. Thank you.

Thank you, Madam Chair.

Senator CAPITO. Thank you.

If we could hold here for just a minute or two. Senator Whitehouse is on his way back, would like to participate in some questioning. So we will just of at ease, I guess would be a way to say it.

Senator CARPER. Madam Chair.

Senator CAPITO. Yes.

Senator CARPER. Rather than just sit here and not continue our conversation, could I be recognized, please?

Senator CAPITO. Yes.

Senator CARPER. A little bit of levy here. Yogi Berra. Who mentioned Yogi Berra? Daj& vu all over again. One of my favorite Yogi Berra stories is Yogi Berra is in the dugout with the other Yankees, and before the game started one of his teammates came in and said, did you hear the news, did you hear the news, Yogi? He said, a Jew has been elected mayor of Dublin. And Yogi thought about it and said, only in America.

[Laughter.]

Senator CARPER. Another Yogi favorite is Yogi once said, when you come to a fork in the road, take it. I think we're at the fork in the road, and my hope is that we will take it.

I learned a few things in preparing for this hearing, Madam Chair. One of those is many of these, I will call them, other executive agreements not approved by Congress have there been? I did have no idea, but it turns out there has been something like 18,000 of them since 1789, compared to about 1,000 treaties that would have been agreed to.

And I thought, well, are some of those executive agreements that have not been approved by Congress? One was the Yalta Agreement that ended World War II in 1945. Another was the Paris Peace Accords that ended the war in Vietnam in which I served. Another was the various adjustments to the Montreal Protocol and substances that depleted the ozone layer from 1987. More recently, the Minamata Convention on Mercury from 2013, a global agreement to protect human health from mercury pollution. All of those were not treaties, they were really essentially executive agreements.

I will yield back my time and thank you.

Senator CAPITO. Thank you.

Senator Whitehouse.

Senator WHITEHOUSE. Thank you, Chairman.

Senator CAPITO. Sure.

Senator WHITEHOUSE. May I first ask unanimous consent to enter into the record the key vote alert from the Chamber of Commerce claiming to represent "the interests of more than 3 million businesses of all sizes, sectors, and regions" threatening to "score the vote" yesterday to destroy the President's Clean Power Plan?

Senator CAPITO. Without objection.

[The referenced information follows:]

KEY VOTE ALERT!

November 17, 2015



U.S. CHAMBER OF COMMERCE
Congressional & Public Affairs
1615 H Street, NW
Washington, DC 20062
202-463-5600

TO THE MEMBERS OF THE UNITED STATES SENATE:

The U.S. Chamber of Commerce, the world's largest business federation representing the interests of more than three million businesses of all sizes, sectors, and regions, as well as state and local chambers and industry associations, and dedicated to promoting, protecting, and defending America's free enterprise system, strongly supports resolutions of disapproval under the Congressional Review Act to prohibit a regulation that goes beyond the statutory and legal authority of the Clean Air Act and to protect consumers and industry from economically damaging greenhouse gas regulations on new and existing power plants.

The resolutions—S.J. Res. 23 regarding "Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units" (NSPS CRA), and S.J. Res. 24 regarding "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units" (ESPS CRA)—would provide precisely the kind of protection from excessive and overreaching regulations that the Congressional Review Act was designed to achieve.

It is widely agreed that the Clean Air Act was never intended to regulate carbon dioxide, and it remains poorly designed for such a task. Nonetheless, the Environmental Protection Agency (EPA) has recently finalized its first-ever greenhouse gas regulations on new power plants, and concurrently finalized a dramatic reconfiguration of the nation's electric power sector in the form of the EPA's regulation of carbon emissions from existing power plants. These final rules are the very latest in a string of already issued rules targeted at many of the nation's most affordable and reliable electric generation facilities. The impact these rules will have on power prices means they will inevitably have negative implications extending to nearly every segment of the economy.

Specifically, the NSPS CRA would invalidate the EPA rule that mandates strict limits on carbon emissions from newly built power plants, in particular requiring that all new coal-fired power plants include carbon capture and sequestration (CCS) systems. However, despite Clean Air Act requirements that mandated technologies be "adequately demonstrated," CCS is nowhere near commercial viability due to financial, technological, and other hurdles. Accordingly, EPA's designation of CCS as the best system for compliance under this rule amounts to nothing more than a regulatory euphemism for what is plainly a ban on the construction of new coal-fired power plants. The NSPS CRA would appropriately

invalidate the EPA final rule that seeks to eliminate the ability to construct new, state-of-the-art coal-fired power plants anywhere in the nation.

In addition, the ESPS CRA would serve to invalidate the EPA's final rule dictating an unprecedented restructuring of the nation's electric system under the false authority of a seldom-used provision of the Clean Air Act. Not only does the EPA's existing plant rule dictate what types of electric generation can be considered by individual states to meet their current and future electricity needs, but the rule incredibly sets standards of performance for existing fossil-fueled electric power generating units that are stricter than those finalized by EPA as applicable to new electric generating facilities.

Twenty-seven states and scores of business and industry associations, along with other entities, have already sought to stop this rule through the appropriate legal avenues due to the harm this rule poses to the availability of affordable and reliable electricity. The ESPS CRA would ensure that the nation is able to avert the irreversible damage to the nation's economic competitiveness that will otherwise follow from the EPA's full implementation of its carbon regulations for existing power plants.

For these reasons, and in order to protect the countless benefits that affordable and abundant domestic energy resources provide to the nation's economic development and security, the Chamber strongly supports S.J. Res. 23 and S.J. Res. 24. **The Chamber strongly urges you to support S.J. Res 23 and S.J. Res 24 and may consider including votes on, or in relation to, these resolutions in our annual *How They Voted* scorecard.**

Sincerely,

A handwritten signature in black ink, appearing to read "R. Bruce Josten".

R. Bruce Josten

Senator WHITEHOUSE. Thank you, Madam Chair.

May I also ask unanimous consent to enter into the record a letter signed by more than 360 companies, including General Mills, Nestle USA, Dannon, Staples, Adidas, Gap, Levis, and Schneider Electric, which has a good Rhode Island presence, always glad to have Schneider Electric involved, that was sent to the Nation's Governors expressing strong support for implementation of the EPA's carbon pollution standards for existing power plants?

Senator CAPITO. Without objection.

[The referenced information follows:]



July 31, 2015

National Governors Association
444 North Capitol Street NW, Suite 267
Washington, D.C. 20001-1512

RE: Support for State Implementation of Carbon Pollution Standards

Dear Governors:

We, the undersigned companies and investors, have a significant presence in your state and strongly support the implementation of the Environmental Protection Agency's Carbon Pollution Standards for existing power plants. These standards, also called the Clean Power Plan, are critical for moving our country toward a clean energy economy. The Plan's flexible approach provides an exciting opportunity for states to customize their own energy portfolio, expand clean energy solutions, attract new industries to the state, and create thousands of jobs.

Our support is firmly grounded in economic reality. Clean energy solutions are cost effective and innovative ways to drive investment and reduce greenhouse gas emissions. Increasingly, businesses rely on renewable energy and energy efficiency solutions to cut costs and improve corporate performance. In 2014, a study by Ceres, Calvert Investments and the World Wildlife Fund revealed that 60 percent of Fortune 100 companies have set their own clean energy targets and have saved more than \$1 billion a year in the process.¹

Clear and consistent policies can send market signals that help businesses and investors plan for the future. We are seeking long-term policies that provide businesses the certainty needed to transition to a clean energy economy. Electric power plants are the single largest source of carbon pollution in the United States and the Clean Power Plan will be pivotal in reducing their emissions.

As you develop your implementation plan we hope you will include the building blocks of renewable energy and energy efficiency, which will allow you to mitigate the risks of climate change and the volatility of fossil fuel prices.

We are already experiencing increased frequency and intensity of storms, warmer temperatures, extreme precipitation, and changes in weather patterns that will continue to put trillions of dollars of institutional investors' assets at risk and require companies to be innovative at adapting to these changes. From our positions as employers and fiduciaries, we seek a greater degree of policy certainty in order to better manage these risks in our operations, supply chains, and portfolios.

We are encouraged that the Plan allows states to use a number of flexible strategies to comply with the standards. States can build on successful clean energy policies already in place around

the country and thereby accelerate additional investment. Evidence shows that emissions reductions can be achieved without long-term economic harm or damage to the reliability of our electricity system.²³ We also hope to see states take care to ensure a just transition for impacted workers and communities during this shift toward a low carbon economy.

We encourage your timely finalization of your state's implementation plan and offer the support of the business community in your pursuit of cost-effective clean energy solutions.

Thank you for your leadership.

Sincerely,

ABC Box Co.
adidas Group
 Adventure safety International
 Aggrandized
 Agrarian Ales
Akamai Technologies, Inc.
 All Seasons Garden Center
 Allard PPC
 American Exchange
 American Outdoor Products, Inc.
 Amicus Green Building Center, LLC
 Aquinas Associates
 Argyle Brewing Company, LLC
 Arjuna Capital
 Asean Corporation (Stalkmarket brands)
 Aspen Brewing Company
Aspen Skiing Company
Autodesk
 Auralites Inc
Aveda
 Bay Trading
 Bella Stella
Ben & Jerry's
 Benjamin Visuals
 Bespoken Corporate Communications
 BIOJAM
 Blogs for Brands
 Blue Chip Technologies LLC
 Blue Moon Massage
Boston Common Asset Management
 Breathe Deep
Breckinridge Capital Advisors
 Brewery Vivant
 Bridger Bowl

Broadside Bookshop
 Broadway Cab LLC
 Buena
 Building Doctors
 Bum Boosa Bamboo Productions
Burton Snowboards
Calvert Investments
 Captains of Industry
 Carolina Biodiesel, LLC
 Catskill Brewery
 CDI Meters, Inc.
 Cedar Mill Communications
 CEO Pipe Organs/Golden Ponds Farm
 Chandler Ilc
 Chez Sven Bed & Breakfast
 Christopher Reynolds Foundation
 Chuckanut Brewery & Kitchen
 Clark Farms
 Classic Communications
 Clean Agency
 Clean Power Finance
 Clean Yield Asset Management
Clif Bar & Company
 Climate Clean, Inc.
 Climate First!, Inc.
 Climate Ready Solutions LLC
 ClimeCo Corporation
 Closed Loop Advisors
 Cocoa Corporation
 Colorado Sustainable Financial Planning
 Communitas Financial Planning
 Computer Co-op
 Concept Green LLC
 Contempl8 T-Shirts LLC

Continuum Industries
 Convergence Energy
 Cooperative Energy Futures
 Copyrose Marketing & Communications
 Cornerstone Tree Care
 CR360
 Creativo
 Creekwood Energy Partners
 Curren Media Group
 Dana Investment Advisors
 Daughters of Charity, Province of St. Louise
 DBL Partners
 Debra Little Sustainable Design
 Detour, LLC
Dignity Health
 Digs
 Distributed Energy Management
 Dominican Sisters
 Domini Social Investments LLC
 Earth and Sky Architecture
 Earthshade Natural Window Fashions
 EarthWiseOptions.com
eBay
 Ecco Bella
 Eco Ohio
Eco-Products
 Ecogate, Inc.
 EcoPlum
EILEEN FISHER, Inc.
 Electric Vehicle Institute
 Energy Strategy Environment
 EnviroMedia
 Espresso Parts LLC
 Ethical Markets Media
 Eva Realty, LLC
 Evluma
 eWind Solutions
 Exact Solar
 Fiberactive Organics, LLC
 First Affirmative Financial Network
 Flynn & Assoc., Inc.
 Fort George Brewery and Public House
 Fort Production Management, Inc.
 Fresh Perspective, Inc.
 Fresh Potato Factory
 Friends Fiduciary Corporation

Gaia's Basket
Gap Inc.
General Mills, Inc.
 GO Box
 GOLO Enterprise
 Gomez Consulting Group
 Great Green Content
 Green Advantage Consultants
 Green Alliance
 Green And Profitable
 Green Century Capital Management
 Green CO2 systems
 Green Concierge Travel LLC
 Green Energy Marketing and Consulting
 Green Girl Land Development Solutions LLC
 Green Heron Tools, LLC
 Green Pod LLC
 Green Team Spirit
 GREENPLAN Inc.
 GreenTone Environmental Design
 Greenway Transit Services, LLC
 Gypsy Divers
 Handmade Nepal Inc.
 HaydenTanner, LLC
 Helicon Works Architects
 Hermans Eco Inc.
 High Flight Arts and Letters
 Hill Country Green Team
 Hilton Head Brewing Co.
 HJKessler Associates
 HM3 Energy
 Holistic Project Management Consulting
 Hopcroft Consulting
 House Kombucha
 Hugg-A-Planet
 Hydroscares Inc.
 I & I Design
 IDEASforUs.org
 Impact Infrastructure LLC
 Imperium Renewables, Inc
 Indow Windows
 Innovative Power Systems
 ipsy
 iResortApp
 Isle Inc.
 J.K.F. Chilson, Opals & more

Jade Asset Growth, LLC
 Jedlicka Design
 Joyce Moore Financial Services/Whole Earth
 Investments
 Juhl Energy
 Jumpin' Jay's Fish Cafe
 Just in Time Direction
K2 Sports
 Kayak Media
 Kenozza Type, Inc.
 KERBspace
 Kirschenmann Family Farms
 KK1
L'Oreal USA
 Leisure Wheels Quadracycles
Levi Strauss & Co.
 Linda Harrar Productions LLC
 Made By Hand International
 MAR and UNE Provinces of the Society of
 Jesus
 Mark Gamba Photographs
Mars Incorporated
 Maryknoll Fathers and Brothers
 Matrix Design Studio
 Mercury Press International
 Mercy Health
 Mercy Investment Services
 Meriwether Group
 Metropolitan Group
 Michael Bader MD
 Midwest Coalition for Responsible
 Investment
 Mightybytes, Inc.
 Miller Chiropractic
Miller/Howard Investments, Inc.
 Modern Species
 Moldestad Ind., LLC
 Moorland Studios, Inc.
 mothering Mother
 MotherTongues
 Mountain Gear, Inc
 Mountain Rider's Alliance
 Mountain Rose Herbs
 Mphpm Designs
 Mt. Baker Bio
 Namaste Solar
 National Benefit Service Center
 National Foundry Products
 Natural Investments
 NBIS
 Neil Kelly
Nestle
 Never Too Late Basketball Camps, Inc.
New Belgium Brewing Company
 New Moon Girl Media
New York City Office of the Comptroller
Next Step Living
 North Star Toys
 Nutritional Needs
 NYR Organic
 Oasis Montana Inc.
 Oceans, Arts, & Designs, Inc.
 Odell Brewing
 Ogress Productions
 Olavie
 Old Bust Head Brewing Co.
 OSEIA
 Papillon Resorts, LLC
Pax World Management LLC
 Performant Software Solutions
 Personal Saga
 PLC Repair
 Pollen Brands
 Portfolio Advisory Board, Adrian Dominican
 Sisters
 Positive Energy Solar
 Powell Energy and Solar
 Practical Energy Solutions
 Praxis Northwest
Presbyterian Church (U.S.A.)
 Priyamvada Sustainability Consulting LLC
 Probst Furniture Makers
 Promotional Product Solutions
 Proof Lab Surf Shop
 Pure Strategies, Inc.
 PureSolar, Inc.
 Quest
 R. John & Co.
 RAES Foods, Inc.
 Rainbow Solutions, Inc.
 Raquette River Brewing
 Re-Nuble

Region VI Coalition for Responsible
 Investment and Sisters of the Humility of
 Mary
 ReVision Energy
 Rizzo Mattingly Bosworth PC
 Rockford Brewing Company
 Rune's Furniture
 s2 Sustainability Consultants
 Saibot Media
 San Juan Coffee Company, Inc
 Saunders Hotel Group
 Savvy Rest
Schneider Electric
 School Sisters of Notre Dame Cooperative
 Investment Fund
 Scoville Public Relations
 SEA Builders LLC
 Second Self Beer Company
 See3 Communications
Seventh Generation
 SheerWind
 Shift2Green
 Shimar Recycling, Inc.
 Sidel Systems USA Inc.
 Sisters of St. Dominic of Amityville, NY
 Sisters of the Good Shepherd
 Sisters of the Presentation of the Blessed
 Virgin Mary
 Sixpoint Brewery
 Ski Butternut
 Smartwool
 Smuttynose Brewing Company
 Solaero
 SolSource, Inc.
 Solstice Wood Fire LLC
 Sonen Capital
 South Carolina Small Business Chamber of
 Commerce
Staples, Inc.
 Starvation Alley Farms
 Steve Harvey Law, LLC
 Sities Design
Stonyfield
 StraightUp Solar
 Straw Wars USA
 Strong Brewing Co

Stumptown Puzzles
 Suite Sleep, Inc.
SunEdison
 Sun Light & Power
Sungevity
 SunPeak
 Sunsense Solar
 Sunsprout Farms of Central Ohio
 Sustain:Green
 Sustainability Roundtable Inc.
 Sustainability Solutions LLC
 Sustainable Manufacturing Consulting
 Sustainable North Bay
 Sustainable Systems, Inc.
 Swan Creek Energy
 Taiga Company
 Tandon & Associates, Inc.
 Tech Networks of Boston
 Technical Equipment Cleaners
 TerraCarbon LLC
 TerraShares
 The Added Edge
 The Alchemist
The Dannon Company, Inc.
 The Hummer Group, Inc.
 The Leadership Council of the Sisters,
 Servants of the Immaculate Heart of Mary
 The Lion Company, Inc.
The North Face
 The Refill Shoppe
 The Sierra Club Foundation
 The Stella Group, Ltd.
 The Sustainability Group of Loring, Wolcott
 & Coolidge
The Weather Company
 TheHitBid Company, Inc.
 Thinkshift Communications
Thornton Tomasetti
THULE Inc.
 Tierra Vista
Timberland
 Transitioning To Green
 Trap Door Brewing
 Treehouse Chocolate Co
 Tri-State Coalition for Responsible
 Investment

Trillium Asset Management

Triple Ethos
 TripZero
 Triskele Collaborative
 Tulong LLC
 TwentyTwo Designs
 Underground

Unilever

Unitarian Universalist Association
 Van Pelt Corbett Bellows
 Velasquez Family Coffee
 Venner Consulting, Inc.

VF Corporation

ViewPoint Consulting
 Village Bakery & Cafe

Virginia Mason**Walden Asset Management**

Walkabout Farm

Wauna Credit Union

Wespath Investment Management

West Side Auto Repair
 WestCoast Associates Inc.
 William Blackburn Consulting, Ltd.
 William Freimuth Architecture
 Wilson Solarpower Corp
 Winston Eco-Strategies
 Worthen Industries
 WVO Management
YoCrunch LLC
 YR&G
 Zaurie Zimmerman Associates, Inc.
 Zero Waste Solutions
 Zero2Global Renewable Energy Systems
 Zevin Asset Management, LLC

Bold indicates companies with >\$100M in annual revenue and investors with >\$2B in assets under management.

cc:

Dan Crippen, Executive Director
 Office of the Executive Director
 National Governors Association

Sue Gander, Executive Director
 Environment, Energy and Transportation Division
 National Governors Association

¹ See analysis, *Power Forward 2.0: How American Companies Are Setting Clean Energy Targets and Capturing Greater Business Value*, available at <https://www.ceres.org/resources/reports/power-forward-2.0-how-american-companies-are-setting-clean-energy-targets-and-capturing-greater-business-value/>

² See Center for American Progress analysis, *Cutting Carbon Pollution While Promoting Economic Growth*, available at <https://cdn.americanprogress.org/wp-content/uploads/2015/05/CarbonEmissions-brief.pdf>

³ See Brattle Group analysis, *EPA's Clean Power Plan and Reliability*, available at <http://info.aee.net/brattle-reliability-report>

Senator WHITEHOUSE. Thank you, Madam Chair.

May I also ask unanimous consent to enter the White House American Business Act on Climate Pledge into the record? This is 81 companies with operations in 50 States who employ over 9 million people, represent more than \$3 trillion in annual revenue, and with a combined market cap of over \$5 trillion? The signatories include Alcoa, Bank of America, Best Buy, Cargill, Coca Cola, Google, McDonald's, Pepsi, Proctor & Gamble, Walmart, and Walt Disney.

Senator CAPITO. Without objection.

[The referenced information follows:]

The White House
[Office of the Press Secretary](#)
For Immediate Release

October 19, 2015

FACT SHEET: White House Announces Commitments to the American Business Act on Climate Pledge

Today, the White House will announce new commitments from companies from across the American economy who are joining the American Business Act on Climate Pledge. With this announcement, **81 companies** will have signed the American Business Act on Climate Pledge to demonstrate their support for action on climate change and the conclusion of a climate change agreement in Paris that takes a strong step forward toward a low-carbon, sustainable future. These 81 companies **have operations in all 50 states, employ over 9 million people, represent more than \$3 trillion in annual revenue, and have a combined market capitalization of over \$5 trillion.**

By signing the American Business Act on Climate pledge, these companies are:

- Voicing support for a strong Paris outcome. The pledge recognizes those countries that have already put forward climate targets, and voices support for a strong outcome in the Paris climate negotiations.
- Demonstrating an ongoing commitment to climate action. As part of this initiative, each company is announcing significant pledges to reduce their emissions, increase low-carbon investments, deploy more clean energy, and take other actions to build more sustainable businesses and tackle climate change.

These pledges include ambitious, company-specific goals such as:

- Reducing emissions by as much as 50 percent,
- Reducing water usage by as much as 80 percent,
- Achieving zero waste-to-landfill.
- Purchasing 100 percent renewable energy, and
- Pursuing zero net deforestation in supply chains.

- Setting an example for their peers. Today's announcements builds on the launch of the American Business Act on Climate Pledge in July. This fall, the Obama Administration will release a third round of pledges, with a goal of mobilizing many more companies to join the American Business Act on Climate Pledge.

The impacts of climate change are already being felt worldwide. Nineteen of the 20 hottest years on record occurred in the past two decades. Countries and communities around the world are already being affected by deeper, more persistent droughts, pounded by more severe weather, inundated by bigger storm surges, and imperiled by more frequent and dangerous wildfires. Rising temperatures can lead to more smog, longer allergy seasons, and an increased incidence of extreme-weather-related injuries, all of which imperil public health, particularly for vulnerable populations like children, the elderly, the sick, the poor, and some communities of color. No corner of the planet and no sector of the global economy will remain unaffected by climate change in the years ahead.

Climate change is a global challenge that demands a global response, and President Obama is committed to leading the fight. The President's Climate Action Plan, when fully implemented, will cut nearly 6 billion tons of carbon pollution through 2030, an amount equivalent to taking all the cars in the United States off the road for more than 4 years. The Clean Power Plan, the most significant domestic step any President has ever taken to combat climate change, will reduce emissions from the energy sector by 32% by 2030. And while the United States is leading on the international stage and the federal government is doing its part to combat climate change, hundreds of private companies, local governments, and foundations have stepped up to increase energy efficiency, boost low-carbon investing, and make solar energy more accessible to low-income Americans.

The measures taken by the public and private sectors enabled President Obama to set an ambitious but achievable goal of reducing greenhouse gas emissions economy-wide by 26-28% by 2025 last November. And in the eleven months since, we've seen unprecedented global momentum in the fight against climate change.

To date, 150 countries representing more than 85% of global carbon emissions have reported post-2020 climate policies to the United Nations. This includes the major economies like the U.S., China, the European Union and India and it includes a large number of smaller economies, developing nations, island states and tropical countries – some of whom are the most vulnerable to the impacts of climate change.

But these submissions are only the beginning of achieving a successful outcome in Paris this December that puts in place a transparent global framework for increasing ambition over time and continuing to drive down emissions over the course of this century. As the world looks toward Paris, President Obama is committed to building on this momentum, with American leadership at all levels – the federal government, state and local governments and the private sector.

Clean Energy Investment

Additionally, leading up to the White House Clean Energy Investment Summit on June 16, 2015, an independent consortium of long-term investors (“LTIs”), including sovereign development funds, pension funds, endowments, family offices, and foundations, committed to building a new investment intermediary that will identify, screen, and assess high-potential companies and projects for commercial investment that could also produce impactful and profitable solutions to climate change.

Today, this consortium will announce its founding CEO, interim board of directors, sponsors, and confirms the intention of the LTIs to deploy at least \$1.2 billion of investment capital through an *‘aligned intermediary’*, which they anticipate will be formally launched and branded in mid-2016.

The initial group of LTIs announcing financial commitments to work with the *‘aligned intermediary’* includes:

- \$500 million from University of California’s Office of the Chief Investment Officer;
- 350 million from the New Zealand Superannuation Fund;
- \$200 million from the Alaska Permanent Fund;
- \$100 million from TIAA-CREF; and
- \$10 million from Tamarisc.

The effort launches with research support from the Hewlett Foundation, ClimateWorks Foundation, and Planet Heritage Foundation, and a commitment of further operational support, pending final approval, from the MacArthur Foundation.

As President Obama said at the U.N. Climate Summit last September, “There’s one issue that will define the contours of this century more dramatically than any other, and that is the urgent and growing threat of a changing climate.” The American Business Act on Climate Pledge shows that the U.S. private sector, with its history of

innovation and ingenuity, is committed to stepping up and doing its part in taking on this global challenge.

* * *

THE AMERICAN BUSINESS ACT ON CLIMATE PLEDGE

We applaud the growing number of countries that have already set ambitious targets for climate action. In this context, we support the conclusion of a climate change agreement in Paris that takes a strong step forward toward a low-carbon, sustainable future.

We recognize that delaying action on climate change will be costly in economic and human terms, while accelerating the transition to a low-carbon economy will produce multiple benefits with regard to sustainable economic growth, public health, resilience to natural disasters, and the health of the global environment.

The following companies have joined the pledge and their detailed commitments can be viewed at: www.whitehouse.gov/ClimatePledge

ABENGOA BIOENERGY US

Since 2005 Abengoa Bioenergy has produced more than 2.5 billion gallons of renewable ethanol fuel in the US, displacing 2.5 billion gallons of petroleum based transportation fuel and reducing GHG emissions from those gallons by an average of 34%. Building on this commitment to GHG reductions, Abengoa Bioenergy pledges to:

- Require our contractors and suppliers to calculate and report their GHG emissions in order to accurately and affirmatively achieve further incremental emissions reductions in the supply chain.
- Continue to improve energy efficiencies and emissions controls in order to reduce greenhouse gas emissions by at least 10%, compared to a 2005 baseline, by 2025.
- Continue the startup and full scale operation of our newly constructed commercial scale cellulosic ethanol facility in Hugoton, KS, producing up to 25 million gallons per year of extremely low carbon fuel, reducing GHG emissions by approximately 90% compared to petroleum fuels.
- Complete development of new technologies and promote joint investment with third parties in further cellulosic ethanol production facilities utilizing a broad range of feedstocks, including municipal waste, as well as agricultural residues.
- Develop long-term business plans that align with the deep decarbonization necessary to keep global average temperatures from rising less than 2C.

AEMETIS

Aemetis is planning to expand our technology platform and grow into new markets to combat climate change by significantly reducing greenhouse gas (GHG) emissions by displacing petroleum based fuels.

Having met our 2006 pledge to deploy 100 MGY of low carbon biofuels by 2015, Aemetis further pledges to:

- Deploy over 400 MGY of ultra-low carbon fuel by 2025 with greater than 50% reduction of GHG, compared to gasoline.
- Invest approximately \$800 million in new infrastructure for production of ultra-low carbon fuel by 2025.
- Utilize the lowest carbon intensity feedstocks, including agricultural residue and MSW, for the production of renewable jet, diesel, and gasoline replacing fuels.

ALCOA

Building on our existing global commitment to reduce GHG intensity by 30% by 2020 (vs. 2005 baseline), Alcoa pledges to:

- Reduce absolute GHG emissions by 50% in the U.S. (vs. 2005 baseline) by 2025,
- Deploy our full range of innovations to develop materials, products and technologies that move us toward a low carbon sustainable future, and by 2025, demonstrate a net reduction of GHG emissions from the use of our products equal to three times the emissions created by their production.

AMERICAN EXPRESS

American Express has taken measurable actions to reduce its carbon footprint, optimize the efficiency and sustainability of its workplace, and support its customers in reducing their environmental footprints. Currently, 100% of the electricity used to power American Express headquarters and 55% of the electricity used to power all the company's U.S. operations is carbon-free, utilizing a mix of wind, biogas, biomass and solar energy. On-site green power generation and the purchase of renewable energy credits (RECs) helped American Express reduce its carbon emissions by 27.5% between 2007 and 2012.

Building on this achievement, American Express pledges to:

- Reduce absolute GHG emissions by 10% globally (vs. 2011 baseline) by 2016.

APPLE

Apple, already running all of its U.S. operations on 100% renewable energy, will bring an estimated 280 megawatts of clean power generation online by the end of 2016 through investments in Arizona, California, Nevada, North Carolina, Oregon and Sichuan Province, China. Since 2011, Apple has reduced carbon emissions from its global corporate facilities, data centers and retail stores by 48%.

AT&T

By 2020 our goal is to:

- Reduce our direct greenhouse emissions (Scope 1) by 20 percent as compared to our 2008 baseline; and
- Reduce the electricity consumption of our company relative to data growth on our network by 60 percent as compared to our 2013 baseline.

AUTODESK

Building on Autodesk's long-term commitment to support and equip designers and engineers to help solve climate change while meeting our own science-based greenhouse gas reduction target, we pledge to:

- Power our business and growing cloud services with 100% renewable electricity by 2020 as part of our continuing science-based greenhouse gas reduction commitment
- Provide new software and services to help cities and enterprises design, operate, and make the triple bottom line business cases for sustainable buildings, water, and transportation projects.
- Invest in people, start-ups and organizations who are designing climate solutions. We invest dollars, software, and pro bono hours.
- Prioritize education for designers, students and makers to design within the limits of the planet and to address the epic challenge of climate.
- Continue to advocate for climate action in the IT industry, across the many industries we serve, and in the regions where we do business.

BANK OF AMERICA

Since 2007, Bank of America has provided more than \$39 billion in financing for low-carbon activities to help address climate change. Bank of America pledges to:

- Increase our current environmental business initiative from \$50 billion to \$125 billion by 2025 through lending, investing, capital raising, advisory services and developing financing solutions for clients around the world.
- Attract a wider array of capital to clean energy investments by developing innovative financing structures – from reducing investment risk through our Catalytic Finance Initiative to engaging

individual investors through our Socially Responsible Investing platform to building new markets for green bonds, yield-cos and other vehicles.

BERKSHIRE HATHAWAY ENERGY

Berkshire Hathaway pledges to:

- Build on our investment of more than \$15 billion in renewable energy generation under construction and in operation through 2014 by investing up to an additional \$15 billion.
- Pursue construction of an additional 552 megawatts of new wind generation in Iowa, increasing MidAmerican Energy Company's generating portfolio to more than 4,000 megawatts of wind which is comparable to 57 percent of its retail energy load in 2017. MidAmerican Energy Company is the nation's largest owner of wind generation among regulated, investor-owned utilities.
- Retire more than 75 percent of our coal-fueled generating capacity in Nevada by 2019.
- Add more than 1,000 megawatts of incremental solar and wind capacity through long-term power purchase agreements to PacifiCorp's owned 1,030 megawatts of wind generating capacity. PacifiCorp is the nation's second largest owner of wind generation among regulated, investor-owned utilities. This incremental renewable generation, expected to be online by the end of 2017, would bring PacifiCorp's non-carbon generating capacity to more than 4,500 megawatts which equates to approximately 22 percent of PacifiCorp's retail energy load in 2017.
- Invest in transmission infrastructure in the West and Midwest to support the integration of renewable energy onto the grid.
- Support and advance the development of markets in the West to optimize the electric grid, lower costs, enhance reliability and more effectively integrate renewable resources.

BEST BUY

Best Buy is committed to positively impacting our planet and our communities by reducing our impact on the environment, broadening consumer access to energy-efficient solutions, and supporting sustainable product life cycle management.

Best Buy pledges to:

- Reduce our carbon emissions by 45% by 2020 (2009 baseline), derived from operational reductions and renewable sourcing. This science-based goal builds on our 2014 achievement of a 26% reduction in carbon emissions within our operations (2009 baseline).
- Provide an assortment of energy-efficient products and solutions to enable consumers to minimize their own carbon footprint. In 2014, we helped our customers prevent 900 million pounds of carbon emissions through the ENERGY STAR® certified products they purchased from Best Buy.

- Collaborate with industry partners to promote sustainable electronics through manufacture, transport, in-use phase and end-of-life treatment of products.

BIOGEN

Biogen is proud to stand with other leading companies to support the American Business Act on Climate Pledge. This initiative is another demonstration of our ongoing commitment to corporate citizenship: improving the lives of patients, rethinking the way we use natural resources, developing and empowering our employees, and bettering the community.

Biogen pledges to:

- Maintain its Net Zero Carbon Footprint. As of the end of 2014, Biogen became the first biopharmaceutical company to achieve carbon neutrality.
- Reduce our direct and indirect operational carbon emissions by 80 percent by 2020 compared to 2006, normalized by revenue.
- Reduce our water use by 80 percent by 2020 compared to 2006, normalized by revenue.
- Achieve zero manufacturing waste-to-landfill status at all major owned locations.

BLOOMBERG

Bloomberg recognizes that carbon emissions have global environmental, social and economic implications. And we are committed to addressing them through a combination of actions: reducing consumption, buying renewable products and services, helping to set standards, encouraging disclosure and promoting clean technologies.

As a information provider for banks, corporations, governments and others, Bloomberg is leveraging its data, news and analytics capabilities to help our customers identify, manage and seize sustainability and climate-related risks and opportunities.

- Reduce absolute emissions 20% by 2020 vs our 2007 baseline
- Improve Energy Efficiency 50% by 2020 vs our 2007 baseline
- Source 35% direct clean energy sources by 2020
- Generate a 20% or greater IRR on the investments described above

CARGILL

Cargill established comprehensive goals around climate, energy, and water 10 years ago. We have improved energy efficiency by 16 percent, carbon intensity by 9 percent, and freshwater efficiency by 12 percent since setting energy goals in 2000

and climate and water goals in 2005. We continue to raise the bar and have set new goals through 2020.

From our 2015 baseline, Cargill pledges to over the next five years:

- Improve greenhouse gas (GHG) intensity by 5 percent.
- Improve freshwater efficiency by 5 percent.
- Improve energy efficiency by 5 percent.
- Increase renewable energy to 18 percent of our total energy use, up from 14 percent.

Cargill is a signatory to the United Nations' New York Declaration on Forests, committed to doing its part to cut natural forest loss in half by 2020, and strive to end it by 2030.

Cargill continues to work with customers and civil society to build sustainable supply chains that address climate concerns. We also partner with farmers and ranchers to help agriculture adapt to a changing climate. Our focus areas address sensitive needs in the critical supply chains of palm, soy and beef.

- **Palm:** Cargill is building a traceable and transparent palm oil supply chain firmly committed to no deforestation of high conservation value (HCV) lands or high carbon stock (HCS) area; no development on peat, and no exploitation of rights of indigenous peoples and local communities.
- **Soy:** Cargill has played a critical role in stemming the spread of deforestation in the Amazon by working with industry and NGO partners to develop and implement the Brazilian Soy Moratorium, a voluntary zero-deforestation agreement that contributed to a dramatic drop in deforestation in the region.
- **Beef:** A founding member of the Global Roundtable for Sustainable Beef (GRSB) and the U.S. Roundtable for Sustainable Beef (USRSB). Cargill is committed to conserving, reducing and more efficiently managing resources, and mitigating greenhouse gas emissions.

CA TECHNOLOGIES

CA Technologies pledges to:

- Reduce global greenhouse gas emissions by 35%, compared to a 2006 baseline, by 2020.

CALPINE

Calpine is a leading independent power producer and we have long invested in clean, low-carbon and renewable energy resources. We own and operate the nation's largest modern fleet of low-carbon, highly efficient, combined-cycle natural gas-fueled power plants; we also are the nation's largest operator of combined heat and power

(CHP) plants; and we own the nation's largest fleet of renewable geothermal power plants.

Calpine has been a longtime supporter of efforts to mitigate GHG emissions from the power sector. We have also voluntarily taken steps to assure that we provide reliable, low-cost electricity in an environmentally responsible and sustainable manner.

Calpine pledges to:

- Continue in our efforts to support market based solutions aimed at lowering carbon emissions in the power sector.
- Explore investments in low carbon technologies, such as efficient natural gas turbines, renewables and battery storage, which complement our existing clean and efficient gas powered and geothermal fleet.
- Work with states where we operate to help develop the most effective Implementation Plans for compliance with the Clean Power Plan that take into account each states unique standing while achieving the common goal of reducing system wide GHG emissions over time.

CAMPOS BROTHERS FARMS

Since 2009, Campos Brothers Farms has been actively focused on reducing our greenhouse gas emissions, as well as reducing our impact on a variety of environmental stewardship fronts, realizing a reduction of 19.7 Million pounds of CO₂ from being released into the atmosphere. Additionally, we have taken aggressive steps to reduce our water usage by 33%, have reduced our waste by 20% through recycling, orchard pruning management, and full utilization of all three products an almond produce; the hull (for livestock feed), the kernel/nut (one of the most nutritious foods in the world), and the shell (for livestock bedding). In addition, we have partnered with 'Project Apis m' to fund and direct research to enhance the health and vitality of honey bee colonies while improving plant production.

Despite our progress, we recognize that more can be done that will produce multiple benefits with regard to sustainable growth. Building on our progress since 2009 to reduce greenhouse gas emissions, water use, waste and increase recycling in our operations, Campos Brothers Farms pledges to:

- Reduce the amount of CO₂ being released into the atmosphere by an additional 166.4 Million pounds by 2025.

- Reduce our waste by another 25% through additional efficiencies and directive to utilize shells and orchard prunings for co-generation.
- Through increasing our solar power utilization by 400%, purchase of additional electric equipment/vehicles we will move from being nearly carbon neutral, to becoming carbon negative with respect to greenhouse gases.
- Reduce dust into the atmosphere by 60% by 2025
- Improve our company-wide recycling rate to 95% by 2025 up from our 2009 baseline of 75%
- Reduce water usage by at least an additional 10% through technology, soil and tree improving on our baseline of 33% reduction in 2009 by converting to micro/drip irrigation.
- Invest in additional research funding for Project Apis M to enhance the health and vitality of honey bee colonies.
- Participate in a new USDA-funded pilot project between the Almond Board of California and the Environmental Defense Fund and others designed to give both almond and corn growers greater access to greenhouse gas markets like those under California's cap-and-trade program

COCA-COLA

Coca-Cola pledges to reduce the carbon footprint of "the drink in your hand" by 25% by 2020.

Across the Coca-Cola system (our company and more than 250 bottling partners globally), we intend to make significant, comprehensive changes, investments and technology advancements to reduce our greenhouse gas emissions by 25 percent by 2020 as our business continues to grow. We estimate that achieving this ambitious goal will prevent approximately 20 million metric tons of carbon emissions annually by 2020. That's four times the Coca-Cola system's annual carbon emissions from manufacturing.

This goal is comprehensive and extends across our entire value chain - ingredient sourcing, manufacturing processes, packaging formats, delivery fleet, and refrigeration equipment.

COX ENTERPRISES

Cox Enterprises has long been committed to environmental stewardship and conservation. Since 2007, the company has invested more than \$100 million in sustainability and conservation through its Cox Conserves program, which promotes and supports positive environmental change in our businesses and in the community.

Looking ahead, Cox Enterprises aims to send Zero Waste to Landfills by 2024 and become both Carbon and Water neutral by 2044.

We pledge to accomplish these goals by:

- Carbon Reduction through alternative energy, energy conservation and operating a more sustainable fleet.
- Water Conservation programs across our campuses and business operations that reduce our water footprint and balance necessary use with meaningful restoration.
- Waste Diversion driven by increased recycling, exploring new waste technologies, as well as employee and customer engagement.
- Renewable Energy investments in new energy generation technologies as well as existing, proven technologies.
- Sustainable Supply Chain partnership with suppliers, with a focus on conservation including reduction in energy and water used in manufacturing and distribution, reduction in air and water pollution and waste products, use of recycled content in products and packaging, investments in alternative energy sources, and prioritization of environmental friendly transportation.

DELL

At Dell, we believe technology has an important role to play in both mitigating and adapting to climate change. While we will continue to focus on better understanding and managing our carbon footprint, we see our most important role as a provider of technology that will drive research, innovation and meaningful action. With this in mind, Dell puts forth the following pledges for action by 2020 that will reduce our footprint and help our customers to reduce theirs.

Dell pledges to:

- Reduce greenhouse gas emissions from our facilities and logistics operations by 50 percent by 2020, compared to our 2012 baseline.
- Increase purchases of renewable energy to at least 50 percent of our total by 2020.
- Reduce the energy intensity of our product portfolio by 80 percent by 2020, compared to our 2011 baseline.
- Implement zero-waste packaging across our product offerings by 2020, sourcing all packaging materials from sustainable/renewable sources and ensuring all packaging materials are recyclable or compostable.
- Plant 1 million trees by 2020 (beginning 2008) to help sequester carbon and restore habitats.

- Incorporate 50 million pounds of recycled-content plastics and other sustainable materials into our products by 2020 (beginning 2013) as part of our transition to a more circular economy. Dell has already used more than 21 million pounds of recycled-content plastics in our products, including 4 million pounds of closed-loop recycled plastics recovered through Dell's world-class electronics take back programs.

Dell is also committed to demonstrating how technology solutions can create net positive effects – enabling customers to achieve social and environmental benefits that exceed the footprint of the technology used to deliver them. By 2020, we will demonstrate this net positive effect is 10 times greater than the footprint of the technology used to achieve it.

We encourage others to join us in setting meaningful targets, taking action, and supporting global cooperation to reduce emissions of greenhouse gases and address climate change.

DSM NORTH AMERICA

DSM is a global life science and material science company working to create brighter lives for people today and generations to come. DSM is a world leader in sustainable nutrition, materials and health. It delivers innovative solutions that nourish, protect and improve performance in global markets such as food and dietary supplements, personal care, feed, pharmaceuticals, medical devices, automotive, paints, electrical and electronics, life protection, alternative energy and bio-based materials. DSM has 22,000 employees world-wide and is headquartered in Heerlen, the Netherlands. The United States is DSM's biggest country by sales and shareholder base, with approximately 4,000 employees and 35 sites.

DSM has been in continuous operations for more than 100 years. "Dutch State Mines" or DSM, originally a coal mining company has transformed itself through acquisition and divestiture into a global leader in moving to a low carbon, circular economy rebranding the DSM acronym to mean "Do Something Meaningful."

This has translated into a continuous effort to reduce DSM's carbon footprint and create more sustainably products in the United States and globally, and to work with developing nations to ensure that they have the tools to be a contributor to the world economy.

DSM is unique as a publicly traded company as it ties DSM executives' compensation to sustainability goals. Specifically, up to 50% of DSM's variable executive compensation is tied to achievement of sustainability goals. DSM also engages in integrated annual reporting, which includes its financial results alongside its sustainability results.

DSM is engaged in an ongoing partnership with Department of Energy to reduce energy consumption by 20%; it made a \$200 million foreign direct investment in a commercial scale cellulosic biofuels plant in Emmetsburg, Iowa; DSM created a 6 MW solar field project that produces approximately 30-40% of its Belvidere, NJ manufacturing plant's electricity needs at peak production and offsets CO2 emissions from the grid by more than 4,563 Metric Tons annually; it is engaged in innovative research to reduce carbon exemplified by DSM's Clean Cow initiative that will reduce bovine methane emissions by up to 30%; and DSM participates in long-standing efforts to reduce global hunger and malnutrition, including its partnership with the United Nations World Food Programme, Partners in Foods Solutions, USAID, Global Health Corp, World Vision and others.

DSM makes the following pledges:

- DSM will move all operations, on 6 continents, to 100% renewable energy. DSM will move to 50% renewable energy by 2025.
- DSM will maintain an internal Carbon Price of €50/ton
- DSM will reduce its Green House Gas Emissions by at least 25% by 2020
- DSM will improve its energy efficiency by 20% by 2020
- DSM will continue to tie Executive Compensation to meeting sustainability targets.

EMC

In support of our goal to achieve 80% absolute reduction in greenhouse gas emissions by 2050 in accordance with the 2007 Bali Climate Declaration, EMC Corporation pledges to:

- Realize a 40 percent absolute reduction of global Scope 1 and 2 GHG emissions below 2010 levels by 2020
- Obtain at least 20 percent of global grid electricity needs from renewable sources by 2020
- Have all hardware and software products achieve increased efficiency in each subsequent version by 2020

- Reduce energy intensity of storage products 60 percent at a given raw capacity and 80 percent for computational tasks from 2013 to 2020

ENERGY OPTIMIZERS

Energy Optimizers, USA pledges to:

- Reduce greenhouse gas emissions by 100%, compared to a 2005 baseline, by 2017
- Deploy 100% of our energy needs utilizing renewable energy by 2017 by utilizing solar, hydrogen and fuel cells
- Improve energy efficiency across 2,134 square feet of our company property by at least 45% by 2017
- Eliminate deforestation from the production of agricultural commodities by 2020, in alignment with the 2014 New York Declaration on Forests
- Develop long-term business plans that align with the deep de-carbonization necessary to keep global average temperatures from rising less than 2C

ENER-G RUDOX

ENER-G Rudox, Inc. pledges to:

- Reduce greenhouse gas emissions by 25%, compared to a 2005 baseline, by 2025
- Improve energy efficiency across all company properties by at least 20% by 2025
- Increase investment in low-carbon, climate-resilient, and/or green projects by 50% by 2025
- Develop both short and long-term business plans that emphasize sustainability
- Proactively support the massive global effort needed to keep mitigate global warming

FACEBOOK

Facebook pledges to:

- We are committed to powering our operations with 100% clean and renewable energy.
- In 2012, we set ourselves the goal of having 25% of our energy in 2015 come from clean and renewable sources. We are on target to exceed that goal.
- We have doubled our previous target, setting a new goal of having 50% of our energy in 2018 come from clean and renewable sources
- We have designed and built some of the world's most energy- and water-efficient data centers - and will continue to invest in innovation in our infrastructure aimed at improving their efficiency even further.
- We have open-sourced our hardware and data center designs, and will continue to collaborate openly to drive efficiency improvements across the industry.

- We are working actively with dozens of other companies to scale up corporate purchases of renewable energy - sharing best practices and collaborating on policy changes to increase the options available so that more companies can buy more renewable energy.
- We believe in being open and transparent about our environmental performance. We have disclosed facility-level detail on our carbon and energy footprint for the last 4 years, and starting this year are including details on our water footprint. We also have public real-time dashboards for our data centers letting everyone see how efficiently they are operating.
- Access to clean and renewable energy is a key criterion in our site selection process for new data centers.

FULCRUM BIOENERGY

Fulcrum BioEnergy, Inc., a leader in the development of low carbon drop-in transportation fuels from municipal solid waste, hereby pledges to:

- Develop and construct projects that will produce more than 300 million gallons per year of jet fuel, diesel and bio-crude by 2025;
- Produce low carbon fuels that reduce GHG emissions on a lifecycle basis by more than 80% compared to petroleum-based fuels; and,
- Produce these drop-in fuels from municipal waste streams that would otherwise be landfilled and don't compete with food supplies.

GE

Since its 2005 launch, Ecomagination – GE's commitment to accelerate the development of technology solutions that save money and reduce environmental impact for its customers and own operations – has invested \$15 billion in R&D and generated more than \$200B in revenue. GE's operations have seen a 31 percent reduction in greenhouse gas (GHG) emissions since 2004 and a 42 percent reduction in freshwater use since 2006, realizing more than \$300M in savings.

- Last year, Ecomagination extended its commitments to 2020 with new goals: to invest an additional \$10B in cleaner technology research and development; and to further reduce GHG emissions and freshwater use of GE operations by 20 percent from the 2011 baseline which aligns the company with the global goal of keeping warming to less than 2 degrees C.
- GE Ecomagination believes companies can be a positive force for change while also delivering for investors. Ecomagination has achieved both. As one of GE's most successful business initiatives, Ecomagination brings strong returns for shareholders and improved cost and emissions savings for our customers.

GENERAL MILLS

General Mills has long been committed to being part of the solution on climate change. Since 2005, we have reduced our absolute greenhouse gas emissions by 13 percent within our direct operations. Now, we are furthering our commitment by announcing a goal to reduce greenhouse gas emissions across our entire value chain – from farm to fork to landfill – over the next 10 years.

Our goal, developed using science-based methodology, is an ambitious one. We pledge to:

- A [-28%] absolute reduction in greenhouse gas emissions by 2025, using a 2010 baseline.
- Our long term aspiration is to achieve sustainable emission levels in line with scientific consensus by 2050.

In addition to mitigation, we recognize the importance of adaptation in building resilience. For this reason, we commit to supporting climate adaptation programs for key regions, particularly in key commodities.

General Mills has also made other significant commitments in the area of sustainable agriculture:

- We will sustainably source 100% of our top 10 ingredients by 2020. These ingredients include vanilla, cocoa, palm oil, fiber packaging, sugar cane, wheat, oats, dairy and dry milled corn. Together, they represent 50% of our total ingredient buy.
- Eliminate deforestation from the production of agricultural commodities by 2020, in alignment with the 2014 New York Declaration on Forests

Finally, we realize that this level of ambition cannot be realized by one company alone. For this reason, we are signatories to UNGC, BICEP, We Mean Business, the New York Declaration on Forests and Climate Counts.

We believe that by advancing our commitment now, we have an opportunity to encourage others to do the same, establish new partnerships, and together, make real progress towards more sustainable emission levels for our planet and future generations.

GENERAL MOTORS

General Motors pledges to:

- Reduce energy intensity from facilities 20 percent by 2020 over a 2010 baseline.
- Promote use of 125 megawatts of renewable energy by 2020 over a 2010 baseline.

- Reduce carbon intensity from facilities 20 percent by 2020 over a 2010 baseline.
- Reduce water intensity 15 percent by 2020 over a 2010 baseline.
- Reduce total waste 40 percent by 2020 over a 2010 baseline.
- Achieve 150 landfill-free facilities by 2020 and set an aspirational goal to have all manufacturing sites send zero waste to landfill.
- Maximize vehicle efficiencies and reduce carbon emissions around the globe while meeting a variety of customer needs.
- Help make electrified vehicles become more mainstream.
- Collaborate with others and proactively look for sustainability opportunities that collectively drive economic, environmental and social improvements.

GOLDMAN SACHS

Goldman Sachs pledges to:

- Goldman Sachs has had a long standing commitment to harness markets and deploy capital to scale-up clean energy technologies and facilitate the transition to a low carbon energy future. In 2012, we established a ten year goal to finance and invest \$40 billion in clean energy globally. Three-and-a-half years into that goal, we have already mobilized \$33 billion of capital for solar, wind, smart grid and other clean technologies. We expect to achieve the full goal within the next year and will commit to establish a larger 2025 target to deploy capital to clean tech and renewable energy.
- We will also harness financial mechanisms to help our clients strengthen their physical resiliency and more effectively manage risks relating to weather extremes. Since 2006, we have structured over \$14 billion of weather-related catastrophe bonds. As part of our continuing efforts in providing risk management solutions, we will facilitate new models that can evaluate the financial benefits of increased investments in physical resiliency.
- Recognizing the importance of reducing our own carbon footprint, we pledge to achieve carbon neutrality across our operations and business travel in 2015 and maintain it thereafter. We will also aim to use 100% renewable power to meet our global electricity needs by 2020. Finally, by 2020 we will strive to reduce absolute energy use across our occupied operationally-controlled facilities by at least 10% from a 2013 baseline.

GOOGLE

Google pledges to:

- Renewable energy: Google is committed to powering our operations with 100% renewable energy. We have purchased 1.1 gigawatts of renewable energy to power our data centers, and we commit to tripling our purchases of renewable energy by 2025. We believe that by directly

investing in renewable energy projects, we can help accelerate the shift to zero-carbon power and create a better future for everyone. We commit to continuing our \$2 billion/2.5 gigawatts cumulative investments in transformative global clean energy projects, including major investments by 2025 in emerging markets, where there is both great need and great potential.

- **Transportation:** Google shuttles and corporate electric vehicles result in net annual savings of 29,000+ metric tons of CO₂, equivalent to taking 5,700 cars off the road or avoiding 87M vehicle miles every year. In our Bay Area headquarters we commit to reducing single occupancy vehicle commuting to 36%, a 10% reduction from today, by transitioning our employees to shuttles, carpool, public transit, biking, and walking.
- **Water Usage:** Google is committed to reducing our water consumption, particularly in the drought-ridden Western United States, through the use of recycled water irrigation, drought tolerant plants, less turf grass, fixture replacements and employee awareness efforts. After exceeding our 20% energy, water and waste reduction goals in 2014 associated with the California Best Buildings Challenge, we are now targeting a 30% reduction in potable water use by our Bay Area headquarters in 2015 from our 2013 baseline.
- **Products and Platforms:** Google's products help drive carbon mitigation efforts and inform climate science. Our Google Earth Engine geospatial analysis platform makes more than 40 years of satellite imagery available online so scientists and researchers can analyze real-time changes to the Earth's surface. Through the Climate Data Initiative, we provided one petabyte of cloud storage for data and climate/weather models, plus 50 million hours of high-performance cloud computing. We commit to continuing to develop products and platforms that can help reduce emissions and bring the power of cloud computing to climate science.

HERSHEY'S

Since 2009, the Hershey Company has been actively focused on reducing our greenhouse gas emissions and our impact on climate change, as well as reducing our impact on a variety of environmental stewardship fronts, realizing a 23% reduction in GHG emissions from operations during that time. Additionally, we have taken aggressive steps to source 100% RSPO sustainable palm oil. We have also initiated a partnership with The Forest Trust to trace our palm oil purchases and ensure our suppliers are not developing on peat areas and are identifying and reducing greenhouse gas emissions in their operations, two key factors that impact climate change. Finally, we have also partnered with Wildlife Works to purchase carbon credits to offset the unavoidable emissions from our sales and corporate fleet of vehicles.

Building on our 2014 pledge to deploy further actions to reduce greenhouse gas emissions, water use, waste and increase recycling in our operations by 2017, The Hershey Company pledges to:

- Reduce greenhouse gas emissions by 50% by 2025, compared to a 2009 baseline, augmenting the 23% reduction we have already achieved
- Trace 100% of our palm oil purchases to the mill level by 2015 and to the plantation level by 2016, ensuring the palm we purchase is deforestation-free and grown and processed sustainably, in alignment with the 2014 New York Declaration on Forests
- Expand the utilization of electric vehicles in our corporate fleet, and continue to purchase carbon credits to offset unavoidable emissions in our sales and corporate fleet of vehicles while concurrently reducing these emissions
- Achieve zero waste to landfill status at all Hershey facilities by 2025, building on our existing roster of 11 zero waste to landfill facilities
- Save, an additional 25 million pounds of packaging material by 2025, augmenting the 16 million pounds we have already saved since 2009
- Improve our company-wide recycling rate to 95% by 2025, up from our 2009 baseline of 72%
- Reduce absolute water use by an additional 25% by 2025, building on our existing progress of reducing water use by 70% since 2009

Hewlett Packard (HP)

HP Living Progress is our framework for thinking about how we do business. It's the way we integrate sustainability into our business strategy, building on a commitment we articulated in our company objectives in 1957 and have reaffirmed every year since.

With a rapidly growing global population and finite resources, "business as usual" is no longer an option. Through HP Living Progress, we make the environment stronger as we grow by improving the efficiency of our supply chain, operations, and products and solutions, as well as by making community investments that help tackle sustainability challenges. To this end, HP pledges to:

- Reduce greenhouse gas emissions by 20%, compared to a 2010 baseline, by 2020
- Purchase 115 MW of renewable energy by 2020
- By 2020: Decrease first-tier manufacturing and product transportation-related GHG emissions intensity in our supply chain by 20% compared with 2010.
- By 2020: Reduce the emissions intensity of our product portfolio** by 40% compared to 2010 levels.

- Reduce fresh water consumption (per employee) at HP office sites 20% by FY2020 compared to FY2010 baseline
- Explore long-term business plans that align with the deep decarbonization necessary to keep global average temperatures from rising less than 2C.

IBERDROLA USA

With more than 6,000 megawatts (MW) of renewable electricity generation, 8,344 miles of electric transmission lines, 18,952 miles of natural gas distribution lines and 67,430 miles of electric distribution lines, and 67.5 billion cubic feet (Bcf) of natural gas storage, Iberdrola USA's energy businesses are contributing to *America's clean, affordable and energy independent future.*

Iberdrola USA has invested billions of dollars in electricity distribution and transmission networks, renewable electricity generation, natural gas distribution networks, natural gas storage facilities, and smart grid technologies in the United States.

Iberdrola USA is a subsidiary of Iberdrola S.A. an international energy company that is the largest wind energy generator in the world and a leader in the battle against climate change. The company's emissions per kilowatt-hour (kWh) are already 30% lower than the average of the European electricity sector and significantly lower than the U.S. average. Iberdrola S.A. recently committed to globally reducing the company's overall greenhouse gas emissions intensity by 50% in 2030 compared to 2007 levels and to become carbon neutral by 2050.

As part of Iberdrola USA's continued commitment to reducing our carbon footprint in the United States, setting targets to reduce emissions, raising public awareness of the consequences of climate change and incorporating climate risk management into our business plans, Iberdrola USA pledges to:

- Align with Iberdrola S.A.'s commitment to reduce greenhouse gas emissions in the United States and achieve Iberdrola S.A.'s carbon intensity and carbon neutrality objectives.
- Add to our more than 6000 MW of renewable electric generation capacity in the United States. Iberdrola USA has identified and commits to build at least another 446MW of new wind generation in the United States. With the appropriate market conditions and regulatory environment, Iberdrola USA stands ready to develop additional wind and solar projects throughout the country.
- Pursue investments in transmission infrastructure in New England and New York to support the integration of renewable energy onto the grid, including providing better access to the New

England grid for renewable resources in western and northern Maine and adjacent Canadian provinces, and providing enhanced transmission capacity between renewable resources in New York's upstate counties and the New York metropolitan area.

- Improve resilience and reliability of energy infrastructure to extreme weather and climate change impacts through increased use of technology and automation, operations and maintenance procedures, and focused capital investments. Partner with the Department of Energy through the *Partnership for Energy Sector Climate Resilience* to develop and pursue strategies to reduce climate and weather-related vulnerabilities. Utilize the Department of Energy's Value of Service model to develop a cost benefit and prioritization model for system hardening investments.
- Support the continued development and interconnection of new customer-owned generation sources which now total nearly 5,000 small-scale customer-owned facilities feeding into our existing grid.
- Introduce new grid technology to provide faster, lower cost integration for renewable energy resources up to 2 megawatts.
- Commit at least 5 percent of annual fleet acquisition dollars to plug-in electric technologies and, through the Iberdrola Foundation promote third-party PV charging station installations through grants to businesses, non-profits, and municipal governments in communities served by our electric utilities.
- Maintain ISO 14001:2004 certification for environmental leadership in project engineering and management, to develop and maintain the grid serving the region's renewable energy resources at the highest environmental standards.

IBM

IBM has been a global leader regarding energy efficiency and the reduction of greenhouse gas emissions for decades. For example:

- Between 1990 and 2014 IBM saved 6.8 million megawatt hours of electricity consumption, avoided 4.2 million metric tons of CO2 emissions, and saved \$550 million through energy conservation actions.
- We have deployed new I/T solutions developed by IBM for managing the energy efficiency of buildings and data centers. These solutions have typically driven 10% reductions in energy consumption for the systems they monitor.
- In 2014 we used 683,000 megawatt hours of renewable electricity, representing 14.2% of IBM's global electricity consumption and a 17.9% increase from 2013.
- We have already reduced IBM's operational CO2 emissions over 25% against a 2005 baseline.

We put forth our pledges as follows:

- Reduce CO2 emissions associated with IBM's energy consumption 35% by year-end 2020 against base year 2005 adjusted for acquisitions and divestitures.
- Procure electricity from renewable sources for 20% of IBM's annual electricity consumption by 2020.
- Achieve annual energy conservation savings equal to 3.5% of IBM's total energy use.

IKEA USA

At IKEA, sustainability is central to our business. Because climate change is one of the biggest challenges facing society, IKEA Group and IKEA Foundation this year made bold new commitments totaling 1 billion in funding to accelerate the transition to a low-carbon economy and support the communities most at risk. In June, the IKEA Group committed 600 million for investment in renewable energy, building on the 1.5 billion invested in wind and solar energy since 2009. In addition, the IKEA Foundation has committed 400 million of funding to support the communities most impacted by climate change.

Looking forward, we put forth our additional pledges as follows:

IKEA pledges to:

- Produce as much renewable energy as the total energy we consume in our global operations by 2020. This is already the case in the US, where the IKEA Group's wind farm in Hoopston, IL is on target to produce 165% of the electricity and 130% of the energy equivalent to that consumed by IKEA US operations. In addition, the IKEA solar presence in the US consists of 42 solar projects across nearly 90% of IKEA US locations.
- Become 30% more energy efficient in our own operations by August 2020, compared to FY10.
- Reduce carbon emissions from the transport of goods by 30% by 2020 (in relative terms) compared with FY12, for example by reducing the number of shipments through improving our ordering process, equipment, packaging, and net cubic meters of transported goods per shipment, and by increasing the use of rail, barge, and sea rather than road transport.
- Encourage and enable our direct suppliers to become 20% more energy efficient by August 2017, compared to FY12 (defined as total energy consumed/m³ of goods).
- Take the lead in developing and promoting products and solutions that inspire and enable people to live a more sustainable life at home, and achieve more than a fourfold increase in sales of those products and solutions by August 2020, compared to FY13.
- By August 2020, we will contribute to FSC certification of another 10 million hectares of forest in priority areas – which is equivalent to more than double the total area needed to supply IKEA.

This is in addition to 35 million hectares of FSC forest already added through our earlier partnership projects.

- By August 2020, we aim to source 100% of our wood, paper and cardboard from more sustainable sources (currently defined as FSC certified or recycled wood).
- By August 2020, 90% of the waste from our own operations will be recycled or energy recovered, of which 80% of the waste from stores and distribution centers and 90% from IKEA Industry Group will be material recycled.

INGERSOLL RAND

Ingersoll Rand, a world leader in creating comfortable, sustainable and efficient environments, is committed to addressing the unsustainable global demand for energy resources and its impact on the environment for our employees, customers and shareholders.

Ingersoll Rand pledges to:

- Reduce emissions from our products and our operations by over 20 MMT (metric tons) CO₂e by 2020 and expect to cut 50 MMT CO₂e by 2030.
- Invest \$500 million in product-related research and development over the next five years to fund the long-term reduction of GHG emissions without compromising energy efficiency or safety.

INTERNATIONAL PAPER

International Paper is a leader in the use of renewable energy to manufacture our products. Approximately 70 percent of the energy used in our global mill system is self-generated using renewable carbon neutral biomass residuals. Our use of biomass residuals for energy displaces significant fossil fuel use and related GHG emissions.

From a 2010 baseline, we improved energy efficiency by 6 percent (14 trillion Btu/year) and reduced our absolute greenhouse gas emissions by 8 percent (1.4 million tons of CO₂e a year). Since 2012, International Paper has invested \$424 million globally in energy projects yielding great results.

International Paper's 2020 Sustainability goals include pledges over the next five years that will:

- Reduce absolute greenhouse gas (GHG) emissions by 20 percent (3.4 million tons of GHEc a year)
- Improve purchased energy efficiency by 15 percent (34 trillion Btu/year)

These pledges build on International Paper's ongoing sustainability goals established in 2010 which continue to improve our manufacturing efficiencies.

International Paper is committed to responsible forestry around the world and is a leader in the international effort to stop illegal logging and ensure timber legality in the global supply chain. International Paper supports robust, ambitious measures in the Trans-Pacific Partnership (TPP) agreement and future agreements like the Transatlantic Trade and Investment Partnership (TTIP) that advance greater international action to combat illegal logging.

INTEL

Over 20 years ago, Intel established public environmental goals to reduce its environmental footprint, including greenhouse gas emissions. Since 2000, we have reduced our absolute greenhouse gas emissions nearly 40% and our emission intensity by approximately 60%. That substantial progress has been accomplished in part due to aggressive efforts to reduce our emissions of fluorinated gases, a critical component in semiconductor manufacturing. We have installed 20 on-site renewable energy projects to date and will purchase over 3 billion kW-hrs of green power this year, making Intel the largest purchaser in the US for the 7th consecutive year.

To further build on these efforts we pledge to accomplish the following by 2020:

- Continue 100% green power in our US operations and increase renewable energy use for our international operations
- Grow the installation and use of on-site renewable energy to triple our current levels
- Building upon our 60% reduction in emission intensity, further reduce our greenhouse gas emission intensity an additional 10% over a 2010 baseline
- Achieve 4 billion kW-hrs of energy savings through implementation of energy efficiency projects at our global facilities
- Build all new buildings to high energy efficiency standards by meeting the US Green Building Council's LEED gold designation or better
- Increase the energy efficiency of our notebook and datacenter products 25 fold from a 2010 baseline

In addition to the numerical goals above we will aggressively deploy new products and technologies that assist others in reducing their carbon emissions and we will publically track our progress to reduce our carbon footprint and compare our results to a widely-accepted international benchmark, the IPCC's 2050 target.

INTEX SOLUTIONS, INC.

Intex Solutions, Inc. pledges to continue our efforts to be leaders in energy and water conservation, and set an example for other enterprises.

- Intex Solutions, Inc. installed solar panels on our headquarters building 15 years ago.
- We measure all remaining carbon emissions and pays for offsets through the *Carbon Fund*
- Measures all the electricity used while providing services in our clients buildings and pays for offsets to the *Carbon Fund* for any emissions related to that usage
- Won an Environmental Protection Agency (EPA) Small Business Award for energy saving measures such as lighting retrofits and giving employees energy efficient bulbs for their homes.

INVENERGY

Building on our track record of leadership in the development and operation of no- and low-carbon energy technologies, Invenergy pledges to:

- Increase our total deployment of renewable energy capacity by 30% by 2025, relative to today's baseline of 4,746 megawatts.
- Supply American utility, commercial and industrial companies with 1 gigawatt of new wind and solar generation by 2020.
- Double our total deployment of advanced energy storage by 2020 from our 2015 total of 68 megawatts, which will enable additional deployment of renewables.

JOHNSON AND JOHNSON

At Johnson & Johnson, we understand the intrinsic link between a healthy environment and human health. As the world's largest and most broadly-based health care company, our mission is to help people live longer, healthier and happier lives. Our Credo defines our responsibilities to people and the planet, and our citizenship and sustainability practices are an important part of fulfilling this commitment.

As part of our 2020 Citizenship & Sustainability Goals and as a continuation of our legacy in stewarding a healthy environment, we have established new science-based climate goals:

- Reduce our absolute carbon emissions by 20% by 2020 and 80% by 2050; and,
- Produce/Procure 20% of our electricity from clean/renewable energy sources by 2020; and, aspire to power all of our facilities with renewable energy by 2050.

JOHNSON CONTROLS

Johnson Controls, a global multi-industrial company, has made public commitments to reduce greenhouse gas emissions and improve sustainability since 2003. From 2002

through 2014, we reduced our global greenhouse gas intensity by 41 percent and our energy intensity by 40 percent. Additionally, we have already achieved 21 percent of our 25 percent ten year energy intensity reduction goal in only five years as part of the U.S. DOE Better Plants Challenge. We have also recently established updated corporate targets for the reduction of greenhouse gas emissions, energy, water and waste.

From a 2014 baseline, Johnson Controls pledges the following by 2020:

- Reduce greenhouse gas intensity (in metric tons/revenue) by 15 percent
- Reduce energy intensity (in gigajoules/revenue) by 15 percent

In addition, Johnson Controls pledges to provide our small and medium enterprise suppliers with energy management tools and training to help them become more energy efficient, sustainable and competitive. We also commit to invest in the development of new products that expand our use of low-GWP alternatives to HFC refrigerants that best meet the safety, efficiency, reliability, availability, and financial requirements of our customers.

KELLOGG'S

The purpose of Kellogg Company is to nourish families so they can flourish and thrive — from the farmers who grow our ingredients, to the employees who bring our values to life, and the consumers who buy our foods, all of whom want a better world for generations to come. We support the implementation of a strong climate change agreement coming out of Paris that ultimately puts us on a path toward a low-carbon, sustainable future.

The body of science behind climate change has grown clearer and more focused. We recognize that failure to address global warming will make it difficult for Kellogg to continue to meet global food demand and ensure future generations will have a higher quality of life. Kellogg takes a comprehensive approach to reducing our environmental footprint by reducing our carbon emissions; the amount of waste we generate; and, the amount of natural resources we use. We are committed to participating in multiple programs addressing climate risk and transparency, including President Obama's Climate Data Initiative and the U.S. Department of Agriculture's Global Open Data for Agriculture & Nutrition Initiative, and organizations such as Business for Innovative Climate & Energy Policy (BICEP) and the Bipartisan Policy Center (BPC).

As a leading global food company, today Kellogg is pledging to take additional steps, including to:

- Further reduce energy and GHG emissions by an additional 15% from 2015 performance;
- Announce by the end of the year an even more aggressive overall carbon reduction goal that's tied to the science, limiting further warming to 2 degrees Celsius, and which includes our agricultural supply chain;
- Expand the use of low carbon energy in plants by 50% by 2020;
- Implement water reuse projects in 25 percent of plants by 2020, and further reduce water use by an additional 15% from 2015 performance;
- Increase to 30% the number of plants sending zero waste to landfill by 2016;
- Achieve zero net deforestation by 2020 in high-risk supply chains including soy, palm oil, timber, fiber and soy; and
- Support livelihoods for 500,000 farmers, many of whom are women, through partnerships, research and training on climate smart agriculture which helps farmers adapt to climate change while assuring productivity of their yields and reducing greenhouse gas emissions from their agricultural practices.

KINGSPAN INSULATED PANELS, INC.

Building on a 2010 Kingspan Global Corporate pledge Kingspan Insulated Panels – North America pledges to:

- Savings of 1.4% per year beyond achieving the Better Plants goal (25% improvement in energy intensity) in 2015, cumulative CO₂ emissions avoided by the end of the current pledge period (2021) is 10,615,053 kg.CO₂.eq. By extending the pledge beyond 2021 with the same rate (1.4% per year), by the end of year 2025 Kingspan would achieve ~39% improvement in energy intensity. This is equivalent to avoiding CO₂ emissions of 12,882,490 kg.CO₂.eq.
- These Improvements energy efficiency and related Greenhouse Gases reductions are across 452,850 square feet of operations property in the United States. Kingspan's Insulated Metal Panel products also contribute to high thermal performance as exterior enclosure solutions that reduce Demand Side Energy and related Greenhouse Gases. These products are specified on commercial/industrial projects and contribute to "green" building performance criteria.

LAKESHORE LEARNING MATERIALS

Lakeshore Learning Materials pledges to:

- Invest \$1 million in solar panels that will be installed by 2018 and will produce an estimated 4,500 MW of renewable energy by 2025
- Avoid 3,600 tons of greenhouse gas emissions by 2025 through the use of solar power

- Install motion-activated restroom fixtures that will reduce water use by 42,000 tons and conserve 68 tons of paper by 2025
- Conserve energy and resources with an active recycling program that will include the reuse of over 8,000 tons of cardboard by 2025
- Continue to invest in green projects similar to those Lakeshore has launched over the last several years, including the installation of electric vehicle charging stations, a switch to lower-impact packing materials, and the creation of a complete line of low-emission, environmentally friendly furniture

LAM RESEARCH

In 2011, Lam formalized public environmental targets to reduce our environmental footprint, including energy and hazardous waste. Since 2011 we have reduced our energy consumption intensity by 21% and our hazardous waste generation intensity by 74%.

To further build on these efforts we pledge to target the following by 2020:

- Increase renewable energy consumption in our domestic operations to 25%
- Reduce our greenhouse gas emission intensity by 20% from a 2012 baseline
- Achieve an accumulated 14 million kW-hrs of energy savings intensity through implementation of energy efficiency projects at our global facilities from a 2012 baseline
- Build all new buildings to EPA Energy Star standards
- Consistently increase the product and service offerings that enable customers to reduce energy usage, chemical consumption, and greenhouse gas emissions in their operations

In addition to the goals above, we cascade our environmental management system requirements and expectations throughout our supply chain. Lam publicly tracks and makes available our sustainability progress in our annual Corporate Social Responsibility (CSR) report and we benchmark performance to other leading companies in the semiconductor industry.

LEVI STRAUSS & CO.

At Levi Strauss & Co., we believe that climate change mitigation is vital to the long-term success of our business, and the health and well-being of the people who make and buy our products. We've been working for decades to reduce our environmental impact in our operations and supply chain. Our vision is to reduce carbon dioxide and other greenhouse gases through maximizing energy efficiency and using 100% renewable energy — first in our operations and then throughout the supply chain — and to continue to build sustainability into everything we do. We have been, and will

continue to be, outspoken champions for public policies aimed at reducing greenhouse gases.

Levi Strauss & Co. pledges to:

- Reduce greenhouse gas emissions 25% by 2020 in our office, retail and distribution locations.
- At our owned and operated manufacturing plants, reduce greenhouse gas emissions 5% annually per product shipped.
- Purchase a minimum of 20% of our energy from renewable sources by 2020.
- Ensure that no forest-based materials that originate from the world's ancient and endangered forests enter into our supply chain by 2020.

L'OREAL USA

By the year 2020, L'Oreal will:

- Reduce CO2 emissions at our plants and distribution centers by 60% in absolute terms, from a 2005 baseline.
- Reduce our water consumption by 60% per finished product unit, from a 2005 baseline.
- Reduce waste by 60% per finished product unit, from a 2005 baseline.
- Send zero waste to landfill.
- Reduce our CO2 emissions from transportation of products by 20% per finished product unit from a 2011 baseline.
- Source 100% renewable raw materials from sustainable sources. We also confirm our ambition to “Zero Deforestation” to include:
 - By 2020, the goal is 100% of palm supply will be free from deforestation.
 - By 2020, the goal is to have 100% certified board and paper for packaging and POS (promotional material)

MARS

Mars, Incorporated has established a set of ambitious, science-based goals designed to drive our global operations toward being Sustainable in a Generation (SIG). Under these SIG goals, and as part of our broader sustainability programs, Mars pledges to:

- Reduce our dependence on fossil fuels and eliminate 100% of GHG emissions from our operations by 2040. We are on track to reduce our 2015 GHG emissions by 25% (from a 2007 baseline)
- Pursue renewable energy projects around the world that are modeled after the 118-turbine, 200mw wind farm we brought online in 2015 and which now provides the equivalent of 12% of

our global energy requirements, 100% of our U.S. power needs, and has eliminated 24% of our global GHG

- Achieve zero waste to landfill across all of our facilities globally by the end of 2015
- Build all of our new sites globally to the LEED Gold Standard
- Continue to build on our current deforestation policy, which covers the key raw materials in our supply chain (including palm oil, beef, pulp, paper and soy), and source only from producers and suppliers who agree to our strict sourcing standards
- Use our voice, our expertise and our position as a leading global company to identify and advance innovative carbon reduction measures within the agriculture and food sectors, and continue to encourage governments to set clear, achievable, measurable and enforceable science-based targets for carbon emissions reductions.

McDONALD'S CORPORATION

McDonald's believes climate change presents a significant global challenge that, if left unaddressed, will have far-reaching implications for generations to come. As a global food company, we depend on healthy ecosystems and communities around the world to help produce the food and beverages our customers love. As a modern and progressive burger company, we recognize the role we play in addressing this important challenge and doing what we can to reduce our carbon footprint. We aspire to develop and operate the most environmentally-efficient McDonald's restaurants and to source our food and packaging sustainably.

McDonald's puts forth our pledges as follows:

Deforestation: As demonstrated by our endorsement of the United Nations' New York Declaration on Forests in 2014 and our Commitment on Deforestation made in April 2015, McDonald's is committed to eliminating deforestation from our global supply chain. We will focus our initial efforts on beef, fiber-based packaging, palm oil, coffee, and soy used for beef & poultryfeed, given their link to deforestation. We will share time-bound deforestation-free targets for these priority products by the end of this year.

Beef: McDonald's supports the sustainable production of beef. We helped found the Global Roundtable for Sustainable Beef (GRSB) to bring together key stakeholders around a common purpose. In 2014, the GRSB led a collaborative effort to finalize global principles and criteria for sustainable beef production which, among other focus areas, involves managing natural resources responsibly and working to enhance

ecosystem health. We are developing goals and will begin purchasing a portion of our beef from verified, sustainable sources starting in 2016.

Palm Oil: By 2020, our goal is for 100% of the palm oil used in our restaurants worldwide and as an ingredient in McDonald's products to be verified as having come from a system that supports sustainable palm oil production. We will continue encouraging McDonald's palm oil suppliers to move toward traceable and transparent palm oil supply chains as a way to ensure no deforestation.

Fiber: By 2020, our goal is to source 100% of fiber-based packaging from recycled or certified sources. As the first global restaurant business in World Wildlife Fund's (WWF) Global Forest & Trade Network, we support its initiative to eliminate illegal logging and transform the global marketplace to save the world's valuable and threatened forests.

Coffee: By 2020, our goal is to have 100% of our coffee verified as supporting sustainable production. We will work with globally recognized programs and provide support for coffee farmers through initiatives such as our technical assistance project in Guatemala

Restaurant Energy:

- **Energy Efficiency:** Our goal is to increase energy efficiency 20% by 2020 in company-owned restaurants in our top markets, with a focus on restaurant design standards, equipment innovation and operational practices. As we continue to advance our strategic work in this area, we expect to evolve the structure, metrics, and scope of these aspirations in the next year using an appropriate baseline.
- **Renewable Energy:** McDonald's USA is a signatory to the Corporate Renewable Energy Buyers' Principles, developed by WWF and World Resources Institute (WRI). We support a shared mission to increase access to cost-competitive renewable energy across the McDonald's U.S. system.
- In 2014, the McDonald's company-owned restaurants and franchisees in Europe purchased 76% of their electricity from renewable sources across 21 markets, 10 of which have achieved or are working toward purchasing 100% renewable electricity. McDonald's U.K. has committed for a 20-year period to purchase renewable energy directly from new infrastructure.

Restaurant Waste & Recycling: Our goal is to minimize waste and increase the amount of in-restaurant recycling to 50% by 2020 in our top markets, which involves efforts such as packaging optimization and expanding our recycling of materials including corrugated cardboard and used cooking oil.

MICROSOFT

At Microsoft, we're committed to driving environmentally sustainable business practices and catalyzing technology innovations that help people and organizations around the world to realize a sustainable future. Microsoft pledges to:

- Maintain carbon neutral operations for our datacenters, offices, labs, manufacturing facilities, and business air travel.
- Purchase 100% renewable energy for the operations of our datacenters, offices, labs, and manufacturing facilities.
- Offset 100% of emissions from business air travel through supporting carbon offset projects that also drive social benefits in emerging nations.

MONSANTO

Monsanto pledges to:

Internal Operations

- Monsanto GHG Operational Footprint Goal- Reduce Crop Protection Greenhouse Gas Emissions by an additional 22% on a per product basis by 2020 (baseline 2010). This represents a cumulative reduction of 45% from 2002.
- Company Commits to Increase Irrigation Water Efficiency Across Operations, Saving 30 to 80 Billion Gallons of Fresh Water Every Year by 2020 (baseline 2010).

Collaborations and offerings to growers:

- Climate Corporation provides growers have the opportunity to utilize data analytics and monitor nitrogen in corn production on a field by field basis. This is one of several features that supports sustainable intensification- maximum productivity with the optimal amount of inputs.
- Through collaborations Monsanto will safely and sustainably innovate through advanced breeding and biotechnology to advance new plant varieties and hybrids as well as precision management tools that give farmers more choices to measurably improve nutrient use efficiency and curb greenhouse gas emissions on at least one million acres in the United States by 2020.
- Through collaborations Monsanto will drive cover crop research trials on over 100 locations across the Midwest to validate economic and yield benefits to both growers and society.
- University of Chicago research compared the impact of the 2012 drought relative to the last significant drought in 1988 and the impact of improved technology for farmers. That research showed that if farmers in the 2012 drought had been limited to the same agronomic choices they had in 1988, production would have been reduced by 25 percent. Monsanto has recently supported the extension of this work to understand the impact that changes in climate and water availability could have on North American crop production

NIKE

At NIKE, everything we do begins with the athlete. We know that climate-related issues like pollution may impact an athlete's ability to perform. That's why NIKE, Inc. has been working for over a decade to cut energy use and greenhouse gas emissions throughout our value chain. We will continue to harness the power of sustainable innovation to reduce our impacts and help protect the future of sport. As part of this work NIKE, Inc. pledges to:

- **Reach 100% renewable energy in our owned or operated facilities by 2025.** NIKE, Inc. already sources renewable energy through on-site generation at some global facilities, and we are actively exploring advancing on-site renewable energy generation at additional owned or operated facilities. To supplement the on-site generation, we will look to procure off-site renewable energy. This will include all owned or operated facilities where NIKE is responsible for energy purchasing decisions. Additionally, NIKE will continue the work that we have led for more than a decade with contract factories to help them implement programs to understand their energy use and climate impacts, increase their energy efficiency, and reduce their carbon emissions.
- **Participate in the Better Buildings Challenge, run by the U.S. Department of Energy.** In line with the challenge criteria outlined by the USDOE, NIKE, Inc. has committed to reducing energy consumption over a ten year period in a majority of owned or operated facilities within the U.S. portfolio by 20% and will publicly share milestones of progress towards this goal.
- **Advance materials innovation.** Growing, creating and processing raw materials represents the greatest environmental impact across NIKE's value chain. NIKE recently launched a challenge with MIT Climate CoLab to find revolutionary new ideas for engaging industries, designers and consumers in valuing, demanding and adopting low-impact materials. We believe there are significant innovation opportunities ahead in this area and we are working to unlock the barriers to developing and scaling a new palette of more sustainable materials.

NESTLE

As a global nutrition, health and wellness company operating in 197 countries, we continue to build on our commitments by tackling climate change and decreasing the environmental impact of our business. Nestlé pledges to:

- Nestlé has worked to reduce GHG emissions in our factories for over 10 years. We are committed to a reduction of 35%, compared to a 2005 baseline, by end of 2015.
- In May 2015, Nestlé announced 25 manufacturing factories in the U.S. achieved zero waste to landfill. By the end of the year, 30% of our U.S. factories will achieve the landfill free status. Moving us closer to our commitment to be landfill free in all U.S. factories by 2020.

- Nestlé has invested more than \$61 million in energy efficiency efforts and has increased onsite consumption from renewable resources by 24% compared to 2010. As a member of RE100, we are committed to identifying a path by 2017 for achieving 100% renewable electricity. We will also develop a low-carbon energy plan for each US operating facility to use renewable energy where possible by 2016 and encourage the utilities where we operate to shift to low-carbon energy mix.

Globally, Nestlé plans a reduction of water use by 40% by the end of 2015, with a baseline year of 2005. By 2016, we will implement projects in California facilities that will save 144 million gallons of water annually.

NOVOZYMES

Novozymes biological solutions are efficient and sustainable in their effects. With over 700 products that reduce energy needs, raw material requirements and environmental waste in their use by our customers, Novozymes is able through life cycle analysis to demonstrate CO2 emission reductions.

- Prior to 2015 Novozymes established long term goals to deliver 75 million tons of CO2 emission reductions annually through the use of our products.
- This year, Novozymes increased its ambition for emission reductions and now targets 100 million tons of CO2 reductions annually by 2020.

ONE3LED

Our company, consisting of only 5000 square feet and 15 employees, has reduced our greenhouse gas emissions by 19 metric tons by implementing measures such as full LED lighting, daylight harvesting, and comprehensive recycling procedures. Co-founded by two young brothers from Missouri, One3LED is living proof that even the smallest businesses can do their part to help alleviate climate change.

By its very definition, reduction of carbon emissions is saving the world. This is why we have dedicated our entire business model to helping other businesses do the same. Since 2012 One3LED has completed over 400 LED lighting projects across the U.S. reducing carbon emissions by an estimated 19,000 metric tons. The environmental comparable of this reduction is planting 15,000 acres of U.S. forests, taking 4,000 cars off the road, and erecting five industrial wind turbines.

Our commitment to action doesn't end with just businesses though. In 2014 One3LED created a non-profit giving program called "Change The Bulb" that focuses on bringing energy efficiency LED lighting to low-income families and nonprofit businesses. The

program provides their homes and buildings with otherwise unattainable energy savings by replacing energy-wasting lighting with LED.

Building on our previous commitments, One3LED pledges to continue our mission of energy efficiency and environmental advocacy and raise of efforts by 2019 through:

Reducing our own carbon footprint:

- Install solar panels on our building.
- Implement energy efficient HVAC systems.
- Use all recycled materials for our business cards, customer presentation materials, and office supplies.

Assisting other businesses:

- Double our greenhouse gas reduction assistance from 19,000 metric tons to 38,000.
- Dedicate a section of our website to carbon footprint reduction education.
- Expand our business model to encompass other clean energy technology such as lighting controls, HVAC, and water conservation systems.
- Provide free lighting-based carbon footprint reduction seminars to businesses and organizations.

Assisting low-income homes and non-profit organizations:

- Reach 1000 inner city families.
- Expand our work with Habitat for Humanity to an additional metropolitan area in the U.S each year.
- Continue to work with LED lighting manufactures to donate their overstock and/or previous generation products to inner city schools to use in their classrooms and gymnasiums.
- Provide non-profit organizations with free energy-reduction lighting assessments.
- Continue the international Change The Bulb program with at least one mission per year.

PACIFIC ETHANOL

Since committing to produce low carbon, renewable fuel in 2006, Pacific Ethanol has produced and sold a cumulative 1.2 billion gallons of ethanol with a carbon intensity value 50% lower than gasoline. Building on these accomplishments, Pacific Ethanol pledges to:

- By 2025, supply over 515 million gallons per year of low carbon ethanol to the market with a 50% reduction of GHG on a relative basis (g/MJ) compared to gasoline.
- By 2025, produce a minimum of 50 million gallons per year of ultra-low carbon ethanol that will reduce GHG emissions by 90% on a relative basis (g/MJ) compared to gasoline.

- We further pledge to reduce our process carbon emissions by 40% by 2025, as part of an effort to develop long-term business plans that align with the deep decarbonization necessary to keep global average temperatures from rising less than 2C.

PEPSI-CO

At PepsiCo, we recognize that limiting global warming to 2° Celsius is absolutely critical to our future and reiterate our call for collective action and our commitment to implementing solutions that will help achieve this goal. PepsiCo pledges to:

- Utilizing PepsiCo's Sustainable Farming Initiative, expand the use of sustainable farming practices to 500,000 acres of farmland used by our North American agricultural suppliers in our corn, oats, potato, and citrus supply chains by the end of 2016.
- Continue to implement hydrofluorocarbon (HFC)-free point-of-sale equipment (coolers, vending machines and fountain dispensers) to meet the goal that all of our new equipment in the U.S. will be HFC-free by 2020.
- Continue to reduce the greenhouse gas emissions from our global fleet through the use of electric, hybrid, compressed natural gas, alternative fuel vehicles and other fuel efficiency programs.
- Strive for zero deforestation in our business operations and global supply chain by 2020.
- Utilize the data generated and best practices learned at our facilities employing photovoltaic systems in the U.S. to help inform future solar installations and meet our goal of achieving an absolute greenhouse gas reduction.
- Strive to increase the amount of recycled content in our global packaging, as we have in our U.S. beverage packaging which included 111 million pounds of rPET in 2014.

PG&E

As a provider of electricity and natural gas to millions of Californians, PG&E understands our responsibility to manage our carbon footprint, advance policies that put California and the country on a cost-effective path toward a low-carbon economy, and address the emerging need to adapt to changing climate conditions. We also remain focused on advancing and providing customers—and our employees—with industry-leading tools and incentives to help them manage and reduce their energy use and capitalize on new, clean energy technologies.

We want the actions we take and decisions we make regarding climate change to enable a better quality of life for our customers, communities and the planet. As a company with a mission rooted in public service, we have a distinct role to play in being a catalyst and advocate for clean energy innovation and a low-carbon economy.

advancing economic growth and opportunity, and driving solutions to local and global environmental challenges.

In support of our continued commitment to combating climate change, PG&E proposes to achieve the following by 2020:

- **Facilitate Deployment and Integration of Low-Carbon, Clean Energy Technologies:**
 - *Provide our nearly 16 million customers with an electricity supply that is more than 60 percent carbon-free*, making it one of the cleanest electricity supply portfolios of any investor-owned utility in the country.
 - *Support the implementation of the Clean Power Plan* by working with the state of California and other stakeholders to ensure its effective implementation.
 - *Plan a total grid investment of approximately \$3 billion a year* to both modernize the grid to make it more resilient and facilitate our vision of the Grid of Things™—a grid that will integrate distributed solar, energy storage, electric vehicles and other low-carbon technologies.
 - *Expand the system-wide deployment of our mobile gas leak detection system* that uses the most sophisticated, cutting-edge technology to find more natural gas leaks faster—helping to improve our ability to prioritize repairs and replacements, which enhances public safety and reduces the amount of methane released to the atmosphere.
- **Support Our Customers and Communities:**
 - *Continue to lead and innovate on energy efficiency* by helping our customers save approximately 4,400 GWh of electricity and 90 million therms of natural gas, avoiding about the same amount of power used by 600,000 homes in PG&E’s service area.
 - *Weatherize 500,000 homes to help low-income customers* reduce energy use, better manage energy costs, and increase safety, health and comfort.
 - *Facilitate the rapid adoption of rooftop solar installations* by improving upon our current ability to interconnect a solar system in three days or less—among the fastest process times in the nation—to the point where our interconnection process is fully automated.
 - *Dedicate more than \$5 million over the next five years to continue to invest in partnerships that support clean energy deployment in underserved communities*, including support for solar and renewable energy education and funding for solar panel installations in underserved communities, working in partnership with non-profit organizations.
 - *Work with regulators to agree on programs that will allow continued acceleration of repairs and replacements to eliminate non-hazardous methane leaks in our natural gas distribution system* to maintain a near zero “workable” leaks backlog and further reduce other minor leak backlogs.

- **Take Action in Our Operations and Encourage Our Employees to Do the Same:**
 - *Expand our fleet of alternative-fuel vehicles*—one of the nation’s largest among electric and gas utilities—by investing at least one-third of our annual fleet procurement spend in electric vehicles, totaling more than \$100 million.
 - *Achieve top decile performance in facility energy and water reduction among industry peers*—reducing the environmental footprint of our facilities (as reduced energy and water use translates into greenhouse gas savings), while also providing an enhanced workplace for our employees.
 - *Build upon our existing employee incentive programs* that offer discounts for rooftop solar installation and the purchase of electric vehicles to encourage employees to take action at their homes.

POET

Since 2005, POET has reduced its greenhouse gas emissions intensity by nearly 14%. As one of the world’s largest producers of renewable fuel, POET pledges to:

- Produce over 1.7 billion gallons of low carbon ethanol annually, with a 35% reduction of greenhouse gas emissions compared to gasoline.
- Produce 820 million gallons of cellulosic ethanol by 2025 across the POET footprint at a 75% reduction in greenhouse gas emissions compared to gasoline.
- Develop long-term business plans that allow POET to be good stewards of the Earth by converting renewable resources to energy and other valuable goods as effectively as humanly possible.

PORTLAND GENERAL ELECTRIC

PGE has been supportive of a national policy to reduce global warming for nearly a decade and is actively reducing its carbon emissions through specific actions. This global challenge should be addressed at the federal level by achieving real carbon reductions across all sectors of the economy. We are pursuing prudent, sustainable energy actions while maintaining system reliability and affordability for all our customers.

As a provider of electricity to nearly 850,000 Oregonians, PGE pledges to:

- Implement our plan to end use of coal at Oregon’s only coal-fired power plant by December 31, 2020
- Add more than 800 megawatts of new renewable energy, on top of more than 700 megawatts of new wind generation we’ve already built, bringing our mix to one-third new and legacy renewable power in average hydro years by the end of 2025

- Optimize cost-effective integration of renewable resources by joining the western energy imbalance market in late 2017, acquiring an additional 5 megawatt hours' worth of energy storage by 2020, and pursuing a water heater load-control and storage pilot program
- Advance our smart grid initiatives to improve the efficiency and resilience of the transmission and distribution system, including work on conservation voltage reduction, smart switches, and transformer replacements and spares
- Continue investments in our hydroelectric plants, along with habitat and water improvement projects, to retain access to this sustainable, carbon-free power for our customers
- Diversify our renewable portfolio with cost-effective solar projects, adding to our existing 16 megawatts of PGE-owned solar facilities and solar power purchase agreements while continuing our support for customer-side solar installations
- Use our integrated resource planning process to evaluate and pursue further climate-friendly resource strategies, including ongoing efforts to help customers make efficient use of energy
 - Capture all cost-effective energy efficiency as our first resource choice
 - Expand demand response and dynamic pricing to reduce the need for new generation
- Maintain high growth in our nationally top-ranked voluntary renewable power program and continue helping local governments and schools with "Green Power Community" strategies, sustainable buildings, solar projects and electric vehicle charging stations
- Promote vehicle electrification to help reduce carbon emissions from the transportation sector
 - Install charging stations at all PGE sites and incent EV adoption by employees
 - Fulfill our Edison Electric Institute pledge to devote 5 percent of our fleet vehicle budget to fleet electrification
 - Continue working to ensure the driving public has access to charging infrastructure

PwC US

In 2007, we set a carbon reduction goal and developed programs to cut our GHG emissions 20% (vs 2007 baseline). Since that time we have exceeded our reduction goal through various initiatives including building a LEED Gold-certified data center and virtualizing over 2,800 of its servers. This has also enabled us to deliver on our commitment to a modern, flexible and efficient workplace for our employees. As a result, we have reduced redundant square footage per employee, decreased our travel emissions, and put in place virtual collaboration technologies.

We are now extending our goal and pledging to:

- Reduce GHG emissions 45% by 2020 (vs. 2007 baseline),

- Power our workspaces with 100% renewable energy (RECs) while continuously improving their efficiency and achieving LEED certifications in our new buildouts, and
- Continue to support flexibility and deploy technologies that aid in reducing ground and air travel, purchase forestry offsets in order to continue to reduce the impact of our air travel, and support our local communities' environmental conservation efforts.

PROCTER & GAMBLE

Procter & Gamble (P&G) has had comprehensive efforts to address energy and climate underway for many years. Our long term vision is to power our plants with 100% renewable energy. As we continue to drive our efforts on climate change forward, P&G pledges to:

- Reduce absolute GHG emissions by 30% by 2020 (vs. a 2010 baseline) – a goal that is consistent with science-based methodologies that are helping companies align targets with climate science
- Achieve 30% Renewable Energy powering our plants globally by 2020
- As a significant action step towards this goal, we will manufacture our Fabric & Home Care products in North America with 100% wind power. To accomplish this, we have partnered with EDF RE to develop a new wind farm in Texas, to bring 100 MW renewable power on line, equivalent of eliminating 200,000 metric tons of GHG emissions per year.
- Promote Cold Water Washing for machine laundering of clothes – with a target of 70% of all machine loads being done in cold water by 2020
- Build a traceable palm oil supply chain and ensure palm oil suppliers have implemented no deforestation policies and practices by 2020.
- Have 100% of the virgin wood fiber used in our tissue/towel and absorbent hygiene products be 3rd party certified by 2015. Have 100% of our paper packaging be either recycled content or 3rd party certified virgin material by 2020.

QUALCOMM

Qualcomm's pledges to:

- Reduce absolute Scope 1 and 2 greenhouse gas emissions from global operations by 30%, compared to a 2014 baseline, by 2025

RICOH USA

Ricoh pledges to:

Reduce greenhouse gas emissions:

- Advanced nations need to reduce their environmental impact to one-eighth the fiscal 2000 levels by 2050. Based on this, the Ricoh Group has established mid- and long-term environmental impact reduction goals for three key areas: energy conservation, resource conservation, and

pollution prevention. Ricoh sets the target to reduce the company's total lifecycle CO2 emissions by 30% by 2020 and by 87.5% by 2050 from the 2000 level.

- As part of Ricoh's commitment, we have continuously improved the energy efficiency of our products. As a result, the average energy consumption of our ENERGY STAR certified color Multifunctional Printers has decreased more than 70% over the last 7 years
- In addition, we will install a solar farm system at our ENERGY STAR certified corporate facility in New Jersey by 2016 in order to partially offset its energy expenditure.

Resource Conservation and Recycling

- Ricoh's goal is to reduce the new input of resources by 25% by 2020 and by 87.5% by 2050 from the 2007 level. To reach that goal, we utilize materials in the most effective way possible. We are making our products smaller and lighter, employing parts with longer lifecycles, recycling and reusing parts and products, and expanding the use of renewable resources.

SALESFORCE.COM

At Salesforce, we believe in leveraging the power of our people and our products to reduce the impact that we and our customers have on the planet. From how we deliver our products to our focus on renewable energy, we incorporate sustainability into all aspects of our business.

Salesforce's multi-tenant cloud platform makes it possible to use a remarkably small number of servers as efficiently as possible. In fact, our core platform is 98% more carbon efficient on average than on-premise software.

Salesforce pledges to:

- Work towards powering 100% of our global operations with renewable energy.
- Continue pursuing LEED certification for our largest office spaces and other innovative green building initiatives.
- Leverage our people, technology and resources to help environmental nonprofits around the world.

SCHNEIDER ELECTRIC

At Schneider Electric we believe that energy and digital transitions provide new efficient solutions to shift in low carbon society and that access to energy is a basic human right. We are committed to providing innovative solutions to address the energy paradox: balancing the planet's carbon footprint with irrefutable human right to quality energy. Schneider Electric has delivered on its commitments to sustainability in the last four years with a series of actions for the company's direct emissions and in the supply chain:

- Through the years, we have developed a solid portfolio of solutions on renewables, energy efficiency, and grid connections that facilitate energy transition
- Avoided 220,000 tons of CO₂ in energy consumption, transportation and site emissions
- Reduced water intensity of our most water intensive sites by 23 percent since 2011
- Increased the number of our products that are considered “Green Premium” and carry an ecolabel to 75 percent
- 2.4 million underprivileged households equipped with energy solutions through Access to Energy program

Because what is good for climate is good for economy, we recognize that delaying action on climate change will be costly in economic and human terms, while accelerating the transition to a low-carbon economy will produce multiple benefits with regard to sustainable economic growth, public health, resilience to natural disasters, and the health of the global environment. We put forth our pledges as follows:

- Achieve 10 percent energy savings by the end of 2017 by reducing the company’s energy intensity
- 120,000 tons of CO₂ avoided through end-of-life products by the end of 2017
- 75 percent of products in R&D to be designed as Green Premium, with an ecolabel, and 75 percent of product revenue to come from Green Premium by the end of 2017
- Zero waste to landfill in 100 industrial sites by the end of 2017
- 50 million underprivileged people obtaining lighting and communication systems with low carbon solutions by 2025 through the Access to Energy program
- Invest over \$11 billion over 10 years on R&D in innovation in sustainability

SIEMENS CORPORATION

We put forth our pledge as follows:

- Siemens pledges to cut our global carbon footprint by 50% by 2020 and to reduce our net carbon emissions to zero by 2030.
To achieve this goal, we have identified key emission reduction levers that will contribute to cutting CO₂-emissions from our own operations and enable Siemens to become CO₂-neutral in the long term.
- **Energy Efficiency.** Invest nearly \$110 million globally in energy efficiency measures for our major factories within the next three years, including measures at a significant number of our total 84 Siemens sites in the U.S. Measures will include investments in buildings and production processes and will result in sustainable annual savings of more than \$20 million in energy costs. In Charlotte, at our LEED Gold certified advanced gas turbine manufacturing facility, we

were able to cut costs and emissions both during construction and during operation by building the plant on a footprint requiring 18 percent less area than traditional production sites. We have already begun to transition to LED light fixtures at many of our facilities in the U.S., including Charlotte, Bartlesville, Beltsville and Sacramento.

- **Distributed Energy Systems.** Implement innovative solutions at Siemens sites, combining power generation with storage solutions and intelligent energy management technologies. Our facility in Sacramento is already powered by up to 80 percent solar energy. In Charlotte, the generator office building has a solar array on-site combined with energy management software.
- **Company Car Fleet.** Focus on global roll-out of best practice examples for Siemens' car fleet around the world, including clear emissions-related requirements, a bonus/malus system to set incentives for low emission cars, the development of an E-mobility solution concept, and the promotion of alternatives to driving such as the use of public transit and telecommuting.
- **Electricity Purchasing.** Change our power purchasing guidelines and move towards a significantly cleaner power mix with a strong focus on renewable energies. As part of this commitment, we will buy electricity produced by our own technologies at our customers' facilities. The world is transitioning away from fossil fuels and inefficient power grids. With this approach, we will support the transition of the energy system towards coordinated solutions that lead to fewer emissions, more efficient power generation and less consumption of natural resources.
- **Supporting Our Customers' Emissions Efficiency.** We will continue to support our customers in reducing energy costs and improving their CO₂ footprints with products and solutions from our Environmental Portfolio, which helped them save approximately 430 million metric tons of carbon dioxide in 2014.

SONY CORPORATION OF AMERICA

We have established a long-term global environmental plan, Road to Zero, which aims for a zero environmental footprint throughout the lifecycle of our products and business activities by 2050. Curbing climate change is one of four perspectives we focus. We have reduced over 1.2 million tons of greenhouse gas emissions from Sony facilities in fiscal 2014 compared to fiscal 2000, which is equivalent to approximately 46% reduction. We have participated in the EPA Green Partner Partnership program since 2009 and are currently listed on the Top 30 Tech and Telecom list for the purchase of renewable energy in the U.S. We were also able to reduce the estimated annual energy consumption per product by 30% in fiscal 2014 compared to fiscal 2008.

We put forth our pledges as follows:

Working toward Road to Zero environmental plan, Sony Corporation of America on behalf of the entire Sony Group pledges to:

- Reduce greenhouse gas emissions from our facilities by 5%, compared to fiscal 2015 baseline, by fiscal 2020 on a global basis
- Reduce the annual energy consumption of its products* by an average of 30%, compared to fiscal 2013 baseline, by fiscal 2020. Reach out to over a few hundred million people worldwide through Sony's Entertainment contents, by fiscal 2020 to raise awareness and inspire action on the issues of environmental sustainability.
- Use and/or purchase renewable energy equivalent to 300,000 tons of CO2 emission by fiscal 2020 on a global basis.
- Enhance engagement of entire value chain by requesting major manufacturing partners and component suppliers cooperate by monitoring their CO2 emissions, water usage and waste. Additionally, we will call on the major manufacturing partners to reduce these levels targeting 1% reduction in GHG emission and water usage intensity** per year.

* AC powered devices which operate the main function with energy input from the main power source (main electricity grid).

** Environmental impact relative to the gross sales of product supplied to Sony.

STARBUCKS

We put forth our pledges as follows:

- Build all company-owned stores to achieve LEED certification -- To date, Starbucks has certified 669 stores in 19 countries, more than any other company in the world.
- Reduce energy use in company-owned Starbucks stores by 25%, compared to a 2008 baseline
- Reduce water use in company-owned Starbucks stores by 25%, compared to a 2008 baseline
- Purchase renewable energy equivalent to 100% of the electricity used in our company-owned stores
- Commit to purchase 100% ethically sourced coffee, through our C.A.F.E. Practices guidelines that increases impact through more efficient use of fertilizers, by preventing deforestation, and by reducing water and energy used in coffee processing. In addition, through our open sourced agronomy support, Starbucks ethically sourced coffee strengthens coffee farmers' ability to support their families and communities through increased coffee quality, more yield per hectare, and greater resilience to the changing climate conditions in some of the most vulnerable communities in the world

- Commit to invest \$50M by 2020 towards a Global Farmer Fund that promotes coffee supply chain resilience and enables investments in sustainable infrastructure through low interest loans
- Continue our commitment, as one of the founding members of the BICEP coalition in the U.S., to advocate for smart climate policy at the Federal and International levels.

SYNGENTA/QCCP

Cellerate Ethanol Technology, a partnership between Quad County Corn Processor and Syngenta pledges to:

- Enable conventional dry grind ethanol plants in the US to produce 609 million gallons per year of cellulosic ethanol by 2025.
- Cellerate produced gallons achieve a >100% GHG reduction compared to gasoline (energy equivalent)

TARGET

Since 2010, Target has reduced greenhouse gas emissions (GHG) by improving energy efficiency, investing in renewable energy, and lowering our overall hydrofluorocarbon impact. These programs have successfully reduced our GHG emissions by 9% since 2010 and eliminated 550,000 metric tons of CO₂e across our building portfolio. Target has established the following goals to support our pledge:

- Model leadership in energy efficiency by achieving ENERGY STAR certification in 80% of our buildings by 2020. These efforts will eliminate 9,000 metric tons of GHG emissions from our stores.
- 10 percent reduction in energy intensity-per-square-foot by 2020 for our stores against a baseline of 2010. These efforts will eliminate 271,500 metric tons of GHG emissions from our stores. To support this pledge, Target joined the Indoor Lighting Campaign launched in 2015, led by the US Department of Energy Better Building Alliance.
- Dramatically increase renewable energy at Target by increasing the number of solar rooftop panels by over 2000% since 2010 to 500 stores and distribution centers by 2020. Solar panels generate approximately one-third of energy use per building.
- Expand investment in offsite renewable energy to complement onsite renewables. To facilitate this effort, Target is partnering with a group of stakeholders to encourage utilities to make renewables more widely available to customers.
- Drive implementation of hydrofluorocarbon (HFC) free refrigerants in our food distribution centers and stand-alone refrigerated display cases. Over the last two years, Target has opened two new food distribution centers that employ ammonia, an HFC-free refrigerant, which has resulted in an annual reduction of 900 metric tons of CO₂e.

- Reduce water use by 10 percent per square foot by 2020 for our stores against a baseline of 2010.
- Divert 70% of retail waste from landfill through reuse or recycle programs by 2020
- Engage additional vendors and product categories in our Clean by Design program. The program includes initiatives our supply chain can implement to reduce wastewater effluent, water use, energy and emissions around the world.

TRI-GLOBAL ENERGY

Building on the 6,200 megawatts of wind power projects that are now under development, under construction or in operation, Tri Global Energy is investing in renewable power diversification with the addition of a solar division and the acquisition of a solar energy company. Accordingly, we put forth our pledges as follows:

- Initiate development of an additional 600-900 megawatts of new utility-scale wind generation projects annually through 2018, not only in West Texas and Eastern New Mexico where TGE's 15 wind generation projects are located, but expanding our reach to locations across the U.S. Tri Global Energy is the leading developer of wind energy in Texas.
- Transition more than 500 megawatts of additional wind capacity into the construction and operations phase annually through 2018 thus increasing renewable capacity available for grid integration and electricity usage.
- Install solar photovoltaic systems on 1,000 commercial and 8,000 residential roof-tops over the next five years for homeowners, non-profit groups and other entities replacing the energy output of carbon-intense plants.

UNILEVER

Unilever United States and our 8,000 employees are proud to manufacture iconic brands including Dove, Lipton, Ben & Jerrys, Vaseline and Hellmann's at 13 plants across the United States.

Urgent action is needed to combat climate change. As part of the Unilever Sustainable Living Plan launched in 2010, Unilever is committed to decoupling our growth from its environmental footprint. We are deepening our efforts to lower our GHG impact from sourcing and manufacturing, and through innovation and behavior change. We will use our scale, influence and resources to create transformational change.

As of 2015, our progress includes:

- We have achieved 100% renewable electricity procurement for our US facilities through a long-term power purchase agreement with NRG, including the annual purchase of 90 megawatts of energy from a Texas wind farm.
- We have achieved our target of zero nonhazardous waste to landfill across our US factory network. Waste prevention and recycling divert organic wastes from landfills, reducing the methane released when those materials decompose.
- In 2012 in the US, we reduced water abstraction per ton of production by 26% when compared to a 2008 baseline. Our Covington, Tennessee ice cream facility reduced annual water abstraction by 75% through process improvements while increasing the volume of ice cream produced.
- In 2012, our North American logistics operations delivered a 7.8% improvement in CO2 efficiency compared to our 2010 baseline.
- As of 2014, we have deployed 3761 HFC-free refrigeration cabinets in the United States using natural refrigerant technology.

We put forth our pledges as follows:

- We have committed to achieving zero net deforestation associated with four commodities – palm oil, soy, paper and board, and beef – no later than 2020. This commitment also extends to our tea businesses and supply chains.
- Globally, by 2020, CO2 emissions from electricity from our factories will be at or below 2008 levels despite significantly higher volumes. CO2 from energy in manufacturing has been reduced by 37% per ton of production respectively since 2008. This is just the latest step in a long journey, in fact, compared to 1995, this represents a 64% reduction in absolute terms.
- We have reached 100% renewable energy procurement for our US facilities and we are committed to move to on-site and directed off-site sources for 100% of our US energy needs by 2020.
- We have joined the RE100 campaign, committing to 100% renewable electricity in our sites around the world, not just the US. We've already achieved that in Europe.
- We will continue to invest and deploy innovative technologies like dry shampoo, which we estimate that compared to washing with heated water, reduces GHG emissions by around 90% per consumer use.

UPS

In 2013, successful execution of our global greenhouse gas strategy at UPS enabled us to exceed a 10 percent reduction in carbon intensity three years ahead of our 2016 goal. In 2014, we achieved a 14.1 percent reduction in our carbon intensity versus a 2007 baseline as a result of successfully executing carbon reduction strategies in our ground and air fleet.

Accordingly, UPS pledges:

- To double our goal to a 20 percent reduction in greenhouse gas emissions by 2020, as measured by our UPS Transportation Intensity Index, off a 2007 baseline. The Transportation Intensity Index normalizes our greenhouse gas (GHG) emissions to business volume, for instance by reducing the amount of fuel required to travel a given distance or to carry a given amount of cargo or packages; covers 96 percent of our worldwide Scope 1 and Scope 2 CO₂e emissions; and combines data from separate carbon intensity metrics associated with our business segments.
- To achieve by 2017 a cumulative billion miles of package or freight movement in our alternative fuel/technology truck fleet, which we expect will number over 7,700 trucks by the end of 2015.

Our UPS plan includes:

- Network and mode optimization to minimize the miles traveled and energy consumed.
- Investments in fuel-saving technologies to reduce our dependency on petroleum-based fuels.
- Investments in alternative fuel vehicles to help offset the use of conventional petroleum fuels
- Energy conservation through facility design, operational practices, renewable energy, and retrofitting.

Accurate, verified disclosure of global greenhouse gas emissions data per recognized standards.

WALMART

At Walmart, we believe climate change is an urgent and pressing challenge, and we must all do our part to reduce, avoid and mitigate the impact of rising greenhouse gas (GHG) levels. We remain committed to our role in accelerating the transition to a sustainable future.

In 2014, we operated with 9 percent less energy per square foot compared with our 2010 baseline and 26 percent of our electricity used was generated from renewable sources - keeping us on track toward our goal of being powered by 100 percent renewable energy. Additionally, we've reduced the GHG intensity of our operations (Scope 1 and 2) for eight consecutive years, we're on track to hold our absolute emissions flat over this decade, even with our continued growth as a company, and working with our suppliers, we're on track to exceed our 2015 goal of eliminating 20 million metric tons of GHG emissions from our supply chain.

Walmart is committed to collaborating with suppliers, NGOs, governments and other corporate partners to continue to enhance the sustainability of our operations and product supply chains for people and the planet.

Walmart puts forth our pledges as follows:

- Drive the production or procurement of 7 billion kilowatt hours (kWh) of renewable energy globally by Dec. 31, 2020 – an increase of more than 600 percent versus our 2010 baseline.
- Double the number of on-site solar energy projects at our U.S. stores, Sam’s Clubs and distribution centers by 2020, compared with our 2013 baseline.
- Reduce the total kWh-per-square-foot energy intensity required to power our buildings around the world by 20 percent by 2020 versus our 2010 baseline.
- Gain increasing visibility into key metrics regarding yields, water usage and GHGs in our food supply chains by 2025. Walmart is now working with suppliers, representing approximately 70% of food sales, to report their yield, water and GHG footprints all the way back to the farm.
- Establish joint agricultural partnerships with 17 suppliers, cooperatives and service providers on 23 million acres of land in the U.S. and Canada, with the potential to reduce 11 million metric tons of GHG by 2020.

Achieve zero net deforestation in product sourcing by 2020 as part of The Consumer Goods Forum.

THE WALT DISNEY COMPANY

Disney has a long-term goal of zero net greenhouse gas emissions.

- By 2020, Disney will reduce net emissions by 50% from 2012 levels by following the hierarchy of avoiding emissions, reducing emissions through efficiencies, replacing high-carbon fuels with low-carbon alternatives, and then using certified offsets for our remaining emissions.
- Disney has also put an internal price on carbon, which has helped inspire innovation within the company, helped integrate the consideration of carbon emissions into decision-making, and resulted in the protection or rehabilitation of over 156,000 acres of forests.
- As of 2014, Disney has decreased net emissions by 31% from 2012 levels.

XEROX CORPORATION

Xerox has a long-standing commitment to environmental sustainability. In 2003, we made a public commitment to reduce Green House Gas (GHG) emissions by joining the U.S. EPA Climate Leaders program and launching an internal program known as Energy Challenge 2012; a ten-year initiative. We exceeded our initial expectations, set

subsequent goals and ultimately cut energy consumption by 31% and GHG emissions by 42% - that's 210,000 tons of carbon dioxide equivalents (CO₂e).

Building on our strategic focus areas to reduce energy use and protect the climate; preserve the world's forests and biodiversity; preserve clean air and water; and prevent and manage waste,

XEROX CORPORATION pledges to:

- Reduce GHG emissions and energy consumption 20% by Y2020, from a Y2012 baseline, a science-based target commitment made in conjunction with the Carbon Disclosure Project's Road to Paris initiative;
- Achieve 20% renewable usage by Y2020 with a goal of reaching 100% by 2050;
- Provide our customers, from the transportation sector to managed print services, with enhanced opportunities to reduce their environmental footprint; and
- Launch 100% of eligible new products in conformance with current applicable ENERGY STAR® specifications.

Some of the projects Xerox is currently engaged in include:

- Teaming with the University of Michigan and other companies to create "MCity" – a 32-acre simulated urban environment to enable mobility developers to test the capabilities of connected and automated vehicles and systems:
Combining a number of transportation solutions to enhance urban mobility, such as "Cloud Park," which uses cameras and computers to direct drivers to open parking spots; the Merge® smart parking system, which uses occupancy data from meters and sensors to vary pricing and hence availability; and vehicle passenger detection to facilitate wide use of HOV/HOT lanes. The result is increasing traffic flow and decreasing time spent searching for a parking place, allowing for reduced fuel usage and improved air quality.
- Developing the Xerox Print Awareness Tool®, which provides end-users with graphical displays of their print usage as well as "eco-tips" to enhance sustainability awareness and choices.
- Continuing to refine and expand the use of our proprietary Emulsion Aggregation (EA) Toner, which utilizes ultra low-melt technology to allow customers to photocopy with more sustainable materials, utilize less electricity and reduce their GHG emissions in comparison to conventional toner.

Senator WHITEHOUSE. Thank you.

And, finally, let me ask unanimous consent to enter into the record a financial sector statement on climate change from the financial giants Bank of America, Citi, Goldman Sachs, JPMorgan Chase, Morgan Stanley, and Wells Fargo calling for a strong global agreement?

Senator CAPITO. Without objection.

[The referenced information follows:]

In support of prosperity and growth: Financial sector statement on climate change

Scientific research finds that an increasing concentration of greenhouse gases in our atmosphere is warming the planet, posing significant risks to the prosperity and growth of the global economy. As major financial institutions, working with clients and customers around the globe, we have the business opportunity to build a more sustainable, low-carbon economy and the ability to help manage and mitigate these climate-related risks.

Our institutions are committing significant resources toward financing climate solutions. These actions alone, however, are not sufficient to meet global climate challenges. Expanded deployment of capital is critical, and clear, stable and long-term policy frameworks are needed to accelerate and further scale investments.

We call for leadership and cooperation among governments for commitments leading to a strong global climate agreement. Policy frameworks that recognize the costs of carbon are among many important instruments needed to provide greater market certainty, accelerate investment, drive innovation in low carbon energy, and create jobs. Over the next 15 years, an estimated \$90 trillion will need to be invested in urban infrastructure and energy. The right policy frameworks can help unlock the incremental public and private capital needed to ensure this infrastructure is sustainable and resilient.

While we may compete in the marketplace, we are aligned on the importance of policies to address the climate challenge. In partnership with our clients and customers, we will provide the financing required for value creation and the vision necessary for a strong and prosperous economy for generations to come.

Bank of America

Citi

Goldman Sachs

JPMorgan Chase

Morgan Stanley

Wells Fargo



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FOR IMMEDIATE RELEASE

Major U.S. banks call for leadership in addressing climate change

Bank of America, Citi, Goldman Sachs, JPMorgan Chase, Morgan Stanley & Wells Fargo issue joint statement on the need for global climate agreement

For more information, contact

- Aaron Pickering — Ceres | pickering@ceres.org | phone: 617-247-0700 ext. 148 | cell: 508-951-0919

NEW YORK, NY – Sep 28, 2015

Six major U.S. banks – **Bank of America, Citi, Goldman Sachs, JPMorgan Chase, Morgan Stanley and Wells Fargo** – have issued a joint statement calling for cooperation among governments in reaching a global climate agreement. The statement, published today by the sustainability advocacy nonprofit Ceres, voiced support for policy frameworks that “will provide greater market certainty, accelerate investment, drive innovation in low carbon energy, and create jobs.”

The banks said that their institutions are collectively “committing significant resources toward financing climate solutions” and added that “clear, stable and long-term policy frameworks are needed to accelerate and further scale investments.”

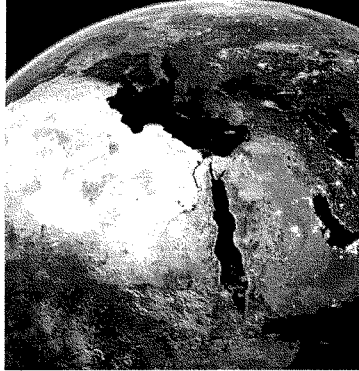
“Financial institutions have a critical role to play in financing the transition to a low-carbon future,” said Mindy Lubber, President of Ceres and director of its \$13 trillion Investor Network on Climate Risk. “As U.S. negotiators enter climate talks in Paris, they can say with confidence that the business and financial community in this country is ready for government leadership to address climate change.”

In today’s statement, the banks said they are “aligned on the importance of policies to address the climate challenge.” They also expressed ambition to continue investing directly in climate change mitigation efforts to make cities and communities more resilient.

For more information and to view the statement, visit: www.ceres.org/bankstatement.

12/2/2015

Major U.S. banks call for leadership in addressing climate change — Ceres



Climate change puts the global economy at risk.

Major U.S. financial institutions agree:

It's time for a global climate deal.

Together, we can finance a sustainable future.

www.ceres.org/bankstatement

About Ceres

Ceres is a nonprofit organization mobilizing business and investor leadership on climate change, water scarcity and other sustainability challenges. Ceres directs the Investor Network on Climate Risk (INCR), a network of over 100 institutional investors with collective assets totaling more than \$13 trillion. Ceres also directs Business for Innovative Climate & Energy Policy (BICEP), an advocacy coalition of 34 businesses committed to working with policy makers to pass meaningful energy and climate legislation. For more information, visit www.ceres.org or follow on Twitter [@CeresNews](https://twitter.com/CeresNews).

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Additional Quotes:

"Climate change presents enormous challenges for global business, but addressing it also offers tremendous opportunities," said **Alex Liftman, Global Environmental Executive at Bank of America**. "Financial institutions play a vital role in accelerating the transition to a low-carbon economy."

"Financing sustainable solutions that matter is central to our business success," said **Valerie Smith, Director of Corporate Sustainability at Citi**. "We are increasingly working with our clients across various sectors to not only manage and mitigate risks but also recognize opportunities associated with addressing climate change."

"One of the critical roles financial institutions play in helping to address climate change is to harness market mechanisms to mobilize much needed capital to facilitate the transition to a low carbon future and build greater physical resiliency. Governments can help markets by establishing a clear, stable policy framework that creates value for these investments and facilitates innovation," said **Kyung-Ah Park, Head of Environmental Markets at Goldman Sachs**.

"Significant investments in urban infrastructure and energy will need to be made over the next two decades," said **Matt Arnold, Managing Director and Head of Social and Sustainable Finance at JPMorgan Chase**. "Governments need to take the lead in sending clear and timely policy signals to ensure these investments support and enhance sustainable economic

12/2/2015

Major U.S. banks call for leadership in addressing climate change — Ceres

growth and development – which includes addressing climate change.”

“Morgan Stanley believes that the capital markets can and must play a positive role scaling solutions to global challenges,” said **Audrey Choi, Managing Director and CEO of the Morgan Stanley Institute for Sustainable Investing**. “The demand for financial tools that address climate change is strong and growing, and we are committed to continued leadership across a range of climate-focused capital markets activity, including financing for clean-tech and renewable energy businesses, underwriting green bonds, and ensuring our wealth management clients have options to align their portfolios with their environmental goals.”

“Businesses across the spectrum are evaluating the risks and opportunities associated with a changing climate – and taking action,” said **Mary Wenzel, Head of Environmental Affairs at Wells Fargo**. “Strong, long-term policy frameworks can provide the business certainty needed to accelerate innovation and investment.”

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Senator WHITEHOUSE. I don't have it with me, but I will get it before the record of the hearing closes. I would also ask unanimous consent that an advertisement in support of climate action put into the Financial Times by Unilever, by General Mills, by Mars, by Nestle, by Ben & Jerry's, and by Kellogg's be added to the record.

Senator CAPITO. Without objection.

[The referenced information follows:]



Dear US and Global Leaders:

This could be a turning point.

When you convene in Paris later this year for climate negotiations, you will have an opportunity to take action that could significantly change our world for the better.

As heads of some of the world's largest food companies, we have come together today to call out that opportunity.

Climate change is bad for farmers and for agriculture. Drought, flooding and hotter growing conditions threaten the world's food supply and contribute to food insecurity.

By 2050, it is estimated that the world's population will exceed nine billion, with two-thirds of all people living in urban areas. This increase in population and urbanization will require more water, energy and food, all of which are compromised by warming temperatures.

The challenge presented by climate change will require all of us—government, civil society and business—to do more with less. For companies like ours, that means producing more food on less land using fewer natural resources. If we don't take action now, we risk not only today's livelihoods, but also those of future generations.

We want the women and men who work to grow the food on our tables to have enough to eat themselves, and to be able to provide properly for their families.

We want the farms where crops are grown to be as productive and resilient as possible, while building the communities and protecting the water supplies around them.

We want to see only the most energy-efficient modes of transport shipping products and ingredients around the world.

We want the facilities where we make our products to be powered by renewable energy, with nothing going to waste.

As corporate leaders, we have been working hard toward these ends, but we can and must do more.

Today, we are making three commitments—to each other, to you as our political leaders, and to the world.

We will:

- Re-energize our companies' continued efforts to ensure that our supply chain becomes more sustainable, based on our own specific targets;
- Talk transparently about our efforts and share our best practices so that other companies and other industries are encouraged to join us in this critically important work;
- Use our voices to advocate for governments to set clear, achievable, measurable and enforceable science-based targets for carbon emissions reductions.


That's where you come in.

Now is the time to meaningfully address the reality of climate change. We are asking you to embrace the opportunity presented to you in Paris, and to come back with a sound agreement, properly financed, that can affect real change.

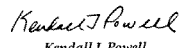
We are ready to meet the climate challenges that face our businesses. Please join us in meeting the climate challenges that face the world.

Signed,


Grant Reid
President & CEO
Mars, Incorporated


Paul Polman
Chief Executive
Unilever


Jostein Solheim
CEO, Ben & Jerry's


Kendall J. Powell
Chairman of the Board & CEO
General Mills, Inc.

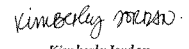

Mariano Lozano
President & CEO Dannon & Regional VP
Danone Dairy North America


John Bryant
Chief Executive Officer
Kellogg Company


Kevin Cleary
CEO, Clif Bar


Paul Gimwood
Chairman & CEO, Nestlé USA


Esteve Torrens
President & CEO, Stonyfield Farm, Inc.


Kimberly Jordan
Cofounder & CEO
New Belgium Brewing Company

All food and beverage companies are invited to join in our commitment. Please go to www.ceres.org/JoinFoodStatement for details.

Senator WHITEHOUSE. And I would like to, with the Chair's permission, ask a question for the record of the Chamber of Commerce, which is present here in the form of Mr. Eule. The question for the record is how does the Chamber's relentless opposition to any climate action represent the views of the companies on these letters who are chamber members?

I think that will probably take a little bit of time, so I would like to make that a question for the record.

Let me also add into the record an article—

Senator CAPITO. Just let me clarify. That means you are wanting a written response from Mr. Eule?

Senator WHITEHOUSE. Yes. And/or the Chamber, if they want to respond through some other personage.

Senator CAPITO. All right.

Senator WHITEHOUSE. I would also like to put into the record a recent press story called "The Koch ATM," which reports that the U.S. Chamber of Commerce received \$2 million from Freedom Partners, which is a Koch-backed operation, and also reflect for the record here that the Center for Media Democracy reports that from 2001 to 2012 The Manhattan Institute received over \$2.1 million from foundations associated with the Koch brothers, including the Charles G. Koch Foundation and the Claude R. Lambe Foundation, and the Union of Concerned Scientists reports that since 1998 The Manhattan Institute received \$800,000, \$475,000 of which has come in since 2007, from ExxonMobil.

Senator CAPITO. Without objection.

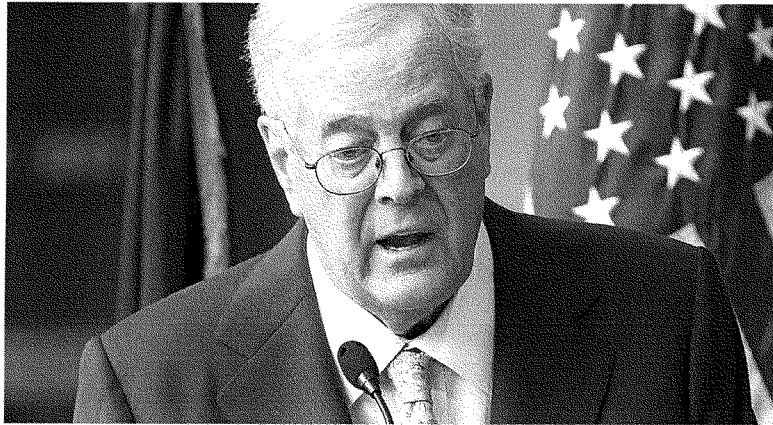
[The referenced information follows:]

POLITICO

The Koch ATM

In 2014, the main group in the brothers' network raised \$126 million and gave out \$88 million in grants.

By KENNETH P. VOGEL | 11/17/15 12:55 PM EST



Getty

The Koch network stepped up funding for its own groups in 2014, but also served as something of an ATM for some of the most powerful groups on the right — doling out millions in grants to the U.S. Chamber of Commerce, the Club for Growth and National Rifle Association, among major backers of Republicans — according to a tax filing publicly released Tuesday morning.

The filings were submitted to the Internal Revenue Service by Freedom Partners Chamber of Commerce, the central group in the increasingly powerful network of

conservative public policy and political groups helmed by the billionaire brothers Charles and David Koch.

The tax filings show that Freedom Partners, which was created in late 2011 to increase coordination within the Koch network, raised \$162 million over the past two years (\$36 million in 2013 and \$126 million in 2014). The 2014 haul was almost entirely from six-figure membership dues of wealthy donors whom the Kochs convene twice a year for summits that highlight the virtues of fiscally conservative, small government policies — and who raise money for groups and candidates who support those policies.

Freedom Partners and most of its grantees do not reveal their donors' names because they are registered under a section of the tax code — 501(c) — that does not require them to do so.



Clinton campaign continues outreach to black lawmakers

By LAUREN FRENCH

The group's impressive haul constitutes the lion's share of the \$290 million that the Koch network expected to spend in the run-up to the 2014 midterm elections. And its tax filings show that the group disseminated the majority of its cash to other groups, with the biggest donations going to a cluster groups that form the central core of the network.

Americans for Prosperity, the network's most politically aggressive group, received \$22 million from Freedom Partners. Concerned Veterans for America, which seeks to engage veterans on fiscal issues, received \$16 million. The LIBRE Initiative, which targets Latino voters, received \$6.5 million. A group that disseminates money to reach evangelical voters received \$6 million, while the American Energy Alliance, which opposes energy regulations, received \$2 million.

But Freedom Partners also wrote grants to an array of groups that play key roles in the broader conservative coalition, but are not considered to be part of the network — including some that have differed sharply with the Kochs' public policy stances.

The U.S. Chamber of Commerce received \$2 million from Freedom Partners, despite lobbying for the reauthorization of the Export-Import Bank, a program vehemently opposed by the Koch network as market-skewing corporate welfare. The Club for Growth and Heritage Action for America – which supported a 2013 government shutdown that the Koch network said it opposed – received \$1 million and \$150,000, respectively.

Other grantees outside the Koch network included the National Rifle Association's Institute for Legislative Action, which received \$4.9 million, and a group called the Dr. Joseph Warren Institute, which spreads the message of medical professionals who oppose Obamacare. It received \$300,000 from Freedom Partners.

Some grantees used Freedom Partners' cash for highly specific campaigns that seemed to have at least the network's tacit endorsement. A \$400,000 grant went to a group called Trees of Liberty, which, as POLITICO revealed last week, spent its cash attacking the leading rival of Koch-favorite Joni Ernst during her 2014 GOP primary campaign for the Iowa Senate seat she eventually won. Trees of Liberty was created in 2013 with the Kochs' blessing to cultivate candidates who share their commitment to free-market conservatism.



House likely to vote Thursday on Syrian refugee bill

By JAKE SHERMAN

The tax filings show that Freedom Partners paid Aegis Strategic \$1.3 million in consulting fees. And Freedom Partners donated \$693,000 to an affiliated super PAC, Freedom Partners Action Fund, which last fall aired ads attacking Democratic Senate candidates, including Ernst's general election opponent, then-Rep. Bruce Braley.

Freedom Partners Chamber of Commerce's tax filings reveal that the group is branching out beyond merely disseminating cash to other entities for political and public policy advocacy, and has built its own robust operation. Its staff, which numbered 60 employees in 2013, grew to 133 employees last year. They were paid a total of \$13 million in salary and benefits, including \$794,000 that went to the salary and benefits of the group's president Marc Short.

That salary puts him well ahead of Republican National Committee Chairman Reince Priebus, who made \$153,000 last year, but far behind U.S. Chamber of Commerce CEO Tom Donohue, who was paid \$4.9 million in 2011.

Freedom Partners also spent heavily on functions it used to delegate to grantees. It spent \$1.9 million on focus groups and \$1.2 million on advertising production. It paid \$1.5 million to the firm of Frank Luntz, a regular guest at Koch donor seminars, and \$1.4 million to the Utah-based direct mail firm Arena Communications.

Senator WHITEHOUSE. Thank you.

I think the point I am trying to make here is that the so-called voices of the business community that we are seeing here are in fact the voices of the fossil fuel industry, specifically ExxonMobil, the coal industry, big oil, the Koch brothers; and that the bulk of the broader American corporate community is actively supporting taking action on climate, setting aside the parts of the American economy that are actually involved in the clean energy economy. These are kind of just neutral American businesses, as opposed to companies like I think it is called Mid-America Power, which is providing so much wind power in Iowa right now and other big ventures that are investing heavily, creating jobs, developing technology, and doing good things for the American economy.

So I wanted to make sure that the record of this proceeding reflected both the position of the broader American corporate community and also the funding behind two of the gentlemen who are here today.

Thank you, Madam Chair.

Senator CAPITO. Well, I think we have reached the end of our hearing. I want to thank all of you for participating. I think we have gotten some good discussion.

Senator CARPER. Madam Chair.

Senator CAPITO. Yes.

Senator CARPER. You and I are both from West Virginia. I was born long before you were, but when I think about this issue, I think about the Golden Rule, how do we apply the Golden Rule so we are fair to everybody. In my State, we face global sea level rise. It is going to do us in, eventually, if we don't do something about it.

My native State, West Virginia, one of the top five coal-producing States in the Country, some of our neighbors where I was born and grew up, my dad worked as a coal miner for a little bit out of school. But I have been a longtime supporter of clean coal technology, I am sure you have as well, for over twenty-some years. We spent about \$20 billion on clean coal technology, I think, in the last 20 years, and we have a plant up and running now in Southwest Texas. It will be up and running next year. It will produce about 250 megawatts of energy. We have some other plants where work is being done on those.

It has taken a long time, it has taken a lot of money, but I am encouraged that we are starting to make some progress. So when I apply the Golden Rule to those five coal-producing States, West Virginia, Kentucky, Illinois, Pennsylvania, Wyoming, and others, I think what is the fair thing to do with them, and I think part of the fair thing to do is to continue to invest in clean coal technology and look for the innovation. All those coal plants that they are going to build in China and other places, if they can actually use this technology, we could actually develop it, that could be pretty good job development for all of us.

Senator CAPITO. Well, I would agree, and in the form of letting the panel know that Senator Barrasso is on his way, so the same courtesies that we extended to Senator Whitehouse we will extend to him and wait a little bit longer for him to be able to make questions.

And I do believe innovation, but I do believe that when we talk about the human price and the human consequences of what is going on in terms of climate change, you have to look about what is going on in States like mine right now, and the human consequences of the highest unemployment, a 4 percent cut in our State budget, the first time we have ever had to cut education in many, many years by 1 percent; more people in poverty; a sense of gloom and doom and depression that really I have not seen in our State, and we have had a lot of highs and lows in our State. As you know, we have had experience with kind of feeling that our economics can't move forward.

But it is indescribable where I am living right now, so I see the human consequence of moving forward without the innovation, without longer timelines, without more common sense. So I will just make that a statement.

I am going to ask a quick question because you brought up the sole executive agreements that had been made. I think you said how many over the past, 800?

Senator CARPER. Actually, about 18,000.

Senator CAPITO. Eighteen thousand.

Senator CARPER. They call them executive agreements.

Senator CAPITO. So my question is, Mr. Ku, if this becomes a sole executive agreement by this President, who is leaving office in a year, for the next president coming in, what kind of parameters, does that have any binding measures for the next president, and could the next president come in and just totally undo what has been done in that sole executive agreement?

Mr. KU. Thanks, Senator. I think that a sole executive agreement is the weakest kind of commitment that the United States can make. There are a lot of them, but they are usually for very small things or things within the president's inherent powers. So the Supreme Court has said that only for things that historically Congress has acquiesced in using executive agreements would the Court uphold such executive agreements.

So I think the way to think about this is that if he makes the executive agreement under his sole authority, a president can withdraw the executive agreement under his sole authority.

Senator CAPITO. But that would mean the succeeding president.

Mr. KU. Yes. So a succeeding president would have the authority to withdraw an executive agreement that was made under the sole authority of the previous president.

The only difference, I would just say, is that if the other countries feel like the previous president made a binding promise, the fact there is a new president doesn't make them feel much better about it. So there is a cost to it if the next president withdraws. Even though it is legal, the other countries obviously become upset and unhappy about it, and that is why the Supreme Court, I think, and generally scholars think that the use of sole executive agreements has to be carefully used only where it is clear the president has the authority and there is longstanding precedent for use of a sole executive agreement in that circumstance.

Senator CAPITO. Well, thank you.

Senator Barrasso.

Senator WHITEHOUSE. Madam Chair, before we turn to Senator Barrasso's remarks, may I simply associate myself with the thoughtful remarks of Senator Carper of a moment ago? I have to leave now, but I would like to associate myself with his remarks.

Senator CAPITO. All right. Thank you.

Senator BARRASSO.

Senator BARRASSO. Thank you, Madam Chairman.

You know, if there was one message that I would like to send to the international community ahead of the international climate change conference, it is this: without Senate approval, there will be no money.

Secretary Kerry says that a treaty requiring Senate approval will not emerge from the international climate talks. This is despite the fact that the State Department is pushing for parts of the agreement to be legally binding on the United States.

On November 13th, the State Department, our position has not changed. The U.S. is pressing for an agreement that contains provisions both legally binding and non-legally binding.

Any agreement reached in Paris that contains legally binding requirements on the American people must come to the Senate for a vote. This isn't only the right thing to do, it is also what the Constitution requires.

As we know, the United Nations Green Climate Fund was proposed during the 2009 conference of parties in Copenhagen, Denmark. The Fund facilitates a giant wealth transfer of taxpayer dollars from the developed nations to developing nations to help them adapt to climate change.

Congress has never authorized funding the Green Climate Fund. The United States and other developed nations have pledged approximately \$10 billion for the initial capitalization of the Fund, with the goal of raising \$100 billion annually. Most people think that is a misprint, but it is true, \$100 billion annually is what they are talking about.

On November 15th of last year, the Obama administration pledged \$3 billion in U.S. taxpayer funds over the 4-years during the G20 meetings in Australia. The Administration's Fiscal Year 2016 budget request asks for \$500 million for the Fund.

We cannot support providing taxpayer dollars to this Fund if Congress does not get approval of an agreement.

So I want to make it clear to the Administration, as well as to foreign diplomats across the globe who are looking for U.S. dollars, which is the linchpin of this conference, without Senate approval there will be no money, period.

I and many of my colleagues will be sending the President a letter stating that very soon. We have circulated a copy of the letter.

Now for the questions.

Mr. Cass, it was recently reported in The New York Times, page 1, above the fold, Wednesday, November 4th, China is burning much more coal than it claimed. Article states, even for a country of China's size, the scale of the correction is immense. The sharp upward revision in official figures means that China has released much more carbon dioxide, almost a billion more tons a year, than previously estimated. A billion more tons a year than estimated.

The increase alone is greater than the whole German economy emits annually from fossil fuels.

So how does this impact the Chinese INDC submission and should we be premising U.S. action based on a promise from China, when they can't even accurately count or won't accurately account their coal consumption?

Mr. CASS. Thank you, Senator. I think the Chinese restatement is an important fact, because in that very article they actually quote China's climate advisor, somewhat smugly noting this makes it even easier for them to meet their target.

China has never committed to a level that its emissions will peak at; it has never committed to how its emissions will decline after that. So by after having already put out its commitment, noting, oh, and actually we are burning a lot more coal than we told you, they are in fact making it that much easier to meet a goal that they were on track to meet anyway, without actually making any changes to their policy.

Senator BARRASSO. But it sounds like the cost and concessions to be made by the U.S. in the agreement with China are much more real than what China is ever going to do, and ours have to be done before 2025 and China can continue to go to peak in the year 2030.

Mr. CASS. That is correct. And I think what is most concerning about that in some respects is that we have heard so much at this hearing about the importance of U.S. leadership and about this process we have moved forward with that requires what is essentially called naming and shaming. The premise of getting action from the developing world is that we are going to call out those who do not commit to action and shame them into action. Now, whether that was ever a good idea or not, it is how we have proceeded; and yet the talking points from the most vocal advocates of climate action are now that the China is doing a great job.

Senator BARRASSO. And, Mr. Eule, if I could ask you if a sophisticated country like China can't keep up with its emissions, what level of confidence do we have that other countries with fewer resources and capacity will be able to or willing to produce a reliable system for measuring, reporting, and verifying emission reduction activities?

Mr. EULE. In the Chinese experience, my guess is nothing new. I think there are a lot of developing countries that don't have a handle on how much greenhouse gas emissions they are actually emitting. So it is an excellent question, and I am not quite sure at this point that measuring, reporting, and verification can be set up so that we can, with assurance, guarantee that the emission cuts they have promised are actually going to be delivered.

Senator BARRASSO. And then a question for both of you, if you could. There was a recent opinion piece in *The Wall Street Journal* by Bjorn Lomborg, who many of you are familiar with, noted that in the run-up to the negotiations, he says, rich countries and development organizations are scrambling to join the fashionable ranks of climate aid, of the donors. This effectively means telling the world's worst off people, suffering from tuberculosis, malaria, malnutrition, that what they really need isn't medicine, isn't mosquito nets, or micronutrients, but a solar panel.

Could the ultimate effect of the negotiations make it actually harder, harder for countries to raise their own people out of the abject poverty in the name of climate change?

Mr. CASS. I think that is certainly a concern, and I think Senator Wicker called attention to the fact that the U.K., under pressure to provide climate finance, has simply said, OK, we will shift our other develop aid into climate finance.

I think the good news for people in developing countries is that their own leaders are refusing to prioritize emissions cuts over economic growth. The bad news is that the developed world, for the sake of getting a signed piece of paper, may reorient their own aid toward solar panels instead of drinking water.

Senator BARRASSO. Mr. Eule.

Mr. EULE. Mr. Cass said essentially what I was going to say. The simple fact is when you look at what developing countries are doing, they have set their priorities, and their priorities are economic development, poverty eradication, and energy access; it is not about addressing greenhouse gas emissions. And I think that is going to be the way it will be for the foreseeable future.

Senator BARRASSO. Thank you.

Thank you, Madam Chair.

Senator CAPITO. Thank you.

Senator Carper, anything else?

Senator CARPER. If I could make a unanimous consent request to put in the record, Madam Chairman, a copy of the U.S. pledges for the general climate fund, which actually appear to be around \$3 billion, instead of the \$45 billion quoted earlier.

I would just say to my friend from Wyoming, you missed this, but we have a number of States. I was born in one that produced a lot of coal, and as we go forward and try to figure out how to deal with this issue of climate change and global warming, we need to be mindful how do we help the States that will be adversely affected, just as we try to help the low-lying States that are in danger of being drowned.

And I would say if we don't provide leadership, the rest of the world, they are not going to do much at all. Why should they? If we do provide leadership, we have a shot, we have a chance.

Thank you.

Senator CAPITO. Thank you.

Thank you again to the panel and thank all those who attended, and I will call this hearing adjourned.

[Whereupon, at 11:27 a.m. the hearing was adjourned.]


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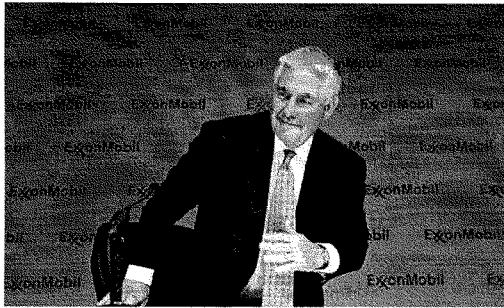
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ExxonMobil Is Still Spending Millions of Dollars on Climate Science Deniers

Posted: 07/16/2015 2:11 pm EDT | Updated: 07/17/2015 12:59 pm EDT



ExxonMobil CEO Rex Tillerson says oil and natural gas will still meet 60 percent of global energy demand in 2040 and we'll just have to deal with the consequences.

ExxonMobil spokesman Richard Keil told a carefully worded whopper last week.

After the Union of Concerned Scientists (UCS) [revealed](#) that Exxon was aware of the threat posed by climate change as early as 1981 and has intentionally been deceiving the public for decades, reporters contacted Keil for comment. One reporter asked him about ExxonMobil's long history of funding climate change denier groups.

"I'm here to talk to you about the present," Keil [said](#). "We have been factoring the likelihood of some kind of carbon tax into our business planning since 2007. We do not fund or support those who deny the reality of climate change."

ExxonMobil no longer funds climate change deniers?! Is that right?

Technically, perhaps, because practically no one can say with a straight face that global warming isn't happening anymore. Most, if not all, of the people who used to deny the reality of climate change have morphed into climate *science* deniers. They now concede that climate change is real, but reject the scientific consensus that human activity -- mainly burning fossil fuels -- is driving it. Likewise, they understate the potential consequences, contend that we can easily adapt to them, and fight government efforts to curb carbon emissions and promote renewable energy.

ExxonMobil is still funding those folks, big time.

Keil said he wanted to talk about the present, so why don't we? According to the most recent publicly available [data](#), last year ExxonMobil spent \$659,000 on congressional climate-science-denier political campaigns and \$1.9 million on 15 denier think tanks, advocacy groups and trade associations for a total of \$2.56 million. Meanwhile, between 2007 -- when Keil said ExxonMobil began to factor in the ramifications of a carbon tax -- and 2014, the company spent at least \$10 million on climate science denier organizations to spread disinformation and undermine efforts to address climate change.

ExxonMobil Claimed it Stopped Funding Deniers Eight Years Ago

This isn't the first time ExxonMobil has denied it was sponsoring a climate disinformation campaign.

Back in 2007, a UCS [report](#) revealed that the oil giant had shelled out at least \$16 million between 1998 and 2005 to a network of more than 40 climate denier think tanks and advocacy groups to advance its agenda. Widely covered by the news media, the report prompted ExxonMobil CEO Rex Tillerson to acknowledge that his company had a PR problem. "We recognize that we need to soften our public image," he said, according to a January 10 story in *Greenwire*, a trade publication. "It is something we are working on."

A month later, just after the release of the U.N. Intergovernmental Panel on Climate Change's Fourth Assessment Report, an ExxonMobil official followed through on Tillerson's promise to temper the company's position.

"There is no question that human activity is the source of carbon dioxide emissions," Kenneth Cohen, vice president of public affairs, told *Greenwire* on February 9. "The appropriate debate isn't on whether climate is changing, but rather should be on what we should be doing about it." But what about the 40-plus ExxonMobil grantees UCS identified in its report? Cohen told *Greenwire* that the company had stopped funding them.

In fact, the company did not stop funding them. ExxonMobil's documented support for denier groups did peak at \$3.48 million in 2005, when the company began to cut off grantees. That year, it severed ties with the Competitive Enterprise Institute, and over the next two years, it dropped a number of others, including the Cato Institute, Frontiers of Freedom, George C. Marshall Institute, Heartland Institute and Institute for Energy Research.

The company's [funding](#) to denier groups, however, remained substantial, second only to the Koch brothers' war chest. The company spent nearly \$21 million from 1998 through 2006 and some \$10 million from 2007 through 2014. Last year, the company paid out \$1.9 million to 15 denier groups, including 10 cited in the 2007 UCS report.

The Disinformation Campaign Continues

ExxonMobil's climate science denier network may have shrunk since 2007, but the 15 groups currently in the company's stable, including the American Enterprise Institute, American Legislative Exchange Council, Manhattan Institute and National Black Chamber of Commerce, are still doing their best to sow doubt about climate science and denigrate renewable energy.

Let's take a quick look at what these four emblematic groups are doing.

The American Enterprise Institute (AEI), which has received \$1.9 million from ExxonMobil since 2007, has played a relatively bit part in the climate and energy debate and, to its credit, has hosted some well-publicized forums on the pros and cons of a carbon tax. Even so, some of its prominent scholars are still pumping out disinformation. Two of the organization's primary talking heads on climate and energy these days are institute fellow Jonah Goldberg and resident scholar Benjamin Zycher, who is also a senior fellow at the Pacific Research Institute, another ExxonMobil grantee.

During an appearance on Fox News Channel's *Your World with Neil Cavuto* show last November, Goldberg [denounced](#) climate scientists as profiteers who are "financially incentivized" to advocate for government action on climate change. Cavuto did mention that Goldberg works at AEI, but left out the fact that the organization has been generously funded not only by ExxonMobil, but also by the American Petroleum Institute and Charles G. Koch Charitable Foundation. Zycher, meanwhile, has been caught playing fast and loose with the facts. For example, in late 2011, AEI published a book on renewable energy by Zycher that [claimed](#) the cost of solar power had jumped 63 percent since 2001. In fact, it had plummeted nearly 40 percent over that time.

Since 2007, ExxonMobil has donated \$454,500 to the American Legislative Exchange Council (ALEC), the secretive lobby group that drafts sample corporate-friendly legislation for state lawmakers. The company has also given campaign contributions to seven of ALEC's 21 board of directors. What does a company like ExxonMobil get for that money? At a three-day conference held in Washington, D.C., last December, ALEC's corporate and legislator members collaborated on sample [bills and resolutions](#) that would, among other things, thwart implementation of the Environmental Protection Agency's proposed standard for existing power plant carbon emissions and block the EPA's new proposed standard for ground-level ozone.

For ALEC, the role human activity plays in global warming is still up in the air. "Climate change is a historical phenomenon," its website [states](#), "and the debate will continue on the significance of natural and anthropogenic contributions." That tortured position gives the organization the opening to invite such notorious climate science denier groups as the Heartland Institute and the Committee for a Constructive Tomorrow to run workshops at its conferences. Both organizations are former ExxonMobil grantees.

The Manhattan Institute received \$475,000 from ExxonMobil between 2007 and 2014. Last year the company gave the institute \$100,000 for its energy policy center, the primary beneficiary being senior fellow Robert Bryce, a former reporter who previously worked for the Institute for Energy Research, another ExxonMobil grantee. Bryce has said he's "agnostic" about climate change, and over the years he has written a stream of newspaper columns that sing the praises of oil and coal and disparage the potential of wind and other renewable energy technologies. For example, his May 4, 2012, *Wall Street Journal* [column](#), "Gouged by the Wind," claimed state standards requiring utilities to ramp up their use of renewables would significantly raise electricity rates, despite [evidence](#) to the contrary. His most recent [column](#), "The Poor Need More Energy: What BP Knows and Pope Francis Doesn't," which ran on June 22 in the *National Review*, maintained that the best, low-cost energy source for developing countries is coal.

Finally, from 2007 through last year, the National Black Chamber of Commerce (NBCC), which boasts 151 chapters nationwide, received \$800,000 from ExxonMobil, and the organization's president, Harry C. Alford, is unapologetic about taking fossil fuel industry money. "Of course we do and it is only natural," Alford [states](#) on the NBCC website. "The legacy of Blacks in this nation has been tied to the miraculous history of fossil fuel... [F]ossil fuels have been our economic friend."

In June, the NBCC placed a [column](#) by Alford in a number of newspapers charging that the EPA's plan to curb carbon emissions from existing power plants would impose "economic hardship" on blacks and Hispanics.

In fact, unchecked climate change will likely hurt poor and minority Americans most.

How did Alford come up with his upside-down assessment? John Rogers, a senior energy analyst at UCS, took a [close look](#) the NBCC-commissioned study that Alford used as the core of his argument and found it was based on several flawed fossil fuel industry-friendly studies. Two of the bogus studies were produced by ExxonMobil grantees, demonstrating the reach of the company's disinformation campaign. One was from the Heritage Foundation, which received \$340,000 from ExxonMobil between 2007 and 2013; another was from the U.S. Chamber of Commerce, which received \$1 million from ExxonMobil last year.

ExxonMobil Curries Favor in Congress

Besides funding climate science denier groups, ExxonMobil spends a considerable amount of money on federal election campaigns. In 2014, for example, the company contributed \$10,000 to reelect the most notorious denier in Congress, Sen. James Inhofe (R-Okla.), the chairman of the Environment and Public Works Committee, matching what it gave him in 2008. You may remember that just last February, Inhofe brought a snowball onto the Senate floor, ostensibly to prove that the cold spell gripping the Northeast somehow proved that human activity is not causing climate change. "Climate has always changed," Inhofe [declared](#). "...No one would debate that it has always happened. The debate is whether man is causing that to happen."

Inhofe, however, is just the tip of the proverbial melting iceberg.

More than 40 percent of the \$1.6 million ExxonMobil spent last year on 283 congressional races went to 102 documented climate science deniers. It gave \$544,000 to 89 deniers in the House, including Fred Upton (R-Mich.), chairman of the Energy and Commerce Committee, and Lamar Smith (R-Texas), chairman of the Science, Space and Technology Committee. Thirty-four of the 54 members of the Energy and Commerce Committee got ExxonMobil money, and half of those recipients are climate science deniers. Sixteen of the 39 members of the Science Committee, meanwhile, got ExxonMobil funding, and four of the recipients are deniers.

Upton, who had [called for](#) taking action on global warming before landing the Energy and Commerce chairmanship in 2011, now [maintains](#) - despite overwhelming scientific evidence -- that climate change is "not manmade." In April, his committee passed a bill sponsored by Ed Whitfield (R-Ky.), another ExxonMobil-funded denier, that would give states the choice to opt out of the EPA's new carbon emission rules for existing power plants and postpone implementation until all legal challenges are resolved. That likely would take years.

When it comes to climate science denial, Lamar Smith is nearly on par with Inhofe. In April, he wrote a [column](#) for the *Wall Street Journal*, "The Climate Change Religion," which was riddled with false claims, prompting a scathing [critique](#) by Factcheck.org. But Smith is doing a lot more than repeating the fossil fuel industry's talking points in the pages of the *Wall Street Journal*. Since January, his committee has passed a [handful of bills](#) that, if enacted, would roll back public health and environmental protections and obstruct the EPA and other federal agencies from enacting science-based rules.

Then there's the Senate. The balance of ExxonMobil's support for deniers -- \$115,000 -- went to 13 senators, five of whom sit on the Energy and Natural Resources Committee and four others on the Environment and Public Works Committee, including Chairman Inhofe. Shelley Moore Capito (R-W.Va.), who received \$10,000 from ExxonMobil last year and sits on both committees, has introduced a version of Whitfield's opt-out bill in an Environment and Public Works subcommittee.

ExxonMobil's 'Plan B' is Not a Viable Answer

In response to a reporter's question last week in the wake of UCS's revelation, Exxon spokesman Richard Keil [maintained](#) that ExxonMobil today "believes the risk of climate change is clear, and warrants action."

Really?

A close reading of the transcript of the company's annual shareholders meeting in May says otherwise. Over the last 25 years, ExxonMobil has repeatedly fended off shareholder resolutions to address climate change, and this year was no different. The message was loud and clear: Stay the course. Technological ingenuity will enable us to cope with the consequences.

One shareholder-sponsored resolution called on the company to set goals for curbing carbon emissions. Another would have required the company to appoint a climate change expert to its board. Still another requested a report on the company's state and federal lobbying expenditures, including lobbying through trade associations and other organizations, such as ALEC. The answer was no, no and no. None of the climate-related resolutions passed.

In his opening statement at the meeting, CEO Rex Tillerson predicted that oil and natural gas "will meet about 60 percent of global energy in the year 2040." And when asked later why he uttered nary a word about renewable energy in his remarks, Tillerson quipped, "We choose not to lose money on purpose" to loud applause.

Tillerson, who has long maintained that climate models are flawed, recommended a wait and see approach. "What if everything we do, it turns out our models were really lousy ... and it turned out the planet behaved differently because the models weren't good enough to predict?" he said. "What's Plan B?"

For Tillerson, Plan B is continuing to burn fossil fuels and adapt to whatever happens, be it sea level rise or crop failures. "Mankind has this enormous capacity to deal with adversity," he said, "and those solutions will present themselves as the realities become clear."

In lieu of ExxonMobil's dangerous, do-nothing Plan B, there are many things the company and other major carbon polluters can and must do to protect the planet. Step one for ExxonMobil: Put an end to its climate disinformation campaign. That means doing more than just talking about closing it down. ExxonMobil and other major fossil fuel companies must stop funding proxy groups and politicians to sow doubt about climate science and oppose proven ways to address the problem. After decades of deception, we need more than just talking the talk.

Elliott Negin is a senior writer at the Union of Concerned Scientists. UCS intern Jayne Piepenburg contributed research for this article. Data on ExxonMobil expenditures on denier groups came from the company's publicly available [financial records](#) compiled by UCS and Greenpeace. Data on climate science deniers in Congress came from documentation provided by the [Center for American Progress](#) and journalist [Bill Moyers](#). Data on federal campaign contributions came from the [Center for Responsible Politics](#). Data on state campaign contributions came from the [National Institute on Money in State Politics](#).

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Conversations

32 Comments

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Philip Brewbaker · Streeling University

With the kind of money at their disposal, Exxon and others could easily have LED the renewable revolution, and profited mightily by it. I'm not sure what kind of disease it is that suggests that EARTH as a consideration is secondary to next quarters profits, but I hope its not contagious. It reminds me of tobacco companies who know they are giving schoolchildren cancer, but STILL place cigarette stands right outside the school exit (in developing nations) and offer single cigs to 12 year olds for next to nothing.

Is it 'The Virtue of Selfishness'?

Like · Reply · 21 · Jul 16, 2015 11:45am



Richard Wickberg

The stock holders and managers of petroleum monopolies are stuck in the 19th century. The champagne is still flowing now and things are fine.

Change has come!


Like · Reply · 4 · Jul 16, 2015 1:03pm



Ronald Cohen · Lawyer at Private Practice law Firm

Philip: The short answer is lack of vision and an inability to defer


rewards. If resources were put into alternative energy there's a capital investment, a lead-time and a reduction in monies available to the core business, reducing profits, possible depressing share prices and cutting bonuses. You don't get rewarded for the crop you've planted that's harvested after you've gone.

Like · Reply ·  5 · Jul 16, 2015 1:34pm



Paul J Chamberlain

Richard Wickberg Fossil fuels are what powered the twentieth century, and will power most of the 21st century. You assertion that fossil fuels companies are stuck in the 19th century is ridiculous. It is the eco-left that wants to take us back to the 17th century with their windmills.

Like · Reply ·  1 · Jul 16, 2015 4:17pm


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Ian Monteith · University of Saskatchewan

For those old enough to remember the war by the big tobacco companies against the science linking smoking to cancer, this is history repeating itself.


Big tobacco had the goal of creating doubt, calming the public's concern; denying there was anything wrong; withholding evidence that made their side look bad, even when it was their own research that had uncovered the results; maligning the scientists who were proving the cancer-tobacco link; spending millions to create groups that would promote the message that cigarettes were safe, thus making it appear as if a grass-roots movement had sprun... See More

Like · Reply ·  5 · Jul 16, 2015 10:19pm



Elliott Negin · Washington, District of Columbia

Thanks for your comment. I pointed out that the fossil fuel industry is using the tobacco industry's playbook in a blog post last week. See <http://www.huffingtonpost.com/.../internal-documents-show...>


Like · Reply ·  4 · Jul 17, 2015 5:33am



Paul J Chamberlain

Elliott Negin The Union of Concerned "Scientists" uses the same misinformation techniques as the tobacco industry. Their anti-nuclear campaign exploits public ignorance to promote irrational fear all the while claiming they are not anti-nuclear.


Had we continued building nuclear plants, we could have been completely off of coal by year 2005, this would have saved hundreds of thousands of lives.

Like · Reply ·  1 · Jul 17, 2015 11:59am



Paul J Chamberlain

Elliott Negin The comparison to tobacco is absurd. Tobacco only harms people, where as fossil fuels are currently essential to supporting our populations. Fossil fuel do far more good than harm.


Like · Reply ·  1 · Jul 17, 2015 12:01pm

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Ronald Cohen · Lawyer at Private Practice law Firm

The issue continues to be one of rewards. Tillerson gets his reward from Exxon-Mobil and the only way they see to fund themselves is to destroy the biosphere and, for them, that's OK. Tillerson will be long retired by 2040 and the mess he and others in his position make will be paid for by others yet unborn. Remember: Soy lent Green is people - that how far a corporation will go to keep up the cash flow.

Like · Reply ·  5 · Jul 16, 2015 1:28pm



Robert Cairns · Works at Self-Employed

Ronald Cohan,,, onya ron ,,excelllent analasis of the corporate

Manhattan Institute for Policy Research

From SourceWatch

The **Manhattan Institute** (MI) is a right-wing 501(c)(3) non-profit think tank founded in 1978 by William J. Casey, who later became President Ronald Reagan's CIA director.^[1] It is an associate member of the State Policy Network.

According to the Manhattan Institute, it is "focused on promoting free-market principles" and has a mission to "develop and disseminate new ideas that foster greater economic choice and individual responsibility."^[2]

"The Manhattan Institute concerns itself with such things as 'welfare reform' (dismantling social programs), 'faith-based initiatives' (blurring the distinction between church and state), and 'education reform' (destroying public education)," Kurt Nimmo wrote October 10, 2002, in *CounterPunch*.^[3]

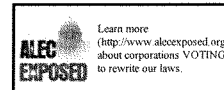
Koch Wiki

The Koch brothers -- David and Charles -- are the right-wing billionaire co-owners of Koch Industries. As two of the richest people in the world, they are key funders of the right-wing infrastructure, including the American Legislative Exchange Council (ALEC) and the State Policy Network (SPN). In SourceWatch, key articles on the Kochs include: Koch Brothers, Koch Industries, Americans for Prosperity, American Encore, and Freedom Partners.

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http://www.sourcewatch.org/index.php/Manhattan_Institute_for_Policy_Research



Learn more about how the State Policy Network aids ALEC and spins disinformation in the states.



12/2/2015

Manhattan Institute for Policy Research - SourceWatch

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Ties to the Koch Brothers

The Manhattan Institute has received funding from the Koch brothers. The Claude R. Lambe Foundation, one of the Koch Family Foundations, reported giving \$2,075,000 to the Manhattan Institute between 2001 and 2012, the last year for which data is available. The Charles G. Koch Foundation gave \$100,000 to the Institute in 2012.

Controversies

Cutting Ties over Pension Plans

Cliff Asness, Henry Kravis, and Thomas McWilliams said they would cut ties with the Manhattan Institute in 2013 over the organization's calls to abolish defined benefit public pension plans. According to the *New York Post*, "The moves come after the American Federation of Teachers in April (2013) called out 33 top money managers for backing efforts to eliminate public pensions -- while soliciting their investment dollars."^[4]

Asness, who is the founder of AQR, said he would not renew his term on Manhattan's board of trustees when it expires in 2014, and McWilliams, who is a managing partner at Court Square, resigned from the Institute's board.^[4]

Meanwhile, one hedge-fund manager and Institute board member, Dan Loeb, refused to back down or give in to calls from the AFT to resolve his apparent conflict of interest -- that is, his position at Third Point, which wants access to pension fund investments, and his position at Manhattan, which supports privatization of pension funds and government services.^[4]

Immigration: Covering All the Bases

In 2007, the *New York Times* reported, "In the think-tank world, a leading advocate of a path to citizenship for illegal immigrants is Tamar Jacoby..., an expert at the conservative Manhattan Institute. One of the most implacable voices against any such 'amnesty' is Heather Mac Donald -- also of the Manhattan Institute."^[5]

While many of the Institute's fellows do not hold an anti-immigration stance, they do oppose "government programs intended to accommodate immigrant concerns, such as bi-lingual education."^[6]

"The organization has attacked . . . immigrant support programs as obstacles to full social integration and to the benefits of the market system."^[6] However, the Institute is in favor of reforming the U.S. immigration system and has written of the economic benefits of migration.^[7]

Ties to the American Legislative Exchange Council

The Manhattan Institute's Senior Fellow and Director of its Center for Medical Progress, Paul Howard, spoke at the 2011 American Legislative Exchange Council Annual Conference in a Workshop titled "Rationing By Any Other Name: Medicare's Independent Payment Advisory Board." He co-lead the panel with the Pacific Research Institute's Director of Health Care Studies, John Graham (the Pacific Research Institute is also a State Policy Network member).^[8]

About ALEC

ALEC is a corporate bill mill. It is not just a lobby or a front group; it is much more powerful than that. Through ALEC, corporations hand state legislators their wishlists to benefit their bottom line. Corporations fund almost all of ALEC's operations. They pay for a seat on ALEC task forces where corporate lobbyists and special interest reps vote with elected officials to approve "model" bills. Learn more at the Center for Media and Democracy's ALECexposed.org (<http://alecexposed.org/>), and check out breaking news on our PRWatch.org site (<http://www.PRWatch.org>).

Financiers of Neo-conservatism

12/2/2015

Manhattan Institute for Policy Research - SourceWatch

The "financing of neo-conservatism doesn't come from D.C.", Mark Gerson is quoted as saying in the April 27, 2003, *New York Observer*. "Instead, said Mr. Gerson, it comes from New York moneymen like Bruce Kovner, chairman of the Caxton Corporation, and Roger Hertog, the vice chairman of Alliance Capital Management. Last year, both financiers helped fund a new newspaper, *The New York Sun*, now fighting its anti-liberal battle with its *New York Times* --counterprogrammed slogan, 'A Different Point of View.' Both Mr. Kovner and Mr. Hertog also chipped in to join neoliberal Martin Peretz as co-owners of *The New Republic*. Mr. Kovner and Mr. Hertog, as enlightened neoconservative businessmen-intellectuals, are also on the board [of trustees] of the Manhattan Institute, where Mr. Gerson and William Kristol are also trustees, as well as the Washington, D.C.-based American Enterprise Institute."^[9]

War on Terrorism: "Axis of Evil"

In 2001, David Frum left the Manhattan Institute "to join the Bush administration as a speechwriter. It was there that he coined the term "axis of evil" to describe Iraq, Iran and North Korea. This became the signature phrase of President George W. Bush's 2002 State of the Union speech and shorthand for Bush's war on terrorism."^[10]

Ties to Big Tobacco

Tobacco industry documents reveal relationships between the Manhattan Institute and tobacco companies. The Institute sought funding from tobacco companies, including Brown & Williamson,^[11] and has received funding from R.J. Reynolds.^[12] In 1991, Lorillard, Inc. budgeted a \$4,000 contribution to the Manhattan Institute^[13] and the same amount in 1996.^[14] Phillip Morris budgeted \$25,000 for the Institute in 1995.^[15]

A 1997 R.J. Reynolds memo reveals RJR's intent to use the Manhattan Institute as a third party to help the company reduce the public's perception of danger from exposure to secondhand smoke:

"Devise ways to educate the public about epidemiology and put risk in perspective. For example, work with Steven J. Milloy, Michael Fumento, CEI Competitive Enterprise Institute, the **Manhattan Institute** and others to put together a 1/2-hour or 1-hour TV show explaining epi[demiology] and risk. Create an epi/risk website to educate the general public, maybe working with the Harvard School of Public Health. Do the same for journalists."^[16]

History

The Institute describes its policy agenda over its 25-year history as having spanned "taxes, welfare, crime, the legal system, urban life, race, education, and many other topics. We have won new respect for market-oriented policies and helped make reform a reality."^[17]

In its publication *Buying a Movement*, People for the American Way describes the Manhattan Institute's agenda as advocating for "privatization of sanitation services and infrastructure maintenance, deregulation in the area of environmental and consumer protection, school vouchers and cuts in governmental spending on social welfare programs; it is a preferred source of information" for then-New York City Mayor Rudolph W. Giuliani.^[18]

The organization describes its communication strategy as being based around the strengths of its "senior fellows": "Their provocative books, reviews, interviews, speeches, articles, and op-ed pieces have been the main vehicle for communicating our message."^[17]

"Books are central to our approach. We make every effort to ensure that our authors are published by respected trade publishers and that their books receive as much review attention and publicity as possible. Nothing allows us to make a sustained, comprehensive argument more effectively," the website states.^[17]

Charles Murray -- an author whom *CounterPunch* calls "a far right ideologue who wrote *The Bell Curve* in 1984, a book that essentially argues black people are genetically and intellectually inferior to white people" -- was based at the Manhattan Institute while writing the book *Losing Ground*.^[1]

Funding

Between 2001 and 2010, the Manhattan Institute received more than \$3 million from the conservative Bradley Foundation.^[19]

Between 1985 and 2005, the Institute received \$20,579,883 (unadjusted for inflation) in a total of 294 grants from a small group of right-wing foundations.^[20]

The following organizations had given donations to the Manhattan Institute as of 2005:^[20]

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- Armstrong Foundation
- Bill & Melinda Gates Foundation^[21]
- Brady Education Foundation, Inc.
- Castle Rock Foundation
- Earhart Foundation
- F.M. Kirby Foundation
- Gilder Foundation
- Gordon and Mary Cain Foundation
- Hickory Foundation
- Jaquelin Hume Foundation
- John Templeton Foundation
- John M. Olin Foundation, Inc.
- JM Foundation
- Koch Family Foundations (Claude R. Lambe Foundation)
- Lynde and Harry Bradley Foundation
- Randolph Foundation^[22]
- Roe Foundation
- Ruth and Lovett Peters Foundation
- Scaife Foundations (Sarah Mellon Scaife, Carthage^[23])
- Shelby Cullom Davis Foundation
- Smith Richardson Foundation
- Walton Family Foundation
- William E. Simon Foundation
- William H. Donner Foundation

Other Affiliations

- Independent Task Force on Immigration and America's Future (ITFIAF)^[24]
- State Policy Network^[25]

Personnel

Board of Trustees

As of June 2014:^[26]

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- Bruce G. Wilcox, Chairman, Management Committee, Cumberland Associates, LLC
- Kathryn S. Wylde, President & CEO, The Partnership for New York City

Staff

Key staff as of June 2014:^[27]

- Lawrence J. Mone, President
- Michael Allegretti, Vice President of Programs
- Brian Anderson, Editor, *City Journal*
- Michael Barreiro, Vice President of Operations
- James Copland, Director, Center for Legal Policy
- Molly M. Harsh, Director of Programs, Adam Smith Society
- Timothy Hoefer, Director, Empire Center for New York State Policy
- Paul Howard, Director, Center for Medical Progress
- Howard Husock, Vice President, Policy Research
- Jessica Perry, Director of Development

Fellows and Scholars

As of June 2013:^[28]

- Brian C. Anderson, Editor, *City Journal* (New York City)
- Rick Baker, Adjunct Fellow, Center for State and Local Leadership (St. Petersburg, Florida)
- Michael Knox Beran, Contributing Editor, *City Journal* (New York City)
- Claire Berlinski, Contributing Editor, *City Journal* (Istanbul, Turkey)
- Ben Boychuk, Associate Editor, *City Journal* (California)
- Lester Brickman, Visiting Scholar, Center for Legal Policy (New York City)
- Robert Bryce, Senior Fellow, Center for Energy Policy and the Environment (New York City)
- James R. Copland, Senior Fellow and Director, Center for Legal Policy (New York City)
- Theodore Dalrymple, Contributing Editor, *City Journal*
- Daniel DiSalvo, Senior Fellow, Center for State and Local Leadership (New York City)
- Richard C. Dreyfuss, Senior Fellow, Center for State and Local Leadership (Pennsylvania)
- Stephen D. Eide, Senior Fellow, Center for State and Local Leadership (New York City)
- Richard A. Epstein, Visiting Scholar, Manhattan Institute (New York City)
- Andrew C. von Eschenbach, Chairman, Project FDA (New York City)
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- Diana Furchtgott-Roth, Senior Fellow, Manhattan Institute (Washington, D.C.)
- Nicole Gelinas, Senior Fellow and Contributing Editor, *City Journal* (New York City)
- Edward Glaeser, Senior Fellow and Contributing Editor, *City Journal* (Boston)
- Richard Greenwald, Adjunct Fellow, Center for State and Local Leadership (Newark, NJ)
- Victor Davis Hanson, Contributing Editor, *City Journal* (California)
- Stephanie Hessler, Adjunct Fellow, Manhattan Institute (New York City)
- Paul Howard, Senior Fellow and Director, Center for Medical Progress (New York City)
- Peter W. Huber, Senior Fellow, Center for Medical Progress, Center for Energy Policy and the Environment, Center for Legal Policy (Hanover, NH)
- Howard Husock, Vice President, Policy Research, Manhattan Institute (New York City)
- Kay S. Hymowitz, Senior Fellow and Contributing Editor, *City Journal* (New York City)
- Stefan Kanfer, Contributing Editor, *City Journal*
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- Andrew Klavan, Contributing Editor, *City Journal* (Los Angeles, CA)
- Joel Kotkin, Contributing Editor, *City Journal* (California)
- John Leo, Senior Fellow, Center for the American University (New York City)
- Herbert London, Senior Fellow, Center for the American University (New York City)
- Heather Mac Donald, Senior Fellow and Contributing Editor, *City Journal* (New York City)
- Myron Magnet, Editor-at-large, *City Journal* (New York City)
- Steven Malanga, Senior Fellow and Senior Editor, *City Journal* (New York City)
- James Manzi, Senior Fellow, Manhattan Institute (Boston, MA)
- Edmund J. McMahon, Senior Fellow and Director, Empire Center for New York State Policy (Albany/New York City)
- John H. McWhorter, Contributing Editor, *City Journal* (New York City)
- Judith Miller, Adjunct Fellow and Contributing Editor, *City Journal* (New York City)
- Mark Mills, Senior Fellow, (New York City)
- James Piereson, Senior Fellow, Director, Center for the American University (New York City)
- Avik Roy, Senior Fellow, Manhattan Institute (New York City)

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- Fred Siegel, Senior Fellow, Center for State and Local Leadership and Contributing Editor, City Journal (New York City)
- Guy Sorman, Contributing Editor, City Journal
- Harry Stein, Contributing Editor, City Journal (New York City)
- Sol Stern, Senior Fellow and Contributing Editor, City Journal (New York City)
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See also: Manhattan Institute senior scholars

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Manhattan Institute Websites

- <http://www.albanyinc.com/>
- <http://www.centerforpolicingterrorism.com>
- <http://www.city-journal.org/>
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- American Legislative Exchange Council
- State Policy Network
- John J. DiIulio Jr.
- Judith Miller^[29]
- Pete Hegseth
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The White House
Office of the Press Secretary
For Immediate Release
November 15, 2014

FACT SHEET: United States Support for Global Efforts to Combat Carbon Pollution and Build Resilience

Today, President Obama is announcing the intention of the United States to contribute \$3 billion to the Green Climate Fund (GCF), reflecting the U.S. commitment to reduce carbon pollution and strengthen resilience in developing countries, especially the poorest and most vulnerable. The United States joins other nations that have already pledged financial support to this vital new global effort, including Mexico, Korea, Germany, France, Denmark, Norway, and Switzerland. Additional countries are expected to pledge soon.

By financing investments that help countries reduce carbon pollution and strengthen resilience to climate change, the GCF will help leverage public and private finance to avoid some of the most catastrophic risks of climate change. By reducing those risks, the GCF will help promote smart, sustainable long-term economic growth and preserve stability and security in fragile regions of strategic importance to the United States.

The U.S. contribution to the GCF builds on a history of U.S. leadership to support climate action. In 2008, the Bush Administration pledged \$2 billion to the Climate Investment Funds, which were established as a transitional measure to finance efforts to help developing countries address climate change. The U.S. pledge to the GCF demonstrates a continuation of the bipartisan resolve to help developing nations reduce their own emissions, whose dangerous impacts on the climate affect us all, as well as to help the most vulnerable cope with the impacts of climate change. The GCF will also help spur global markets in clean energy technologies, creating opportunities for U.S. entrepreneurs and manufacturers who are leading the way to a low-carbon future.

The GCF was originally called for in 2009 in the Copenhagen Accord, in which developing countries first committed to taking action to mitigate their carbon emissions, including by laying out specific goals and targets. The GCF will employ world-class safeguards and will finance projects and programs with the greatest potential to reduce harmful pollution and foster adaptation to climate impacts. Although the political impetus to establish the GCF came from the multilateral climate negotiations, the GCF is

an independent legal entity that makes independent funding and operational decisions. It is not a United Nations agency or entity, nor will it have a large bureaucracy.

The United States intends to contribute \$3 billion to this initial fund raising effort, not to exceed 30 percent of total confirmed pledges. This share is consistent with the U.S. contribution to other funds in which we have exercised U.S. leadership to catalyze other contributions. We expect that the U.S. share will decline over time as the range of countries contributing to the GCF expands. While the United States is committed to supporting a wide range of mitigation and adaptation programs in developing countries through the GCF, we will target a significant portion of our GCF support to the GCF's Private Sector Facility. This is in recognition of the essential role the GCF must play in mobilizing private sector financing to scale up low-emission and climate-resilient investment in developing countries.

The United States expects that the GCF will become a preeminent, effective, and efficient channel for climate finance and is working to finalize the GCF's governance and institutional policies in 2015. In this regard, the United States reserves the ability to direct a portion of this pledge to other multilateral climate funds to the extent necessary based on the pace of progress.

Some of the innovative features of the GCF include:

- **A dedicated Private Sector Facility.** Unlike most climate funds, the GCF will have a dedicated Private Sector Facility to support entrepreneurs developing low-carbon and climate resilient projects. It will also mobilize capital from private investors around the world. The Board is also advised by a standing Private Sector Advisory Group, composed of business leaders from developed and developing countries.
- **Inclusive governance and wider donor base.** The GCF's governance structure—headed by a 24-member Board with an equal number of developed and developing countries—gives it a uniquely high level of international buy-in and collaboration, with a corresponding ability to attract non-traditional donors.
- **World-class safeguards and accountability mechanisms.** The GCF will require among the strongest fiduciary standards and social and environmental safeguards for all multilateral funds in climate finance today. This will help promote GCF-financed projects and programs that are responsibly designed and implemented, and that all financial resources are managed prudently and transparently. Moreover, the GCF has an Independent Evaluation Unit, which evaluates the impact of GCF programs and projects, as well as an Independent Integrity Unit, which investigates allegations of wrongdoing or prohibited practices. Both units will report to the Board, not the Secretariat. The Board itself makes independent funding and operational decisions.
- **Work in both mitigation and adaptation.** The GCF will balance its support for emissions mitigation and climate adaptation and resilience activities, building up expertise in both areas and positioning itself to

capitalize on synergies between them. This balance will make the GCF unique compared with other funds.

- **Global reach.** The GCF will work through a larger network of public and private partners than most other climate funds. This will help reach more regions and communities, as well as unlock opportunities in both adaptation and mitigation in hard-to-reach locations.