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CLEAN ENERGY POLICIES THAT REDUCE OUR DEPENDENCE ON OIL

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

OF THE

COMMITTEE ON ENERGY AND COMMERCE
HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

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CLEAN ENERGY POLICIES THAT REDUCE OUR DEPENDENCE ON OIL

WEDNESDAY, APRIL 28, 2010

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 9:36 a.m., in Room 2123, Rayburn House Office Building, Hon. Edward J. Markey [chairman of the subcommittee] presiding.

Present: Representatives Markey, Doyle, Inslee, Melancon, Matsui, McNerney, Welch, Dingell, Pallone, Engel, Green, Capps, Matheson, Barrow, Waxman [ex officio], Upton, Stearns, Whitfield, Shimkus, Shadegg, Pitts, Bono Mack, Sullivan, Burgess, Scalise, Griffith, and Barton [ex officio].

Also Present: Representative Latta.

Staff Present: Phil Barnett, Staff Director; Bruce Wolpe, Senior Advisor; Greg Dotson, Chief Counsel, Energy and Environment; Lorie Schmidt, Senior Counsel; Alexandra Teitz, Senior Counsel; Michal Freedhof, Counsel; Alex Barron, Professional Staff Member; Melissa Cheatham, Professional Staff Member; Caitlin Haberman, Special Assistant; Karen Lightfoot, Communications Director, Senior Policy Advisor; Lindsay Vidal, Special Assistant; Mitchell Smiley, Special Assistant; Mary Neumayr, Minority Counsel; Andrea Spring, Minority Professional Staff; Aaron Cutler, Minority Counsel; and Garrett Golding, Minority Legislative Analyst.

OPENING STATEMENT OF HON. EDWARD J. MARKEY, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF MASSACHUSETTS

Mr. MARKEY. Good morning. And welcome to the Subcommittee on Energy and the Environment.

Consumers today spend more than half a billion dollars a day on foreign oil. That is half of our trade deficit. Between 2001 and 2008, when gasoline increased from $1.46 to $3.27 a gallon, the annual household's annual energy cost increased by almost $2,000, slightly more than the average tax cut provided during the same period. These gas dollars go straight to OPEC, and some of them wind up in the hands of terrorists.

We have spent too long resisting efforts to reduce our dependence on oil. As Tom Friedman of the New York Times puts it, the price of oil and the path of freedom run in opposite directions. Some oil payments find their way to Iran to fund its nuclear program, and other payments help fund teachings that perpetuate hate against

Americans. But until recently, we were on the path of ever-increasing oil dependence.

As you can see from the red line, in 2007 the Department of Energy projected increased levels of oil consumption far into the future. These are based on the Bush administration's oil-friendly policies, and these numbers were actually put together by the Bush administration Department of Energy.

With Democrats in control of Congress, we moved quickly to end this dangerous cycle, enacting the first mandated fuel economy provisions in 32 years, which was a huge first step. President Obama accelerated their implementation with a 35.5 mile-per-gallon standard by 2016. Combined with the Renewable Fuel Standard and the Recovery Act measures, you can see from the blue line that we have frozen our levels of oil consumption for the foreseeable future. Again, that number from the Energy Information Agency.

But we can and we must do more. The EPA has modeled what is technologically possible from a range of clean energy policies like those in the Waxman-Markey bill. And you can see from the green line that we can save more than all of the oil we currently import from OPEC, as much as 4 million or 7 million barrels a day more than we have already accomplished. That is the green line.

So we must continue down the path to further reducing our oil dependence. The Waxman-Markey bill includes $20 billion and other measures to deploy plug-in hybrid and all-electric vehicles, and has other provisions to help save oil.

Now, I am sure we will be told, "No, you can't. It will cost too much. It can't be done." But let me remind you, the automobile industry delivered that very same message for nearly a decade. They said the technology didn't exist; that we would all have to drive tiny little go-carts if we raised fuel economy standards; and that the industry would suffer.

Meanwhile, other countries innovated. The U.S. bled manufacturing jobs. Some auto makers closed facilities, APTA facilities, in part because we didn't raise standards quickly enough for them to compete. A recent study found that by transitioning to electric vehicles we could create 1.9 million new jobs by 2030 in the United States; we can improve our trade deficit by $127 billion per year; and the typical U.S. household would pocket almost $4,000 extra in gasoline saved and other benefits.

But if we do not act, we will prevent a generation of Americans from competing in the largest economic growth opportunity of the 21st century: The 2 million new clean energy jobs that would be created in America under the Waxman-Markey bill will be, unfortunately, created overseas; and we will simply trade our dependence on foreign oil for dependence on Chinese solar panels, Korean batteries, and German wind turbines.

To say that it can't be done, I say to those, look at the clean energy entrepreneurs like A123, A Better Place, and the scores of new entrepreneurial companies that have begun this process of reinventing energy technologies and who are proving that, yes, it can.

By charting this new path towards an energy-independent future, we will one day be able to tell OPEC that we don't need their oil anymore than we need their sand. That is what this hearing is all about.

The chair has completed his opening statement. We now turn to recognize the ranking minority member, the gentleman from Michigan, Mr. Upton.

OPENING STATEMENT OF HON. FRED UPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. UPTON. Thank you, Mr. Chairman. And I would like to welcome all of our witnesses here this morning, with a special welcome to Administrator Jackson. Ms. Jackson, we have many important issues before this subcommittee, and we would hope that this is not your last visit. We look forward to your testimony and interaction today.

Before I begin, I would like to submit for the record the June 2009 hearing testimony of Lion Oil. It is a small refiner with about 1,200 employees. It is located in Arkansas. And from that testimony regarding the Waxman-Markey cap-and-trade legislation—which I would note is pretty much the same as the EPA regulations—"will result in the shuttering of our refinery and the destruction of 1,200 jobs."

Yes, shuttering domestic refineries will not reduce our dependence on foreign oil. It will kill American jobs, while we import more refined oil products from countries with more lax environmental laws. EPA regulations that would result in the loss of domestic refineries would not extend to refineries in India, where we will be importing gasoline at, frankly, higher prices. We can remember the $4 gasoline in the past. These policies could send it even higher.

I agree that we must take action to reduce America's dependence on energy from unstable foreign governments and dictatorships, but we can do that by increasing domestic production of oil and natural gas, including recovering our vast oil shale reserves while promoting unconventional fuels such as coal-to-liquid technology. We need, simply, all of the above. We cannot enact or have EPA force costly job-killing climate change policy under the so-called umbrella of energy independence.

I would agree that if we allow the EPA to take command and control of our economy that our oil imports will in fact decrease. But you know what else will decrease? American jobs. Raising the price of gasoline because of cap-and-trade by as much as perhaps 70 cents a gallon, 77 cents a gallon, will indeed increase our consumption.

We are seeing a trend to electrify the transportation sector, which I think is good, but electric cars have to plug into a baseload power source. The EPA is fighting a war on coal, where we get over 50 percent of our power today. I would be interested in hearing the administration's view on nuclear power, something that was not in cap-and-trade or, I believe, in the Administrator's testimony this morning.

It is a fact that EPA climate regulations or worldwide climate agreements thus far will not include China or India. As we suffer from double-digit unemployment, are we going to send simply more jobs abroad for no environmental benefit? Yet many in Congress and the administration continue to promote policies that will push gas and electricity prices even higher by foolishly blocking and creating disincentives for energy production here in North America.

They have also taken ill-conceived steps to block our government from using home-made fuel derived from coal and oil from our Nation's closest ally and northern neighbor, Canada. The glaring consequence of no domestic energy production is greater dependence on foreign sources of energy, coupled with higher gasoline, oil, and natural gas and electricity prices.

Our economy is in a tough time right now. And coming from Michigan, I know firsthand just how difficult things are for the folks at home. Rising energy prices will only exacerbate the economic problems that we are facing, and by law the EPA is prevented from taking economic considerations into account. I think that is wrong.

Now, before I yield back, I would just like to raise another important issue with Administrator Jackson: coal combustion waste or coal ash. For 30 years, EPA has resisted subjecting CCW to Federal hazardous waste management regulations. Doing so now, I believe, would have serious economic and environmental consequences. Coal ash has been regulated in accordance with varying requirements and programs established by the States, and unwarranted hazardous designation will eliminate the environmental benefits of reusing coal ash and only force greater disposal in landfills.

Recycling the ash falls right in line with our new green era of responsibility. Both the Green Building Initiative and the U.S. Green Building Council encourage using fly ash in concrete or products that contain recycled materials in green buildings. That benefit would be lost if somehow we saw regulation. So I would hope that perhaps you might be able to comment on that.

At this point, I yield back the balance of my time.

Mr. MARKEY. The gentleman's time has expired.

For the record, the Nuclear Energy Institute endorsed the Waxman-Markey bill.

Let me turn and recognize the chairman of the full committee, the gentleman from California, Mr. Waxman.

OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. WAXMAN. Thank you very much, Mr. Chairman.

The title for today's hearing is on Clean Energy Policies that Reduce Our Dependence on Oil. Now, I think what we have seen in this country for decades is a view that we can't do anything about this problem. We are just dependent on foreign oil to sustain our way of life, and that is it. There is not much we can do about it. Maybe drill a little bit more in the United States to get more domestic oil, but you can't replace all that oil we are bringing in; so why try?

In fact, the policies that we saw in the first part of this decade were exactly what the Republican President wanted. He had a Republican Congress, and therefore President Bush got through—energy policy—more than 95 percent of the policies he wanted. But what we accomplished in terms of dependence on foreign oil with regard to those policies, we were still on a trajectory to need more

oil every year, year after year for as far as we could project into the future.

It seems now that each year the amount of oil that we imported has been going up, up, and up and up, and that makes us more vulnerable, vulnerable to our national security being compromised.

However, in the last few years Congress reversed its course. In, I guess it was 2007, and 2008, the Energy Independence and Security Act was adopted, and it increased the CAFE standard, which meant that cars had to be more efficient in the use of gasoline. The beginning of last year, we passed the Recovery Act, and in that law we invested in the technology and manufacturing capability to help bring plug-in electric vehicles to market beginning this year. In that law, we helped State and local governments replace their buses, trucks, and work vehicles with natural gas-powered vehicles, all the way from New York to Texas, from California to Maryland. So we have started to do things that have actually reduced our dependence on foreign oil.

Today's hearing will explore some of the real actions we have taken already to cut our Nation's dependence on this oil. And I want to welcome Ms. Lisa Jackson to the committee. She is going to testify regarding clean energy policies that are being implemented by the EPA that are reducing our dependence on oil.

Earlier this month, EPA finalized the historic rule establishing greenhouse gas tailpipe standards for cars and trucks. The EPA has produced strong but workable standards for tailpipe emissions, harmonized with standards from the National Highway Traffic Safety Administration. These standards will cut our oil dependence by 1.8 billion barrels of oil. It will draw on the development of new technology here in the U.S., and provide the U.S. auto industry with the certainty it desires. These standards do all this while saving American consumers $3,000 over the life of the vehicle.

So what we have is a standard that is supported by the auto companies and auto workers, States, and the environmentalists. They are all on board. These policies are already making a difference for our Nation's future. For the first time in decades, the Energy Information Administration no longer projects that the U.S. need for oil will increase year after year. We now expect that the U.S. will not need any more oil in 2030 than it did in 2007. This is a remarkable improvement for our energy security.

There is still more work to do. Administrator Jackson will brief us on an important new EPA study that reveals the dramatic oil savings that are technically feasible and can be achieved through new energy policies.

But the good news is that as we begin to solve the seemingly intractable problems of oil dependence, we also make progress on another seemingly intractable problem, the dangerous increase in our carbon pollution.

This is what we stand for: strong, pragmatic, and effective policies that face the threats to our country and find sensible ways to resolve them. These are not partisan issues. They shouldn't be looked at as partisan issues. But we did go down that partisan road in the early part of this decade, and that road took us to greater dependence and problems that we see as intractable, rather than problems that we are now looking at as problems that we can deal

with. And we can, as a result, have a safer and more efficient and more better future for our environment as well as the economy of this Nation.

Thank you, Mr. Chairman.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Kentucky, Mr. Whitfield.

OPENING STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF KENTUCKY

Mr. WHITFIELD. Thank you, Mr. Chairman. And I am glad we are having this hearing today on clean energy policies that will reduce our dependence on oil. I am pleased also that we have Environmental Protection Agency Administrator Lisa Jackson with us this morning. And anytime we talk about dependence on oil, one of the innovative actions we are trying to move to is electrification of our transportation system. And I want to talk about the importance of coal in meeting the electricity demands of our country. We know today that coal produces 51 percent, 52 percent of the electricity needs in this country. We know that the demand for electricity is going to increase dramatically over the next 20 years. And I have the clear impression that this administration and this EPA has a strong bias against coal.

Now, why do I say that? Well, one, this endangerment finding that they are working on right now. We know and the EPA has admitted, itself, has acknowledged that the finding, the endangerment finding will cause job losses in the U.S., and I think that that represents a clear and present danger to our economy and all of our efforts to provide the conditions for job growth and prosperity.

In addition to the endangerment finding, this EPA is limiting coal permits. This EPA is trying to designate coal ash as a hazardous material. This EPA, in my view, is trying to create as many obstacles as possible in using coal. And I can assure you that China is using more coal, India is using more coal, because they want to be competitive in the global marketplace, and we know that coal produces the least expensive electricity.

Now, if we are going to provide additional incentives for solar power, wind power, I feel very strongly that those alternative sources are inefficient, too expensive, use too much land, and do not produce enough electricity and cannot produce enough electricity. And I would hope that this administration would spend more time, more money on helping us perfect carbon capture and sequestration. Dr. John Hauser at MIT is one of the leaders in this regard. He is working diligently with others to do this. And I think our long-term viability and strengthening our economy depends upon developing carbon capture and sequestration and continued use of coal. Thank you.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Michigan, the chairman emeritus of the committee, Mr. Dingell.

OPENING STATEMENT OF HON. JOHN D. DINGELL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. DINGELL. Thank you, Mr. Chairman.

The Democratic Congress and the Obama administration have done a tremendous amount to reduce our dependence on foreign oil. Our efforts began with the Energy Independence and Security Act, which was dealt with in this very committee and which continued with the American Recovery and Reinvestment Act, and the administration's coordinated approach to deal with vehicle emissions, and, finally, the administration's proposal for increased offshore drilling.

After many years of predictions that our dependence on foreign oil would only create additional dependence on that oil, we are seeing a change in that trajectory. The news only gets better if we see the American Clean Energy and Security Act signed into law.

I would like to take a moment to commend Administrator Jackson for her work leading to a single, harmonized standard for greenhouse gas emissions and fuel efficiency for autos. Prior to this landmark agreement, our auto makers faced a patchwork of standards that would have been very nearly impossible to meet. Now that we have a single national standard for model years 2012 to 2016, it is time to begin the same approach for the post-2017 model years. The administration has been successful once, and I know that with effort, they can do the same thing again.

As much as I disagreed with the Supreme Court in the case of Massachusetts versus EPA, the decision, although erroneous, was made. EPA was required to move forward with their endangerment finding, and they have done so. That endangerment finding is the legal underpinning for a national standard for autos. The national standard is too important to our manufacturers and to our economy for us even to consider a resolution of disapproval.

Of course, it is important that we note that remarkable technologies are coming out of our auto makers. Whether we are talking about the Chevy Volt, the Ford Escape, and the Fusion hybrids, advanced transmission or advanced submission control technology, our auto makers are stepping up to the plate to provide consumers with quality, clean, and fuel-efficient technologies. GM is building the battery packs for the Chevy Volt in my district in Brownstown, Michigan, and Ford is doing the same thing at their Ypsilanti Township plant. We are busily creating 21st century jobs while we are protecting the environment.

Mr. Chairman, I thank you again. And I look forward to our witnesses and their comments.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Texas, the ranking member of the full committee, Mr. Barton.

OPENING STATEMENT OF HON. JOE BARTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. BARTON. Thank you, Chairman Markey. I want to thank you and Chairman Waxman for agreeing to hold this hearing and inviting Administrator Jackson. I want to thank you, Madam Adminis-

trator, for agreeing to come. I look forward to a productive exchange of ideas.

Mr. Chairman, I think it is no secret that I don't believe the endangerment finding that the Environmental Protection Agency put out in April has been properly done.

I guess I would start with the premise that when I was born in 1949, my life expectancy was 68 years old. My communications director and his wife had a baby girl last week; her life expectancy is 81. We are told by the Census Bureau that a baby born 10 years from now can expect or anticipate to live to 82. Neither of my grandfathers lived past the age of 67. My father died at the age of 71. My mother is alive and well at the age of 85.

So I don't see as a basic premise how the Environmental Protection Agency can say that CO_2 is an endangerment to the public health of the people of the United States when our life expectancy is going up, when the models that the endangerment finding are based on show no endangerment, even in their own models in the most extreme cases, until 200 years from now. It just doesn't wash with me, Mr. Chairman. So I am going to be asking our distinguished Administrator a number of questions about that endangerment finding when it is my opportunity to do so.

This endangerment finding, if implemented and backed up by all the regulations that the Environmental Protection Agency has indicated they plan to put upon the United States economy, would require rules to regulate CO_2 from aircraft, from ocean-going vessels, nonroad engines and vehicles, all types of fuels, cement plants, petroleum refineries, nitric acid plants, utilities, oil and gas production, landfills, animal feed operations. It could be construed to even allow regulation of large public events where large numbers of people accumulate, such as the World Series, Super Bowl, Boston Red Sox at Fenway Park, because under the strictest interpretation of the Clean Air Act, enough CO_2 is emitted in a large gathering to trigger the point-source standard for regulation. I know that is not the intention. I don't think the EPA would do that. But it is technically possible.

Our economy should be about economic jobs and growth, Mr. Chairman. Congress has an obligation to promote economic growth. This is the committee, the Energy and Commerce Committee, the oldest standing committee in the House of Representatives, that has the primary responsibility for authorizing legislation to create that economic growth.

The Clean Air Act originated in this committee, as you know, Mr. Chairman. The senior members of this committee voted the last time on the reauthorization and amendments to the Clean Air Act early the 1990s under the leadership of then-Chairman John Dingell. I was a member of that committee at that time, and I voted for those amendments, Mr. Chairman. I think it was a good piece of legislation, and I have absolutely no qualms that I voted for it.

Having said that, it is my opinion, and I think the record will bear this out, that the Clean Air Act was never intended to regulate CO_2. CO_2 is not a pollutant under the definition of that act. And the court case in Massachusetts versus EPA doesn't say that CO_2 is a pollutant. It doesn't say that the Clean Air Act requires

that CO_2 be regulated. It simply says that the Environmental Protection Agency has an obligation to make a decision.

It is my opinion that they have made the wrong decision. It is my opinion that the endangerment finding is, in and of itself, a threat to the economic vitality of this country. And, as I said earlier, Mr. Chairman, when it is my opportunity to ask questions of our distinguished Administrator, I will be asking her a series of questions about that endangerment finding.

With that, Mr. Chairman, I am very appreciative of the opportunity to participate in this hearing. I yield back the balance of my time, and look back to a productive hearing.

[The prepared statement of Mr. Barton follows:]

Opening Statement of the Honorable Joe Barton
Ranking Member, Committee on Energy and Commerce
Subcommittee on Energy and Environment hearing on
Clean Energy Policies That Reduce Our Dependence on Oil

April 28, 2010

Thank you, Mr. Chairman. Today's hearing raises some critical questions about how we're going to ensure reliable, affordable energy to power our cars and industry, and to literally empower Americans to do the things that need doing. It also affords a chance for us to consider how we will grow the economy while the Obama Administration is working so diligently to shrink it.

I will venture at the outset that the answers to these questions are not to be found anywhere in the Environmental Protection Agency's recent finding that carbon dioxide is dangerous to humanity.

I will also venture that the Administration's policies, pitched in the name of increasing America's energy security, will actually increase, rather than lessen, our dependence on foreign supplies of fuel. The Administration's global warming policies seek to cap access to America's

proven and abundant energy. The President and Administrator Jackson believe that undeveloped renewable sources will do despite evidence that they simply cannot meet existing energy demands, much less those of a growing, vibrant economy in the future. I believe they may wreck the economy.

It used to be that the Administration's choice of clean-energy policies were advertised as reducing global warming. Now the reason is shifting to national security, and I'm sure we will hear how the Administration's ideas will reduce our dependence on foreign as well as American oil. In particular, we will hear about the agency's recently finalized greenhouse gas emissions standards for cars and trucks, the first of a surge of new regulations the Administration is seeking to load onto the U.S. economy.

The Administration touts these new EPA emissions standards as a critical part of new national fuel efficiency standards. Yet the fact is that to achieve the fuel economy and greenhouse gas reductions of its so-called tailpipe rule, we do not and did not need the EPA.

Congress long ago gave authority for fuel economy standards to the National Highway Traffic Safety Administration and, in 2007, authorized that agency to dramatically increase fuel efficiency and thus reduce automotive oil dependence. NHTSA's fuel economy standards by themselves will address the vast majority of the greenhouse gas emissions EPA's new regulations also seek to reduce – without triggering a host of other new greenhouse gas regulations and their destructive economic side-effects.

Rather than work through the existing statutory framework provided by Congress, the Administration went ahead with its own strategy to impose its climate change agenda on the American economy and the public by issuing its endangerment finding – based on what appears to be a bizarre understanding of public health impacts.

EPA thus has triggered a wave of economically devastating new EPA regulations that will delay or halt new construction and expose millions of entities to potential new permitting requirements, and, if they don't comply with those requirements, to enforcement actions, penalties and litigations. The Administration's new greenhouse gas rules will also make energy-

intensive businesses less competitive and drive those companies – and the jobs that go with them – overseas.

The EPA endangerment regulations involve what EPA, itself, admits are the "absurd" side effects of its new regulatory scheme that have little to do with oil dependence. These side effects of triggering new permitting requirements threaten all types of business enterprises – from new energy exploration, power plants and manufacturing facilities, to sources like hospitals, restaurants and other small businesses. Add all this up and you can see why we are concerned about rising costs and the threat to jobs in America.

What we have to confront today are the economic impacts of EPA's endangerment finding and related global warming policies.

We also have to examine the scientific basis behind the Administrator's decision that carbon dioxide and other greenhouse gases endanger public health.

I always find it intriguing that when we ask for proofs from the global warming community, what we get are press releases. We're supposed to believe with the same intensity as Al Gore believes because -- and we're told this over and over -- to question is to condemn the planet and its people. Yet I'm interested to hear from the Administration just how failing to embrace its job-killing plans will, for instance, alter the life expectancy of people living today.

The day I was born in 1949, I could expect to live 68 years, so I guess my time is nearly up. One of my staff had a child last week, and that baby can expect to live to age 81. According to the Census Bureau, a baby born 10 years from now can anticipate living to 82 and a half. That's been the beneficial product of the American economy before we discovered global warming -- better jobs, better medicine, better nutrition, with steadily wealthier, healthier people, living longer, richer lives. But the Administration says we have to change all that because global warming is coming.

Before I commit to changing the most successful society in the history of the world, I want to see proof instead of reasons. I'm eager, in fact, to

learn from Administrator Jackson today how the rising life expectancy of Americans will stall or go into reverse if we don't do what she says. I suspect that her cure for global warming will cause those terrible things to happen instead of preventing them, but I'm more than willing to be convinced otherwise by the actual facts.

But if nobody can justify the threats to our economic growth with measurable, positive health benefits based on hard science, we must do what the facts require and disapprove of this assault on our future.

Thank you Mr. Chairman, I yield back the remainder of my time.

Mr. MARKEY. The gentleman's time has expired.

The Chair recognizes the gentleman from Louisiana, Mr. Melancon.

OPENING STATEMENT OF HON. CHARLIE MELANCON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF LOUISIANA

Mr. MELANCON. Thank you, Mr. Chairman. I would like to take a moment, first of all, to recognize the families of the 11 victims that lost their lives in the deepwater rig last week and those that were injured. I am thankful for those that survived. Those men and women are doing what so many other men and women do in Louisiana every day, working hard to provide a better life for their families and produce resources for their country. Their sacrifice is immeasurable to those that love them. And so I ask everyone to remember the human face of this tragedy and to keep them and their families in your prayers.

I also ask that we all keep in mind the safety of those brave responders and pray for their work, that it goes swiftly and without incident, as we continue to try and clean up after this horrible disaster.

I would like to also call attention to the serious environmental and economic threat posed by the disaster. The oil slicks that are spreading from the rig site could have a detrimental impact on marine life along our fragile coast, and they must be properly contained. The marshes and estuaries that line the Louisiana coast, as well as the Mississippi coast, are home to the most productive fisheries in the country, if not the entire world, and host countless species of migratory birds throughout the year. Protecting these natural gifts and resources must be a priority for all of us.

My remarks today will be short and simple. I thank the Chairman for holding this hearing and allowing us the chance to have this very important discussion.

All of our lives are touched by the production of oil and petroleum products every day. Many of us traveled by car to be here today, and to communicate with each other, all of us will use a plastic pen or keyboard at some point today. There is no doubt oil and its byproducts play an important role in our country's history and economic development. I think our committee and our caucus should be proud of the forward-thinking energy policies that have been put in place. But I would be remiss if I didn't point out the continuing importance of oil and petroleum products in our economy.

The good-paying jobs and the affordable energy and chemical products drive our economy day in and day out. It is impossible to know exactly what the future looks like, but I think it is important today to focus on priorities, our national security, and strengthening the economy.

I think we should be talking about energy independence. Producing energy from our homegrown assets, all of them, not just some of them, makes us less reliant on hostile nations and promotes American ingenuity. For example, we shouldn't have to buy all of our patented solar equipment from foreign manufacturers.

In Louisiana, we have proudly produced oil and gas for generations, constantly innovating and evolving the way we explore and extract. As I recognized at the beginning of my statement, there are real costs associated with production. But our State has selflessly carried on this work to ensure that the rest of the country can have some reasonable stability in energy prices and availability. We will continue to do this work and will lead the way until energy security becomes a reality for our country.

In conclusion, I wish to request again that Administrator Jackson and her Agency continue to carefully review the science associated with requiring refineries to blend E–15 in their stock. It is estimated that in just a few short years, every gallon of gasoline sold in the United States will be at least blended to E–10 levels. This blend wall, as it is called, means that refiners will no longer be able to comply with the renewable fuel standard as established by law. I ask that the Administrator use her authority to reduce the blending requirements rather than force refiners to blend higher levels of ethanol in their commercial-grade gasoline. This move could have serious consequences, such as voiding some car and green engine warranties, which in turn lead to costly legal liability battles. Also, the high organic content of E–15 is known to increase the nitrogen and sulfur oxide, the nox and sox, emissions.

Biofuels represent a strong part of the solution to our domestic energy needs, but balancing those needs with the impact on our existing economy is critical, and I thank the Administrator for giving this due consideration. And I again thank the Chairman for his time.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Illinois, Mr. Shimkus.

OPENING STATEMENT OF HON. JOHN SHIMKUS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. SHIMKUS. Thank you, Mr. Chairman.

And Administrator Jackson, welcome. We had a chance to visit about a year ago at the Illinois delegation luncheon, and I offered my assistance on an energy security approach that I think would meet some of your goals and objectives. I still offer that and look forward to working with you when you take me up on that offer.

I am glad I followed my friend, Charlie Melancon, because you have a competing view on what we have done on renewable fuels, and I am going to use the opening statement to just pose a series of questions and talk about this, because I obviously have another issue I want to talk to once we get the questions.

According to you, 65 percent of the gasoline in the United States is consumed by 2001 vehicles or newer. It has been widely reported that you are considering partially approving E–15 for 2001 model cars and newer, which I support. But there is a concern with this in that splitting the automobile population on an improved blend versus addressing the entire fleet—because you look at the capital expense that would be incurred—I think it is safe to say that many people would not do the expansion that is needed in infrastructure if you are only going to be able to address 65 percent of the fleet. So I will have a written question to ask for comments on that, and I think that is an issue that needs to be considered.

The U.S. imports roughly 65 percent of petroleum today. This is an energy security hearing. Ethanol currently is about 8.4 percent of the gasoline pool. It is the only thing we have done to decrease our reliance on imported crude oil, and it has had great success. And we have displaced 12 billion gallons of imported crude oil by using renewable fuels.

Now, the interesting thing is that, because of the blend wall, we are producing ethanol and we are exporting it overseas. So if we want to continue to decrease our reliance on imported crude oil, why would we have an arbitrary limit that now forces us to export the ethanol, versus continuing to use the ethanol to decrease our reliance on imported crude oil? We are exporting to India, South Korea, and the EU, while we are still importing oil from Venezuela. This seems counterproductive.

And I know that is why we are pushing, and I do appreciate your looking at the E–15. But that is also a reason why we think that looking at E–11 or E–12 for the entire fleet versus this bifurcation aspect of the 2001 vehicles and above might be an even more credible solution to addressing and decreasing our reliance on imported crude oil. It is good for the country, it is good for our energy security, it is good for farm income, it is good for rural America, it is good for jobs.

And I thank the chairman, and I yield back the balance of my time.

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

OPENING STATEMENT OF HON. DORIS O. MATSUI, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Ms. MATSUI. Thank you, Mr. Chairman, for calling today's hearing. I would also like to thank Administrator Jackson and the rest of the witnesses for appearing before us today.

I commend the EPA for establishing a greenhouse emissions standard for cars and light trucks, and for finalizing a renewable fuels standard, which, as Administrator Jackson rightly points out in her testimony, are inextricably linked to reducing our dependence on oil and cutting emissions of greenhouse gas.

As we all know, oil provides more than 40 percent of all energy consumed and 97 percent of the energy used for transportation. However, it is crucial that we advance policies that lessen our carbon footprint, curtail harmful emissions, create jobs, and safeguard the physical and energy security of our Nation. In doing so, we will preserve and even improve upon our current way of life.

To become less reliant on fossil fuels, Americans must embrace clean technology, clean fuels, and new ways to cut emissions. If we succeed in doing that, we will improve our manufacturing base and regain our competitive advantage in the global economy.

Toward that end, I recently convened a clean technology regional summit in Sacramento and brought together clean-tech companies, nonprofits, utilities, colleges, and businesses to discuss ways in which they are fostering cooperative relationships and strategic partnerships to deepen the region's ongoing efforts to become a clean-tech capital.

On top of Sacramento's leadership as an environmental and metropolitan planning model for the State of California, this summit demonstrated the region's vision to achieving greater energy dependence.

Our Nation must also aspire to be the world leader in producing and exporting clean technology, and the President has repeatedly expressed this goal. Unfortunately, the United States still lags behind many of our international competitors in expanding our clean-tech industry, particularly in exports abroad.

Just yesterday, I, along with Representatives Rush, Dingell, and Eshoo, introduced legislation, H.R. 5156, the Clean Energy Technology Manufacturing and Export Assistance Act, that would provide domestic manufacturing and foreign export assistance to boost the competitiveness of the U.S. clean-tech industry here at home and in the international marketplace.

It is critical that our Nation become the leader in manufacturing and exporting clean technologies, not one that becomes increasingly dependent on foreign energy products. This legislation will enhance our standing in the clean energy race.

I look forward to working closely with my colleagues, stakeholders, and other advocates to move the United States towards a more efficient energy economy that utilizes clean-tech manufacturing and lessens our dependence on the oil.

I yield back the balance of my time.

Mr. MARKEY. The gentlelady's time has expired.

The chair recognizes the gentleman from Pennsylvania, Mr. Pitts.

OPENING STATEMENT OF HON. JOSEPH R. PITTS, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF PENNSYLVANIA

Mr. PITTS. Thank you, Mr. Chairman. I would like to thank you for convening the hearing today on such an important issue.

Like all of us, I believe that we should work to decrease the amount of greenhouse gas emissions in our atmosphere and we should be good stewards of this Earth and its resources. In addition, I think it is imperative that the United States become increasingly energy independent. The United States needs to produce far more clean energy from sources that do not rely on the whims of unfriendly nations in far-off regions of the world.

Fundamentally, cutting carbon emissions through punishment, taxation, and the heavy hand of big government will only cripple our economy and send more jobs overseas; and I fear recent EPA actions and the enactment of cap-and-trade legislation would do just that.

Instead, we should be encouraging a clean energy economy through innovation and encouragement and entrepreneurship. If we want to reduce our dependence on oil, I strongly believe that our clean and green energy future is a nuclear future. And with this goal in mind, I have introduced the SAFE Nuclear Act which stands for Streamline America's Future Energy. The bill provides for a regulatory process that will encourage an increase in the production of this clean alternative energy.

Nuclear energy is a viable, clean alternative that can help strengthen America's energy infrastructure. Now, nuclear power can reduce our dependence on foreign sources of energy and reduce the emissions that come from burning fossil fuels. And my bill would provide an additional path in the regulatory process that allows for the approval of new nuclear reactors on or adjacent to an existing site without jeopardizing safety.

Though we may not all agree on issues like cap-and-trade and EPA actions, we can all agree that we need to find a way to produce the energy that fuels our lives in a way that is environmentally friendly and sustainable. Nuclear power fits that description, and the SAFE Nuclear Act will go a long way toward making that safe, clean future a reality. I thank you for the time and yield back.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Texas, Mr. Green.

OPENING STATEMENT OF HON. GENE GREEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. GREEN. Thank you, Mr. Chairman, for holding the hearing today on the clean energy policies that reduce our dependence on oil. And I would also like to welcome Administrator Jackson and the other panelists to our committee this morning.

Coming from Texas, we are the Nation's leader in renewable energy production and the pioneering and developing of its own State portfolio standard. I support efforts to promote renewable energy production that meets the unique circumstances and resources of each State. However, with increases in renewable energy, the Energy Information Administration found that oil and natural gas and coal will continue to make up a large majority of U.S. energy use, even to 2030 and beyond.

If we are to reduce dependence on foreign oil, we must explore and produce more domestically, along with all our alternatives that we are investing in. We cannot drill our way out of our energy needs, but we cannot ignore the benefits that America gains with responsible domestic production. These benefits include reduced reliance on foreign imports, increased economic growth, new high-paying jobs, additional Federal and State revenues, and improved ability to meet our clean energy goals. That is why I strongly support increasing diversifying domestic production in the areas like Alaska's North Slope, the Gulf of Mexico, Federal lands in the West and the Outer Continental Shelf.

I also supported the efforts to raise fuel economy standards in vehicles, to provide tax incentives for consumers to purchase fuel-efficient vehicles, extend tax incentives for renewable energy, increase energy efficiency standards for buildings and appliances, and promote public transit efforts. Several of these initiatives are part of last year's Recovery Act and the Energy Independent Security Act of 2007. They are working well. I will continue to support programs seeking to create cleaner energy technologies, because we all benefit from a cleaner environment.

Finally, while I have you here, Administrator Jackson, I appreciate the working relationship that we have, but also applaud the administration brokering an agreement to provide the auto indus-

try with one national program for fuel economy and greenhouse gas emissions, which was supported by the States, environmental advocacy groups, and the auto industry.

And I would be remiss if I didn't also mention the work we are doing with EPA on the Superfund site that is in our district in East Harris County that our regional EPA is moving very fast to try to contain a problem that has been there for 40 years. I know this is not an easy feat. However, I want to emphasize my opposition to the EPA regulating greenhouse gases from large stationary sources under the endangerment finding. It is my hope that Congress will send the President legislation to set parameters to help regulate emissions with minimal disruption to our economy.

And, Mr. Chairman, again, thank you for calling this hearing. I yield back the balance of my time.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Texas, Mr. Burgess.

Mr. BURGESS. Thank you, Mr. Chairman. I appreciate the Administrator being here. It is so rare we have anyone from the administration come to our committee. I will save my time for questions, and I yield back.

Mr. MARKEY. We thank the gentleman very much.

The Administrator has been before our committee before. And I would just note that the Administrator of the EPA did not appear before our committee from 2001 to 2006, when the minority was then in the majority. So that was, without question, an unprecedented period of time without having the EPA Administrator appear before the committee of jurisdiction. That cannot be said about this Administrator. That was the most successful witness protection program in history.

Let me now turn and recognize the gentlelady from California, Mrs. Capps.

OPENING STATEMENT OF HON. LOIS CAPPS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mrs. CAPPS. Thank you, Mr. Chairman, for holding today's hearing; especially welcome again to the Administrator of the EPA. And I want to associate myself as well with the remarks of my colleague Mr. Melancon regarding the tragedy off the coast of Louisiana.

Today our economy relies on fossil fuels for energy, and every day we pay a price, many prices. And volatile prices starts instability and unnecessary pollution. We simply must change this untenable situation. The best way to beat this addiction is to reduce overall demand, promote renewables, and develop alternatives.

Putting more attention on the potential of clean energy is something that I and others on this side of the aisle have been advocating for years. And since America is not exactly awash in natural oil and gas, reducing our dependence on them would be good not only for our environment but for our economy and perhaps, most importantly, for national security.

But, to be honest, we have to do more than talk about the potential that renewables and alternative energy has for this country. We have to put into place more funding for programs to bring these energy sources to market, and we have to make changes in energy

policy to encourage their use. That is exactly what Democrats have done in the last 3 years.

We have enacted legislation, the Energy Independence and Security Act, and the Recovery Act, to provide an immediate jolt to the clean energy economy to create jobs and enhance our long-term competitiveness by reducing our oil dependence. At the same time, the House has passed legislation to establish a cap-and-trade system for global warming pollution. This bill has the potential to provide trillions of dollars in revenue that could be used, among other things, to provide money for investment in clean energy and tax relief for American families facing economic hardship.

Mr. Chairman, we know what we need to do: Accelerate our economic recovery in the short term, ensure our long-term prosperity. Developing clean power and energy-efficient technologies while combating global warming are initiatives that meet these goals.

Americans want real, meaningful solutions to our Nation's energy challenges. Unfortunately, the leadership under the last administration was driven by a fuel desire to drill our way toward energy independence, and did that by lavishing huge tax breaks on big oil, paying much less attention to reducing demand, renewables, and alternative energy. Their great plan, 95 percent implemented, resulted in volatile energy prices, $500 billion in oil company profits, and an economy on the brink of collapse. Those of us who opposed the Bush-Cheney plan did so because we knew this was the likely result.

We do have a better idea, one that meets today's crisis and transitions us to a new future. It is time to put taxpayer funds to a more productive use, jump-start investments of energy efficiency, renewables, alternative energy, all of which will reduce our oil dependence.

Mr. Chairman, this issue will be the defining measure of our future economic standing and our international security over the next century. I believe we should all take this opportunity to work together to achieve this energy independence for our country.

Thank you. And I yield back the balance of my time.

Mr. MARKEY. The gentlelady's time has expired.

The chair recognizes the gentleman from Alabama, Mr. Griffith.

Mr. GRIFFITH. Mr. Chairman, I will waive my opening statement and reserve my time.

Mr. MARKEY. The gentleman will be able to reserve his time.

The chair recognizes the gentleman from Florida, Mr. Stearns.

OPENING STATEMENT OF HON. CLIFF STEARNS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF FLORIDA

Mr. STEARNS. Mr. Chairman, thank you.

The endangerment finding that many of us feel was rushed into existence by the EPA really has many of us concerned about what the economic impact of this would be. It allows, of course, the EPA to impose the first ever Federal tailpipe standards for greenhouse gases. That is estimated to cost about $52 billion and require the largest industrial sources to install the best available control technology. I mean, that term itself, "the best available control technology," I don't think Administrator Jackson, have you yet defined what this means and whether it is available?

When you look at the impact of this, it is not going to affect just the auto industry and large industrial sources; you are going to regulate greenhouse emissions from aircraft, ocean-going vessels, nonroad engines and vehicle sources, cement plants, fuels, petroleum refineries, utility boilers, oil and gas production, landfills, and even animal feed operations.

So, since 85 percent of the U.S. economy runs on fossil fuels that emit carbon dioxide, imposing a CO_2 tax is equivalent to placing an economy-wide tax on energy use. I think that is what many, at least on this side of the aisle, are concerned about, the economic impact.

Now, according to the Heritage Foundation Center for Data Analysis, the economic effects of carbon dioxide regulation would result in cumulative gross domestic product losses—and these are their figures—of $7 trillion by the year 2029, and single-year GDP losses exceeding $600 billion.

So when you think about the impact of this, with a weak economy, with high unemployment, I think that has many of us concerned. It hit particularly hard on manufacturing, which manufacturing provides the better jobs. And so job losses in some industries could exceed 50 percent with this.

So I think, regardless of what one's view might be on carbon dioxide and global warming, I think perhaps both sides of the aisle can agree that this would have huge economic impact. And companies obviously will innovate and try to work through this, but are they going to make long-term capital investments, waiting to see what the Administrator is going to do?

And so when the EPA uses such language as "best available control technology," if I was to invest in, let's say, a cement plant or I was going to do something in oil and gas production, or I was going to do something in aircraft or even animal feed operations, I would want to know what your regulations are going to be and how am I going to be impacted, before I invest a lot of my money.

So I think you have put sort of a pale over the economy with this. And I think we need to, through this subcommittee, Mr. Chairman, work with commonsense energy solutions that will encourage domestic energy production and create jobs, and be careful of instituting this endangerment finding.

Thank you, Mr. Chairman.

Mr. MARKEY. The gentleman's time that has expired.

The chair recognize the gentleman from New York, Mr. Engel.

OPENING STATEMENT OF HON. ELIOT L. ENGEL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Mr. ENGEL. Thank you, very much, Mr. Chairman. I want to thank you for holding this important hearing and our witnesses for contributing their expert testimony. I look forward to hearing Ms. Jackson's testimony.

We all know that we must break our addiction to oil. It has weakened our economy, it has transformed our wealth into nations and individuals who wish us harm, placed our troops in dangerous places, and damaged our environment. The U.S. consumes 25 percent of the world's oil production, yet controls less than 3 percent

of an increasingly tight supply. Three-quarters of world's reserves are in OPEC Nations and in 2008 the U.S. sent roughly $440 billion overseas to pay for imported oil.

These economic and national security problems are enabled by the simple fact that oil provides more than 96 percent of the fuel for our transportation sector. It is really a transfer of wealth. Unless we act now the problem will continue to worsen.

We should be doing the following: First, we should continue to increase the efficiency of our cars and trucks. Making fuel economy improvements in our existing vehicles will not break our addiction to foreign oil, but it will reduce our overall consumption.

Secondly, we must force petroleum to compete with other fuels. There are many ways to do this and we should use them all. T. Boone Pickens has recommended switching to natural gas for fleet vehicles such as buses and taxis and for interstate trucking. These vehicles can run on natural gas and would only require new pumps at a few central locations and interstate truck stops. We should deploy drop-in fuels produced from waste and algae. These fuels can mix freely gasoline and diesel in existing vehicles.

We should enact an open fuel standard that would require all new gasoline using vehicles to be flex-fuel vehicles, capable of running on gasoline, ethanol or methanol. I argued when we passed our global warming bill that that should have been in the bill, and it should have been and hopefully it will be when we get to a finished product. This cheap and simple modification uses technology that already exists. Brazil accomplished it easily several years ago. Methanol made from natural gas can be produced for around $1.20 a gallon of gasoline equivalent today.

Thirdly, we should move to electrify automotive transportation. I have worked with my friends at Better Place several years now and I am eager to hear about their progress from Mr. Wolf on the second panel today.

Basically we need to have a more balanced energy policy and a policy that relies so heavily on gas, on gasoline, is not one that can be sustained. We can really never be totally free with our national security as long as we rely on despots like Hugo Chavez or the Saudi royal family for our energy supplies. We need to move and we need to do it quickly.

Thank you, Mr. Chairman.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Arizona, Mr. Shadegg.

OPENING STATEMENT OF HON. JOHN B. SHADEGG, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ARIZONA

Mr. SHADEGG. Thank you, Mr. Chairman. And I will try to keep my remarks brief. I want to associate my comments first with Mr. Melancon. I believe it is in America's interest to pursue all energy sources and particularly to appreciate the domestic energy we have produced, including oil, natural gas, and other sources of energy as well as coal.

I am concerned about the topic that my colleague Mr. Shimkus raised, and that is the issue of increasing the ethanol blend. I have introduced legislation to require that no increase in ethanol be permitted until the safety of ethanol is studied in certain pieces of

power equipment. I think that is a legitimate concern. There is a very real danger of that when ethanol blends go above 10 percent, we do not know what impact they will have on the safety of chainsaws and other pieces of equipment or on the reliability of many small motors, including outboard motors and marine engines, and it would be particularly unfair if we moved to those new blend standards and the cost of doing so is imposed on the American public either financially or in terms of safety risk because the equipment was not designed to run on those fuels.

I do commend the EPA for its work, but I disagree with its endangerment finding. I believe it is based largely on the IPCC report, which was the result of almost 2 decades worth of research; however, tragically that research has now been very much placed in doubt. The IPCC report daily is criticized for new errors in its findings. It is found to have exaggerated the sea level rise in Bangladesh due to climate change because it failed to take into account sediment from the Himalayan rivers, it based claims on African crop year that were not peer reviewed, it erroneously claimed that the Himalayan glaciers might melt by 2035, it based claims on drought in the Amazon forest in a report that did not even study drought, and it also used as a basis for temperature predictions apparently data that does not even exist.

Most recently, a study found that 21 of 44 chapters of the IPCC report would receive an F if graded on the grading system used in American schools because the papers relied upon and included newspaper clippings, newsletters, and press releases and not peer reviewed literature.

It seems to me, and I will conclude with this, that when a nation decides to pursue massive public policy on the scale that we are talking about, it is absolutely critical for us to have the support of the American public behind us and not to impose very costly regulations on the economy that could cost jobs and damage our citizens without being sure that the science is right.

And so I would simply urge that we continue to look carefully at the science, that if we decide to draw a policy based on that science that we in fact can assure ourselves and can rely confidently on it being accurate and reliable so that we can win the support of the people. They do not want to see us enact legislation based on political will and not based on sound science.

With that, Mr. Chairman, I yield back.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from New Jersey, Mr. Pallone.

OPENING STATEMENT OF HON. FRANK PALLONE, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Mr. PALLONE. Thank you, Chairman Markey, for having this important hearing and I am excited to have our EPA Commissioner Lisa Jackson here with us this morning. I have known Lisa from her days as Commissioner of the New Jersey Department of Environmental Protection and she has dedicated her life's work to protecting the environment and making our country a healthier place to live, and I want to welcome her here today to testify.

I also want to mention, I know you mentioned about her being available, I remember very early in her tenure when she invited us down on the TSCA reform meeting, a bipartisan meeting. I think it was the first time I had ever been in the EPA Administrator's office in my 22 years here. So she is definitely trying to reach out on a bipartisan basis, and I appreciate that.

Now we are here today to discuss the importance of developing clean energy policies that could reduce our dependence on oil. The U.S. Consumes 25 percent of the world's oil production but our country only contains 2 percent of the world's oil reserves. We waste a billion dollars a day buying foreign oil, and this money all to often winds up in the pockets of nations with hostile views of the United States. This hurts our economy, helps our enemies and puts our security at risk.

We must put an end to our addiction to oil, and the best way to do this is to pursue aggressive clean energy policies with all the tools we have available. And this includes enacting a comprehensive climate change bill into law this year and allowing our Federal agencies such as the EPA to use their authority to regulate emissions and incentivize clean energy development.

We must focus on clean energy policy such as wind power and regulation of global warming emissions rather than expanded offshore drilling that can cause tremendous harm to our environment. I am extremely troubled by the offshore oil rig which caught fire and ultimately sank off the coast of Louisiana last week. This is turning out to be one of the world's worst oil spills. And it is clear that offshore drilling cannot be done in a way that sufficiently protects America's coasts.

And I respectfully request that the President and the Interior Secretary reassess their position on offshore oil. This disaster in the Gulf of Mexico only underscores the need for comprehensive clean energy policy. We must focus our efforts on wind and hydro power, which are some of the cleanest and safest forms of renewable energy.

I want to commend the EPA and Administrator Jackson for all the work that they are doing to regulate vehicle emissions and stationary power sources through the endangerment finding. This plan will save the U.S. 1.8 billion barrels of oil over the life the vehicles purchased between 2012 and 2016.

Once again I would like to thank the chairman for convening this hearing, especially for inviting the Administrator Lisa Jackson, who again has been out front on so many of these issues and you look forward to her testimony, thank you.

Mr. MARKEY. Great. The gentleman's time has expired.

The chair recognizes the gentleman from Louisiana, Mr. Scalise.

OPENING STATEMENT OF HON. STEVE SCALISE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF LOUISIANA

Mr. SCALISE. Thank you, Mr. Chairman. I share the sentiments of my colleague from Louisiana. Our prayers are with those families of the 11 rig workers who lost their lives. I urge the U.S. Coast Guard to move swiftly and use everything in their power to contain

and clean up the spill and investigate the causes of the explosion so we can prevent this terrible tragedy from happening again.

As we hear today from Administrator Jackson, I would hope that we have an opportunity to discuss the administration's plans for creating a national energy policy as well as the effects that many of the recent EPA restrictions would place on our country's economic and national security.

I have long advocated for a comprehensive national energy policy that takes an all-of-the-above approach, incorporating efficiency measures, promotion of new energy technologies, development of renewable energies, and also making sure that we continue to expand our development of our own natural resources at home.

This administration, however, has taken a different approach with restrictive energy policies. Unfortunately, we have seen attempt after attempt by this administration to restrict our ability to invest in our own natural resources. From recent threats by EPA to regulate greenhouse gas emissions to essentially halting the major development of natural gas with restrictions on hydraulic fracturing, what we are seeing is a recipe for making our country more dependent on Middle Eastern oil while killing off millions of American jobs.

Before this administration places severe and economically devastating restrictions on domestic production of our own natural resources, it is incumbent to find ways to reduce our dependence on Middle Eastern oil. About 57 percent of the petroleum we use in America comes from foreign sources, and roughly 20 percent of those imports are from Middle Eastern countries. This not only restricts our ability to one day become energy independent, but also poses potential national security threats to our homeland.

Instead of Washington bureaucrats mandating harmful policies that would kill key sectors of our national economy and make us more dependent on foreign nations who want to do us harm, we should instead explore policies that encourage investments in cleaner energy technologies and innovation in the private sector. The ingenuity of the American entrepreneurial spirit is what has made our country the best in the world. This Congress would be wise to encourage more of that innovation to achieve energy independence.

Thank you, and I yield back.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Washington State, Mr. Inslee.

OPENING STATEMENT OF HON. JAY INSLEE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON

Mr. INSLEE. Thank you, it is an honor after the 40th anniversary of Earth Day to have a director of the Environmental Protection Agency here, and I just noted that we are kind of back to where we started, because the EPA got started when the Cuyahoga River caught fire in Ohio and people understood we had to do something about our problem. And this morning the headlines are the Coast Guard are thinking about lighting the Gulf of Mexico on fire to try to solve this problem. We are really back where we started.

I want to point out that the oil slick that we are concerned about today is really the least of our problems about oil. Because there is a giant invisible oil slick caused by carbon dioxide that comes out of our tailpipes, that goes in the atmosphere, that falls in the oceans and goes into solution. That invisible oil slick is now causing the oceans to become acidic. The oceans today are 30 percent more acid, more acidic than they were before we started burning oil. And they will be much more acidic if we don't change our course.

I want to show members if the committee what that means. If they put up this slide over here. This slide over here shows what happens when the ocean becomes acidic. When the ocean has more acid in it the creatures in it that take calcium carbonate out of the ocean and make their bodies can't do that anymore. This is a picture from NOAA and it shows a terrapod. These are small little plankton-like creatures and they had a shell and that shell, they get the calcium out of the water to make their shell. The problem is as the water becomes more acidic they can not make that shell anymore. This is a picture of what happens when you put a terrapod in water that is as acidic as it will be in 2100 if we continue on this path, and basically what you will see over a period of 45 days it melts. On the left you see the shell is intact, it starts to melt and it basically melts into an indistinguishable blob in 45 days. The entire food chains of the ocean are in danger because of the oil and coal, because they are making our oceans more acidic. And the scientific community believes there may not be healthy corals anywhere in the world by the end of the next century because of this acidic problem.

So the oil slick we are worried about today is the least of our problems. The fact that our oceans may be dead in 100 years or full of weeds rather than beautiful corals is a significant issue why we should be addressing this. Basically what the scientists are telling us, unless we have a sea change in energy policy we may be killing the seas.

So I think this hearing is an appropriate one to have. We know about the national security ramifications of giving $100 million a day to Iran of American money, but we have another security and that is the protein we get out of the seas, and I hope that we can come up with a policy on comprehensive basis to solve this problem.

Thank you.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentlelady from California, Mrs. Bono Mack.

Mrs. BONO MACK. Thank you, Mr. Chairman. I will waive and submit my statement for the record.

Mr. MARKEY. The gentlelady waives.

The gentleman from an Oklahoma, Mr. Sullivan, is recognized.

OPENING STATEMENT OF HON. JOHN SULLIVAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OKLAHOMA

Mr. SULLIVAN. Thank you, Chairman Markey. I appreciate you holding this hearing today on clean energy policies that reduce our

dependence on oil. I am pleased to welcome Lisa Jackson, Administrator of the EPA, today. I look forward to her testimony and any developments on the foreseeable economic impacts that EPA CO_2 endangerment findings and pending regulations will have on the U.S. economy.

If allowed to go into affect, the CO_2 endangerment finding will impose a backdoor energy tax on the American people. By giving the agency unprecedented regulatory authority over almost every foreseeable aspect of our economy, burdening thousands of small businesses with unnecessary and costly compliance expenses and higher energy costs for American families while doing little to protect the environment.

With our national unemployment rate at 10 percent, this is the worst possible time for this administration and the EPA to impose unnecessary job killing energy mandates on the American people.

I am also interested in our witnesses' views on our own domestic oil resources and if they support the development of them, both on shore and off, to reduce dependence on foreign oil imports. According to the Congressional Research Service, the U.S. reserves for oil and natural gas are the largest in the world. I believe we must reduce foreign oil imports and start drilling and utilizing our oil and gas here at home.

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

Mr. MARKEY. The gentleman's time has expired.

The chair regular nieces the from a from California, Mr. McNerney.

OPENING STATEMENT OF HON. JERRY MCNERNEY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. MCNERNEY. Thank you, Mr. Chairman, for convening today's hearing. It was almost a year ago that our committee favorably reported the America Clean Energy and Security Act, and I am grateful for this opportunity to evaluate the new policy proposals. Vigorously pursuing well crafted, clean energy policies is a matter of national security, economic and environmental concern. Investing in new energy technologies and energy efficiency improvements has tremendous potential to create high quality jobs, and I have seen this job creation potential firsthand through my experience in developing wind power and smart grid technologies.

Even during tough economic times communities in my district in California are attracting cutting edge clean energy businesses that are creating good jobs. For example, an electric vehicle manufacturing facility just opened up in Stockton, California and is hiring new workers. Similarly, the Port of Stockton is doing significant business with wind turbine parts, creating jobs at our docks. There are tremendous opportunities for further job growth in the clean energy sector, but to harness that potential we need to continue to evaluate and recalibrate Federal policies.

I would also like to note the compelling national security benefits of pursuing policies to expand America's use of domestically produced energy resources. Over the last 2 years our country has spent about a billion dollars a day overseas for oil imports, some

of which will flow to countries that are unfriendly to our interests. Comprehensive international action to invest in clean energy resources would prevent millions of dollars a day from flowing to Iran. Clearly we have a compelling security interest in aggressively pursuing energy independence.

Mr. Chairman, I thank you again for convening today's hearing and look forward to hearing from our witnesses.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Pennsylvania, Mr. Doyle.

Mr. DOYLE. I am waiving.

Mr. MARKEY. The gentleman will waive. His testimony will be added to the question period.

The chair does not see any other members seeking recognition at this time.

Mr. UPTON. Mr. Chairman, I just might ask unanimous consent for those members who are not here that they might be able to put a statement into the record.

Mr. MARKEY. Without objection, so ordered.

We will now turn to our witness and while also making—before that I will make a unanimous consent request that Mr. Latta and Mr. Murphy, both members of the full committee but not on the subcommittee, have asked for permission to participate in the witness questioning after each member of the subcommittee has completed their questioning. Without objection, so ordered.

Let's turn to our extremely distinguished witness, and we thank her for coming back to the Energy and Commerce Committee. She is EPA Administrator Lisa Jackson. Before becoming EPA's Administrator, she served as Chief of Staff to the Governor of New Jersey and Commissioner of the State of New Jersey's Department of Environmental Protection. Ms. Jackson is a summa cum laude graduate of Tulane University in Louisiana and earned a Master's degree in chemical engineering from Princeton University.

We are delighted to welcome you back to the committee, Administrator Jackson. Whenever you feel comfortable, please begin.

STATEMENT OF THE HON. LISA P. JACKSON, ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY

Ms. JACKSON. Well, thank you. Chairman Markey and Chairman Waxman, Ranking Members Upton and Barton, Chairman Emeritus Dingell, and members of the committee, thank you for inviting me to testify about the Environmental Protection Agency's work to reduce America's oil dependence and greenhouse gas emissions. That work stems from two seminal events.

First, in April 2007, the U.S. Supreme Court concluded in Massachusetts v. EPA that the Clean Air Act's definition of air pollution includes greenhouse gases. The Court rejected then Administrator Johnson's refusal to determine whether that pollution for motor vehicles endangers public health or welfare.

In response to the Supreme Court's decision and based on the best available science and EPA's review of thousands of public comments, I found in December 2009 that motor vehicle greenhouse gas emissions do endanger Americans' health and welfare.

I am not alone in reaching that conclusion. Scientists of the 13 Federal agencies that make up the U.S. Global Change Research Program have reported that unchecked greenhouse gas emissions pose significant risk to the well-being of the American public. The National Academy of Sciences has stated that the climate is changing, that the changes are mainly caused by human interference with the atmosphere, and that those changes will transform the environmental conditions on Earth unless countermeasures are taken.

The second pivotal event was the agreement President Obama announced in May 2009 between EPA, the Department of Transportation, the Nation's auto makers, America's auto workers and the State of California to seek harmonized, nationwide limits on the fuel consumption and greenhouse gas emissions of new cars and light trucks.

My endangerment finding in December satisfied the prerequisite in the Clean Air Act for establishing a greenhouse emission standard for cars and light trucks of model years 2012 through 2016. So I was able to issue that final standard earlier this month, on the same day that Secretary of Transportation Ray LaHood signed a final fuel efficiency standard for the same vehicles.

Using existing technologies, manufacturers can configure new cars and light trucks to satisfy both standards at the same time. And vehicles complying with the Federal standards will automatically comply with the greenhouse gas emissions standard established by California and adopted by 13 other States. This harmonized and nationally uniform program achieves the goals the President announced last May. Moreover, the EPA and DOT standards will reduce the lifetime oil use of recovered vehicles by more than 1.8 billion barrels. That will do away with more than a billion barrels of imported oil, assuming the current ratio of domestic production to imports does not improve.

The standards also will eliminate more than 960 million metric tons of greenhouse gas pollution, but if Congress now nullified EPA's finding that greenhouse gas pollution endangers the American public, that action would remove the legal basis for a Federal greenhouse gas emissions standard for motor vehicles. Eliminating the EPA standard would forfeit one-quarter of the combined EPA, DOT program fuel savings and one-third of its greenhouse gas emissions cuts.

California and the other States that have adopted California's greenhouse gas emission standard would almost certainly respond by enforcing that standard within their jurisdictions, leaving the automobile industry without the nationwide uniformity that it has described as vital to its business.

I would like to mention one more action that EPA has taken to reduce America's oil dependence and greenhouse gas emissions.

In February I signed a final renewable fuel standard. It substantially increases the volume of renewable products, including cellulosic biofuel that refiners must blend into transportation fuel. EPA will implement the standard fully by the end of 2022. In that year alone the standard will decrease America's oil imports by $41.5 billion, and U.S. greenhouse gas emissions that year will be 138 million metric tons lower, thanks to the standard.

EPA's recent work on vehicles and fuels shows that enhancing America's energy security and reducing America's greenhouse gas pollution are two sides of the same coin. The recent analysis by the Agency found that widespread deployment throughout the U.S. transportation sector of efficiency technologies and practices that exist today would cause the sector's oil use and greenhouse gas emissions in 2030 to be 25 to 40 percent lower than they otherwise would be. So while we have started addressing the twin challenges of oil dependence and greenhouse gas pollution, we clearly have the potential to go farther and accomplish more.

Thank you again for inviting me to testify. I would be happy to answer your questions.

[The prepared statement of Ms. Jackson follows:]

Statement of the Honorable Lisa P. Jackson
Administrator, U.S. Environmental Protection Agency
Hearing on Clean Energy Policies that Reduce Our Dependence on Oil
Subcommittee on Energy and the Environment
Committee on Energy and Commerce
U.S. House of Representatives
April 28, 2010

Chairmen Markey and Waxman, Ranking Members Upton and Barton, Chairman Emeritus Dingell, and Members of the Subcommittee, thank you for inviting me to testify about the Environmental Protection Agency's work to reduce America's dependence on oil and reduce emissions of greenhouse gases. That work stems from two seminal events.

First, in April 2007, the U.S. Supreme Court concluded in *Massachusetts v. EPA* that the Clean Air Act's definition of "air pollutant" includes greenhouse gases. The Court rejected the then-EPA Administrator's refusal to determine whether those emissions from motor vehicles cause or contribute to air pollution that endangers public health or welfare.

Second, in May 2009, President Obama announced an agreement between EPA, the Department of Transportation, the nation's automakers, America's autoworkers, and the State of California to seek harmonized, nationwide limitations on the fuel consumption and greenhouse gas emissions of new cars and light trucks.

In response to the Supreme Court's decision, and based on the best available science and EPA's review of thousands of public comments, I found in December 2009 that greenhouse gas emissions from motor vehicles do contribute to air pollution that endangers public health and welfare.

I am not alone in reaching that conclusion. Scientists at the thirteen federal agencies comprising the U.S. Global Change Research Program have reported that unchecked greenhouse gas emissions pose significant risks to the wellbeing of the American public. The National Academy of Sciences has stated that the climate is changing, that the changes are predominantly caused by human interference with the atmosphere, and that those changes will transform the environmental conditions on Earth unless counter-measures are taken. Other major scientific organizations in the United States, including the American Geophysical Union, the American Institute of Physics, and the American Meteorological Society, have affirmed the human contribution to climate change and its impacts.

My finding last December satisfied the prerequisite in the Clean Air Act for establishing a greenhouse gas emissions standard for cars and light trucks of Model Years 2012 through 2016. I signed that final standard earlier this month, on the same day that Secretary of Transportation Ray LaHood signed a final fuel efficiency standard for the same vehicles. Using existing technologies, manufacturers can configure new vehicles to satisfy both standards simultaneously. And vehicles complying with the federal standards will automatically comply with the greenhouse gas emissions standard established by California and adopted by thirteen

other states. This harmonized, nationally uniform program carries out the historic agreement that the President announced last May.

Acting together, the EPA and DOT standards will reduce the lifetime oil consumption of the affected vehicles by more than 1.8 billion barrels. That means eliminating more than a billion barrels of imported oil, assuming the current ratio of domestic production to imports does not improve. At today's prices, we are talking about more than 80 billion dollars' worth of foreign oil that Americans will not need to buy thanks to these standards. What is more, the standards will eliminate more than 960 million metric tons of greenhouse gas pollution.

If Congress were to nullify EPA's finding that greenhouse gas pollution endangers the American public, then that would remove the legal basis for a greenhouse gas emissions standard for new vehicles. Eliminating the EPA standard would forfeit one quarter of the combined program's fuel savings and one third of its greenhouse gas emissions reductions. Moreover, California and the other states that have adopted California's greenhouse gas emissions standards could respond by enforcing those standards within their jurisdictions, leaving the automobile industry without the nationwide uniformity that it has described as vital to its business.

I would like to mention another action that EPA has taken to reduce America's oil dependence and greenhouse gas emissions. In February of this year, I signed a final renewable fuels standard. It requires a large increase in the volume of renewable products, including cellulosic bio-fuel, blended into transportation fuel. EPA will have implemented the standard fully by the end of 2022. In that year alone, the standard will displace approximately 13.6 billion gallons of petroleum-based gasoline and diesel, thereby decreasing America's oil imports that year by 41.5 billion dollars. And U.S. greenhouse gas emissions in 2022 will be 138 million metric tons lower thanks to the standard.

I believe EPA's recent work on vehicles and fuels illustrates the fact that enhancing America's energy security and reducing America's greenhouse gas pollution are two sides of the same coin.

At Senator Kerry's request, EPA recently conducted a scoping exercise to identify the potential reductions in oil consumption and greenhouse gas emissions that would result from pervasive deployment, throughout the U.S. transportation sector, of efficiency technologies and practices that exist today. According to EPA's analysis, that widespread deployment would cause the U.S. transportation sector's year-2030 greenhouse gas emissions to be between 600 million and one billion metric tons less – and our daily oil use in 2030 to be between four million and seven million barrels less – than they otherwise would be. Those numbers represent cuts of 25 to 40 percent from currently projected levels for the transportation sector. EPA's analysis highlights that, while we have started addressing these twin challenges, we have the potential to do much more.

Thank you again for inviting me to testify. I would be happy to answer any questions you might have.

Mr. MARKEY. We thank you very much for your testimony, and now we will turn to questions from the subcommittee members. The chair will recognize himself.

Isn't it true that the Supreme Court decision in Massachusetts v. EPA required the EPA to determine whether an endangerment finding should be made for global warming pollution from cars and trucks?

Ms. JACKSON. Yes.

Mr. MARKEY. Isn't it also true that your predecessor in the Bush administration, Stephen Johnson, reviewed the science and approved a draft endangerment finding that found the global warming pollution endangers the public welfare?

Ms. JACKSON. Yes, sir, that is true.

Mr. MARKEY. Isn't it true that the EPA's proposed endangerment finding made by Stephen Johnson was sent to the White House in December of 2007 and that the Bush administration's EPA also developed a regulatory framework for greenhouse gas emissions under the Clean Air Act?

Ms. JACKSON. Yes, that has been established as true.

Mr. MARKEY. And isn't it true that the White House refused to even open EPA Administrator Johnson's e-mail? And isn't it true that nothing further happened until you conducted a review of the science and submitted your endangerment finding to the Obama White House, which actually opened the e-mail?

Ms. JACKSON. That is true.

Mr. MARKEY. Now some critics have raised numerous questions about the accuracy of climate science over the last 6 months, including questions about whether the Himalayan glaciers will melt or whether the Amazon will dry out. Were any of these specific studies used to determine whether greenhouse gas pollution endangers public health and welfare in this country?

Ms. JACKSON. No, because the endangerment finding was focused on impacts to this country and to the welfare and health of Americans. None of those two studies that you mentioned and the errors that were found in those reports impacted endangerment findings.

Mr. MARKEY. So give us a couple of key findings that you made relating to how changes and climate effect the United States that led to your decision.

Ms. JACKSON. Certainly. Sea level rise, increased threats of droughts, changes in our climate that would have dramatic impacts on agriculture and productivity, increased severe weather impacts, and I think even the acidification issues that we heard earlier all factored into my determination of endangerment.

Mr. MARKEY. And so your decision was based upon the impact on the United America of America?

Ms. JACKSON. That is correct, absolutely.

Mr. MARKEY. So whatever other information is out and being debated about the Himalayas or other parts of the world, that was not what your findings relied upon?

Ms. JACKSON. That is correct.

Mr. MARKEY. Now, could legislative efforts to overturn the endangerment finding also have the effect of overturning EPA's car and light truck standards that you just finalized with the Department of Transportation, the ones that are supported by Ford, Gen-

eral Motors, Chrysler, the United Auto Workers, and that also reduce the need for 2 million barrels of oil per day, could legislative efforts to overturn the endangerment finding legislatively impact that decision?

Ms. JACKSON. Yes, I believe legislation that overturns the endangerment finding would certainly not only impact, but would nullify the regulations you mentioned because that finding of endangerment is the basis for those regulations.

Mr. MARKEY. So this agreement that you reached that everyone agreed upon would in fact be endangered by legislative action?

Ms. JACKSON. Yes, I believe we would take what as we heard here many people think is a very good thing and was a victory for the environment and for our energy independence and our security and we would lose that victory, and in fact we would go back to where we were before, which was a nonuniform complex regulatory net that did not allow auto makers to move forward with certainty.

Mr. MARKEY. Now, let me ask one final question and that is what has been the response from the automotive industry to the merger of the provision in the 2007 law with the finding in Massachusetts v. EPA and then this harmonization in terms of their response to their reinvention of the automobile and the competitiveness of our American auto industry? Could you talk a little bit about that and any misgivings you are hearing from the auto industry about moving in this direction?

Ms. JACKSON. The auto industry has come a long way. I think they have now embraced the certainty that one national standard gives them for cars from 2012 to 2026, so much so that I am aware that they have written asking Congress not to overturn the endangerment finding because——

Mr. MARKEY. Can you say that again?

Ms. JACKSON. They have written asking Congress to not entertain legislation to overturn the endangerment finding because it would strip them of the very regulatory certainty they now have. They have also begun pretty public ruminations about wanting to start the next phase, to do it again, to look at opportunities, and we have also seen industries outside the passenger auto sector look for the same kind of treatment, if you will.

Mr. MARKEY. So I think that is important for everyone to understand, that the United States automotive industry is asking that the endangerment finding not be overturned because it has created an investment environment that is making it possible for them to move forward very rapidly in creating new jobs here in America and becoming more competitive internationally.

I thank you.

Let me turn now and recognize the ranking member of the subcommittee, the gentleman from Michigan, Mr. Upton.

Mr. UPTON. Thank you, Mr. Chairman. Administrator Jackson, I just want to on a different issue, just want to bring to your attention an issue that is very important to Michigan and had some attention this last week. I don't know if it is crossed your desk yet, but my district, Kalamazoo, Michigan, is home to one of the largest Superfund sites in the country, Kalamazoo River, which is the fourth largest contributor of PCBs into Lake Michigan. It was labeled a Superfund site some 20 years ago, thousands of hours of

meetings and negotiations have been held between State and local folks, EPA and the two PRPs charged with funding the clean up. Last week, Friday, Lando Bassett, one of the PRPs, came to a bankruptcy settlement with DOJ that required them to pay only pennies on the dollar for their obligation of the cleanup.

I had been working very closely with Senator Levin, Senator Stabenow. We have been together shoulder to shoulder. We are preparing a letter that ought to be ready I hope by the end of the week to you trying to make sure that—find out what timetable EPA might have to ensure that the cleanup continues as scheduled and the health and welfare of the folks in the watershed is not harmed any further.

I just want to bring that to your attention, and we look for your immediate response as quick as you can. I don't know if you are personally aware of it or not, but it is a big issue in southwest Michigan.

Ms. JACKSON. Yes, I am happy to look into it and get back to you with an idea on cleanups there.

Mr. UPTON. Great.

I just want to say we all want to reduce our reliance on foreign oil, for me particularly coming from auto State. I am a big supporter of the electric hybrids, and I have driven the new Chevy Volt. I have seen an number of different cars that are literally going to be in the showrooms this year, and I know that because of that and other reasons our electricity needs are going to grow by 30 to 40 percent in the next 20 years.

And I am a believer in basic economics, particularly supply and demand. And as we have increased demand like we are likely to have and we are going to need more supply, otherwise that price is going to go considerably up. But sadly what I see coming down the line is a reduction of supply, more regulations in lots of different ways. I don't believe that we have the science yet—I am a big supporter of CCS, carbon capture, we will need more coal plants, clean coal, but we don't have the technology ready yet to impose that on not only existing but new power plants.

I am wondering how many—I don't believe that EPA has approved any new coal—has allowed any new permitting for new coal plants in the last year or two.

Ms. JACKSON. The majority of the permitting actions for new coal plants happen through the States and at the State level. I would say that the reason there has been such a bottleneck in new coal plant permitting is litigation and a shortage of capital. Those are the primary reasons. There are issues with permitting, the permits then result in litigation, and there is great uncertainty about when this country will move to price carbon. That effects the investments markets as well as——

Mr. UPTON. They were also banking on this new technology, the CCS, to be in place, is that not right? Carbon capture?

Ms. JACKSON. I wouldn't necessarily agree that that is the driver for the permit decisions. In fact there is absolutely no reason why a permit decision at that point would depend on CCS, although I join you in hoping that technology has great promise. I am sure you know the President has asked me to cochair a CCS task force

to get 5 to 10 projects up and running in the next few years so that we can hopefully make it commercially available.

Mr. UPTON. I just know as we look to try to meet these demands, 30 to 40 percent increase, and we are going to have to have more coal. We can't sit on our hands with that resource that is there. On the nuclear side I applauded the President breaking ground, I believe it was in Georgia, the two new reactors that he broke ground on back in February or early March, but I also know that we have to deal with Yucca Mountain. We have to deal with a high level of nuclear waste that has been zeroed out in their funding. And I also know as a supporter of renewables, wind and solar we can talk a lot about it, but if we don't have the resources to hook them up to the grid it is no good, let alone to have the backup when the wind and the sun don't shine, as they say.

Ms. JACKSON. Yes. The President has said that we need to invest in our traditional sources. We need to make sure that they are clean sources, so we also need to invest in the technologies like CCS that will address carbon pollution from coal, because coal is such a carbon intense fuel and has such high emissions.

But I think you are right, his actions and this administration's actions have demonstrated a willingness to embrace other forms of energy, including domestic sources. The only thing I might add is that I think just like the cars rule is really an efficiency program for passenger cars, there is a need for us to focus as we have done in the Recovery Act and other places on energy efficiency, on making sure that the average American becomes a miser for power because we will be competing for power in a world marketplace that also——

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the chairman of the full committee, Mr. Waxman.

Mr. WAXMAN. Administrator Jackson, as I understand it, this tailpipe rule that you have issued earlier this month would save 1.8 billion barrels of oil; is that correct?

Ms. JACKSON. That is right.

Mr. WAXMAN. And I am thinking back over the last 30 years and I can't think of any law or regulation that has saved that much oil. Are you aware of any law or regulation that does so much to address our dependence on oil?

Ms. JACKSON. No, not off the top of my head, sir.

Mr. WAXMAN. My understanding is that permit requirements for stationary sources are triggered when a pollutant is subject to regulation under the Clean Air Act. So according to that interpretation you issued on March 29, 2010, this will occur for greenhouse gases on January 20, 2011, when the control requirements of the motor vehicle rule take effect and then they are binding on manufacturers; is that correct?

Ms. JACKSON. That is correct.

Mr. WAXMAN. Once motor vehicle rules are in effect next January, absent any action by the EPA, the Clean Air Act would require new or modified sources that emit more than 250 times of carbon dioxide per year to obtain a permit.

Ms. JACKSON. Right, absent any action by EPA.

Mr. WAXMAN. So in effect because of the Clean Air Act when you deal with the mobile sources, which is what the Supreme Court decision addressed, that would trigger requirements for stationary sources for carbon pollution. I believe we all agree that if EPA did not take further action and these requirements went into effect as is, it would be a significant problem. 250 tons is a reasonable threshold that generally captures only large industrial and commercial sources, but when you are talking about greenhouse gases it would be numerous smaller sources that are not regulated now and I think shouldn't be regulated. I think this would be an unacceptable situation, but thanks to your actions, we don't actually face that situation.

Last fall you proposed a tailoring ruling to significantly narrow application of the permitting requirements to stationary sources of carbon pollution that would exclude these smaller sources. Can you update the committee on the status of that rulemaking?

Ms. JACKSON. Yes, Mr. Chairman, the rule went through public comment. We received a large number of public comments and are in the process of finalizing a rule. As you mentioned, it is important for us to do that in order to give assurance to smaller, and I would go as far as to say mid-sized sources, that they are not, come next January, going to be subject to immediate regulation and in fact we have said just the opposite.

Mr. WAXMAN. What would the tailoring rule require? What would you do?

Ms. JACKSON. Right, it is not final. As we proposed it, it was a phase-in, it is a gradual phase-in of the larger sources, and I have given some hints as to what I believe will be in the final rule and I feel fairly comfortable saying that the final rule will include, come January, only those sources that are currently subject to Title 5 permitting for another pollutant to look at greenhouse gas pollution and then later in the year perhaps an additional number of sources would be phased in, a small number of very large sources. We haven't given the threshold as to what that would be, but it is orders of magnitude higher than 250 tons, the idea being that this is a very slow, deliberate, measured approach with a regulatory community quite frankly that is quite used to.

Mr. WAXMAN. Is it fair to say EPA does not intend to second the smaller sources to Clean Air Act permitting for greenhouse gases any sooner than 2016?

Ms. JACKSON. That is absolutely true.

Mr. WAXMAN. And just to be clear, these requirements can only apply to smaller sources in the future after EPA completed an additional rulemaking; isn't that correct?

Ms. JACKSON. That is correct.

Mr. WAXMAN. Now some argue that tailoring rule may be overturned in court with disastrous consequences. Is your general counsel comfortable with the legal status for this tailoring rule?

Ms. JACKSON. Yes, sir.

Mr. WAXMAN. Now even in the worse case scenario where the rule is overturned in court, wouldn't it take years before we could expect a final decision in the court?

Ms. JACKSON. Yes, I am not a lawyer, but I think——

Mr. WAXMAN. Clean Air Act cases typically take 3 to 5 years before a decision becomes final. It also seems highly unlikely that the rule would remain in effect during any litigation. There would be a higher court to issue a stay. Petitioner would have to show a strong showing that he is likely to succeed on the merits and he would suffer irreparable injury absent a stay. It would be difficult to make this showing for a rule such as this that relieves burdens rather than imposing them. Is that what your lawyer has been saying?

Ms. JACKSON. That is absolutely right.

Mr. WAXMAN. And Mr. Chairman, in my view they are taking a common sense approach, it is an effective approach that will avoid scenarios that none of us want. If Congress enacts comprehensive energy and climate legislation this year as I hope we will do, it will resolve the issue, and there is ample time for Congress to act on this issue in the future if and when it becomes necessary.

Thank you, Mr. Chairman.

Mr. MARKEY. The chairman's time has expired.

The chair recognizes the ranking member of the full committee, Mr. Barton.

Mr. BARTON. Thank you. Thank you, Mr. Chairman. We are trying to convert centimeters to inches down here.

Administrator Jackson, again thank you for being here. Are you familiar with the report that one of your employees Dr. Allen Karlin issued on the endangerment finding at the EPA?

Ms. JACKSON. I am familiar with the work and his desire to have that put into the record.

Mr. BARTON. OK. Did you read his report or a summary of his report?

Ms. JACKSON. I read some summaries of his report and ensured that my staff considered it as part of the comments.

Mr. BARTON. So you are aware that at least one person at the EPA is scathing the concerns about whether at that time was a proposed endangerment finding. One of his concerns was that EPA didn't do any independent analysis of some of these studies that were used to justify the endangerment finding. Why not, why didn't the EPA try to verify some of this information that the finding is based upon?

Ms. JACKSON. The majority of our work at EPA is done by looking at—I am sorry, let me start again. The endangerment finding work primarily relied on peer review, our standard was that we wanted to look at peer reviewed work and we had in addition to external peer reviewers a Federal team of reviewers who were reviewing our work.

Mr. BARTON. Some of the material apparently used were press releases. Is it standard operating procedure for the EPA to issue major findings based on a press release?

Ms. JACKSON. I believe what you are referring to, Mr. Barton, is that subsequent we have come to find out that there have been some allegations made that there were press release information in studies. What we did was whenever someone raised any questions about either the IPCC data or any of the underlying data, I made it clear to myself that we had obligation to investigate whether or not it changed the basis of the finding.

Mr. BARTON. I am sure you are aware that there are e-mails between Dr. Karlin and his superior in which Dr. Karlin is asking his study be considered. One of the e-mail responses is you don't understand, the White House has already made its decision, stop sending—stop working on this report. Are you aware of that e-mail?

Ms. JACKSON. Yes, sir, we discussed that, remember, a while ago on a phone call, we talked about it.

Mr. BARTON. So what is your response? He certainly was of the opinion that the conclusion had already been made that there really wasn't any real effort to do an analysis of the endangerment finding. And you have admitted—or your agency didn't do any independent studies, that you took at face value the material that was basically put out by the advocates were man-made greenhouse gases causing climate change.

Ms. JACKSON. No, sir, I don't agree with that assertion. The Agency's endangerment finding was based on thoroughly reviewed material by a number of scientific organizations. Mr. Karlin's and the e-mail changes we discussed. I don't know why his supervisor wrote what he wrote. He has been counseled, I did not personally do it.

Mr. BARTON. Counseled not to tell the truth, he has been counseled to keep his mouth shut? What has he been counseled to do?

Ms. JACKSON. He has been counseled not to make assertions that aren't factual. The endangerment finding that was begun under the Bush administration—this was years and years of work inside the Agency and Dr. Karlin's advocacy extended back into those days as well. The fact that he had an opinion should not have been shut down because someone asserted that the White House wanted——

Mr. BARTON. Dr. Karlin's opinion was that the EPA should actually do what it is supposed to do, which is try to independently evaluate, which has not happened.

Now you mentioned in response to a question from Chairman Markey that one of the reasons that the endangerment finding was put forward was because of a rise in sea level. Do you know what the sea level rise has been in the last 100 years in the United States?

Ms. JACKSON. I am sure you have it, sir.

Mr. BARTON. I do. Would you want to make a guess?

Ms. JACKSON. I don't see a reason to guess.

Mr. BARTON. It is 20 centimeters. 20 centimeters. Do you know what the EPA estimates the reduction in sea level rise is going to be in the next 90 years because of your tailpipe standard that you have been talking about with Mr. Waxman and Mr. Markey? Do you have any idea what——

Ms. JACKSON. I actually never thought of it in terms of a reduction in sea level rise. We talk about it in terms of greenhouse gas emissions.

Mr. BARTON. Well, you said one of the reasons you issued an endangerment finding was because of rising sea level, where according to your own EPA scientists this tailpipe standard that you all talked about is going to reduce sea level rise over the next 9 years between 600ths to 1400ths of a centimeter. Now how in the

world can sea level rise be used as an excuse for an endangerment to public health?

Ms. JACKSON. I am afraid that——

Mr. BARTON. I am just going on what you said, Madam Administrator.

Ms. JACKSON. Yes, but what we did in the rule that you are referring to is come up with a rule that reduces our dependence on oil, that says we can drive cars that are more fuel efficient and that put out less greenhouse gas pollution. That is what the law requires.

Mr. BARTON. My time has expired. Mr. Markey is being very gracious. Let me ask one more question, Mr. Chairman.

If in fact the endangerment finding is shown to be flawed and is thrown out, is it not true that you cannot regulate CO_2 under the Clean Air Act if you don't have the endangerment finding to give you the authority to do so?

Ms. JACKSON. There were a lot of nots in there, so let me make sure that I understand the question. If the endangerment finding is thrown out or in some way nullified, then the basis for the automobile rule——

Mr. BARTON. No, ma'am, the endangerment finding to regulate CO_2 as a pollutant is—the EPA does not have the authority unless you have an endangerment finding giving you that authority.

Ms. JACKSON. Right, the endangerment finding is not a regulation but it is the basis for regulation of automobiles.

Mr. BARTON. Yes, ma'am. And if we don't have the endangerment finding—not you but the EPA does not have the authority to regulate CO_2 as a pollutant, do you agree with that?

Ms. JACKSON. Right. If we don't have the endangerment finding, we lose the clean car rule, so it is gone, we lose any authority to regulate greenhouse gas emissions from motor vehicles.

Mr. BARTON. Thank you, Mr. Chairman. We will have a number of questions for the record.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Michigan, the chairman emeritus.

Mr. DINGELL. Thank you, Mr. Chairman. Thank you, Administrator, welcome to the committee.

Am I correct in understanding that the endangerment finding is a legal underpinning for the national standard for automobile emissions?

Ms. JACKSON. Yes.

Mr. DINGELL. Now, what would happen to the national standard for autos if the Congress passed a resolution of disapproval of the endangerment finding?

Ms. JACKSON. The legal underpinning would then be gone and so I think that there would be no way to withstand any challenge to the legality of those regulations.

Mr. DINGELL. Now, what would be the practical consequences of that with regard to moving sources and what would be the practical consequence of that with regard to stationary sources?

Ms. JACKSON. With regard to moving sources the regulation would then be void. So we would go back to a situation where California would have the authority along with other States who opted

in to regulate emissions from automobiles, and the Department of Transportation and NHTSA would do CAFE standards probably in accordance with ISSA and as far as stationary sources there would be no EPA authority to regulate stationary sources.

Mr. DINGELL. There would be none.

Ms. JACKSON. I believe.

Mr. DINGELL. Is there authority now to regulate stationary sources or is there not?

Ms. JACKSON. There is actually an obligation to—our reading of the Clean Air Act says there is an obligation to regulate stationary sources.

Mr. DINGELL. With regard to CO_2?

Ms. JACKSON. Yes. Once it became a pollutant and was regulated and found to endanger public health and welfare, the Clean Air Act says now other portions of the Clean Air Act apply.

Mr. DINGELL. Now this is a result also of the Supreme Court's decision in finding an endangerment; is that right?

Ms. JACKSON. Yes, the Supreme Court's order that the EPA make a determination.

Mr. DINGELL. Now what is the practical result to stationary sources if this resolution disapproval passes the Congress?

Ms. JACKSON. The practical result to stationary sources, sir, would be that EPA regular—I believe, I am not a lawyer, I believe EPA would not be able to regular—would not be able to regulate stationary sources any more than mobile sources.

Mr. DINGELL. So how many different regulatory standards would be imposed on, first of all, stationary sources, but under what requirements of law?

Ms. JACKSON. Well, certainly and again not being a lawyer, but certainly we have already seen individual States who in some way are regulating greenhouse gas emissions——

Mr. DINGELL. Would they be regulated under which provisions of the law, would they be regulated under the State implementation plans, would they be regulated under some other section? What would be the practical effect in terms of the number of different regulations of the State rather than the stationary sources would have to meet?

Ms. JACKSON. With the caveat that I will make sure I get an answer from my lawyers, I am aware that States right now have their own State laws.

Mr. DINGELL. But the potential is for how many different—how many different sets of regulations that they would have to correspond to, it would have to do State implementation?

Ms. JACKSON. Uh-huh.

Mr. DINGELL. Would there be other requirements that the States under the Clean Air Act would have to meet?

Ms. JACKSON. There could be individual State level—we are assuming the endangerment finding is gone. So the Clean Air Act authorities for CO_2 may not be available, but many States are already regulating under their own laws and other entities are feeling the effects of litigation under nuisance laws, under common law.

Mr. DINGELL. How many regulations would the auto industry have to meet in the moving sources?

Ms. JACKSON. Oh, potentially 50 or more. Right now 13 States had joined with California to have their own regulations.

Mr. DINGELL. Now the agreements with California and the other States that are there now held by the administration expires just prior to 2017; is that right?

Ms. JACKSON. That is right, it is through model year 20——

Mr. DINGELL. Are there any negotiations going to see to it that we have the same national standard approach going forward for post 2017?

Ms. JACKSON. I think it would be a stretch to say they are in at this time, but there has been expressions of interest from auto makers to begin having discussions.

Mr. DINGELL. You are telling us that there are no negotiations going on under the auspices of the administration or EPA? And can you tell us why that is not taking place? You have to look forward to 2017, which is just a few years off.

Ms. JACKSON. Yes. I think it is probably just a matter of time that we have not yet.

Mr. DINGELL. Well, let me remind you that the law—rather, the automobiles are manufactured with a 3, 4 and 5-year lead time. So if I seek correct you only have a year or so before you are running into a serious collision with that lead time. When do you propose to start these things?

Ms. JACKSON. I think we need to do it soon, sir. So I will get back to you with when we can commit to looking at 2017.

Mr. DINGELL. So are you telling me that you propose to go back on down to EPA and to start looking into that and see what you can do about getting these negotiations going.

Ms. JACKSON. Yes, sir.

Mr. DINGELL. Thank you.

Thank you, Mr. Chairman.

Mr. MARKEY. The gentleman's time has expired.

The chair has three letters from the Alliance of Auto Manufacturers, the International Auto Alliance, and the United Auto Workers, all saying they do not want the endangerment finding to be overturned. I ask unanimous consent that these letters be submitted for the record.

Without objection, so ordered.

[The information appears at the conclusion of the hearing.]

Mr. MARKEY. The chair recognizes the gentleman from Illinois, Mr. Shimkus.

Mr. SHIMKUS. Thank you, Mr. Chairman.

Welcome, Administrator. A couple things.

Let's be clear: When we say price carbon, we mean energy costs increase, correct? If 50 percent of our electricity portfolio is coal, we are adding an additional cost to electricity if we price carbon, correct?

Ms. JACKSON. And it depends how it is done, as to whether or not that is a small——

Mr. SHIMKUS. Well, if we try to manage it, we have capital expenses, which then will incur millions of dollars of new equipment. Or we go to carbon capture sequestration, which is 10 years down the road. That is all addition of cost. So let's be clear: When people say price carbon, they mean increased cost.

Let me refer to this poster here. I have used it many times. My colleagues can all name these individuals. This is what happened under the last Clean Air Act amendments, which I think you can credibly argue had toxic emissions. Fourteen thousand jobs in Illinois, coal miner jobs, were lost, in Illinois alone, not including what happened in Ohio and Pennsylvania or across this country. Pricing carbon destroys jobs, not just in the coal mining industry, in the electricity industry and in the manufacturing industry, because you will increase cost of doing goods.

That is why we are now segueing from the climate debate to energy and security, because with the failed IPCC rulings, with climate-gate, with the fact that scientists are not using the scientific method to replicate these tests, when we are talking about the Supreme Court ruling, the endangerment finding cannot stand on factual evidence.

In fact, my colleague, Mr. Inslee, is just a perfect example of using tests that can't be replicated in the natural environment, because the test that he is quoting is a test that is a synthetic reproduction using unnatural factors and variables. In fact, CO_2 was not even the substance to lower the pH in these samples. What was used was hydrochloric acid.

So what would help the world address climate is that we would agree to use real science, real data that the public can perceive that can be replicated in a real-world environment. We are not using the scientific method. That is why now the public is skeptical on this whole issue of climate change.

Administrator, what is the percent of the Earth's atmosphere that greenhouse gases make up?

Ms. JACKSON. It depends on how you define "greenhouse gases," sir.

Mr. SHIMKUS. Well, OK, you define it.

Ms. JACKSON. Well, EPA's endangerment finding includes six gases.

Mr. SHIMKUS. Well, what is the percentage?

Ms. JACKSON. You know, I have some——

Mr. SHIMKUS. It is 2. Two percent of the entire Earth's atmosphere is greenhouse gases.

Now, you know what is the major percentage of what makes up greenhouse gases in the Earth's atmosphere?

Ms. JACKSON. I am thinking——

Mr. SHIMKUS. Water vapor.

Ms. JACKSON [continuing]. Water vapor.

Mr. SHIMKUS. Do you know what percentage?

Ms. JACKSON. Thirty percent maybe?

Mr. SHIMKUS. A little higher.

Ms. JACKSON. No, I am not going to guess. Why don't you tell me?

Mr. SHIMKUS. Ninety-five percent, 95 percent.

So, of the 2 percent of greenhouse gases that are in the atmosphere, do you know how much is man-made greenhouse gases, which is what we are trying to say is endangering the public health?

Mr. DOYLE. Will the gentleman yield?

Mr. SHIMKUS. It is 2—no, I will not. It is 2 percent of 2 percent. It is 0.28 percent of the entire Earth's atmosphere is what we are debating here.

Now, let me ask you another question. The endangerment finding says "endangering public health." At what concentration does carbon dioxide endanger individual public health?

Ms. JACKSON. Well, we are not talking about what you breathe in that makes you sick. We are talking about concentrations of anthropogenic carbon dioxide.

Mr. SHIMKUS. And define "anthropogenic."

Ms. JACKSON. Man-made.

Mr. SHIMKUS. And that is 0.28 of the Earth's atmosphere?

Ms. JACKSON. But we are talking——

Mr. SHIMKUS. Yes or no? Is that 0.28 percent of the Earth's atmosphere?

Ms. JACKSON. I don't know. I will certainly verify. It is a very low number volumetrically, but——

Mr. SHIMKUS. It is extremely low.

Ms. JACKSON [continuing]. It is not low from a global warming perspective.

Mr. SHIMKUS. Do you know the frustrating thing about this debate? We keep using tonnage to say—and people think of tons, and they say, "Oh, we are overwhelmed by the tons." And we are talking about 0.28 percent of the atmosphere.

Ms. JACKSON. What we are talking about——

Mr. SHIMKUS. OSHA has a standard where parts per million affects public health. Do you know what that standard is?

Ms. JACKSON. It has to be fairly high.

Mr. SHIMKUS. Five thousand parts per million. What is the parts per million in the Earth's atmosphere of greenhouse gases?

Ms. JACKSON. It is 300 or so.

Mr. SHIMKUS. Three hundred forty-eight percent.

This is a fraud being perpetrated on the world that is going to destroy jobs on a false premise that carbon dioxide is going to wipe out the Earth's planet. And the public is on to this, and I am embarrassed by this administration to continue to push it.

Mr. DOYLE. Will the gentleman yield?

Mr. SHIMKUS. I will not. I yield back the balance of my time.

Mr. MARKEY. The gentleman's time——

Ms. JACKSON. Could I respond, Mr. Chairman?

Mr. MARKEY. Yes, you may.

Ms. JACKSON. Thank you.

I disagree with the premise of your analysis, sir. I am certainly not a climate scientist by training, but the volume of material in the atmosphere is a misleading statistic. What we are talking about is balance, is the simplest way I can explain it. That the atmosphere—may I finish, please?

Mr. SHIMKUS. I haven't intervened yet, but——

Ms. JACKSON [continuing]. The atmosphere is in balance. And we keep putting these gases, which have the potential to act as they do in a greenhouse—CO_2 is very warming. It may not be much of the volume of the atmosphere, but its potential to warm the atmosphere, to change our climate is much, much higher than its volume in the atmosphere, probably 25 or 30 percent.

And so, the analysis you are talking about is—to look at the volume and simply say it is not there is to ignore its effect. And it is not simply EPA or Lisa Jackson who is saying that. I mean, you know, the scientists in our country—we have to work by consensus. It doesn't mean there might not be some disagreement, but the overwhelming consensus is that climate change is happening, and it is due to man's impact through the fact that we are burning fossil fuels and we are accumulating vast amounts of greenhouse gas potentials.

Mr. SHIMKUS. So you agree with the hockey stick calculation of the tipping point of greenhouse gases?

Mr. MARKEY. The gentleman's time has expired.

Mr. SHIMKUS. Can she follow up? You gave her time to respond to me. Can she follow up to my question?

Mr. MARKEY. She was answering your question, and I felt——

Mr. SHIMKUS. Does she subscribe to the hockey stick?

Mr. MARKEY [continuing]. I felt that I would provide her——

Mr. SHIMKUS. The one that you brought out here numerous times, this hockey stick graph? Is that valid science?

Mr. MARKEY. To the gentleman, you asked her a question.

Mr. SHIMKUS. She responded.

Mr. MARKEY. The time expired. She asked if she could respond to your question.

Mr. SHIMKUS. All right. Thank you, Mr. Chairman.

Mr. MARKEY. I was only doing it really as a courtesy to you so that——

Mr. SHIMKUS. I am just asking if she still supports the hockey stick graph.

Mr. MARKEY [continuing]. So that your answer to the question——

Mr. SHIMKUS. Do you support the hockey stick graph?

Mr. MARKEY. It is obviously——

Mr. SHIMKUS. Do you know what the hockey stick graph is?

Mr. MARKEY. I guess what the gentleman is trying to say is, how can only a 2 percent addition to the atmosphere cause such a huge change? And it would be like saying, how can—what if subprime loans were only 2 percent?

Mr. SHIMKUS. What I am trying to say is the science is flawed, and we are going to destroy jobs. That is what I am saying.

Mr. MARKEY. If subprime loans were only 2 percent of the total financial products in the world, could they cause a global financial meltdown?

Mr. SHIMKUS. Two percent of 2 percent of 2 percent.

Mr. MARKEY. Yet that is a financial reality, as is this a scientific reality.

The gentleman's time has expired.

The chair recognizes the—I know the gentleman from Pennsylvania would like to be recognized at this time, but that could only happen with the generosity and beneficence of the gentlemen from Texas and California.

I recognize the gentleman from Texas.

Mr. GREEN. OK. Thank you, Mr. Chairman. And I will try and be as quick as we can.

Madam Administrator, I want to thank you again for appearing this morning.

And I have always believed that a balanced energy policy must have three basic points: energy conservation and efficiency, research and development in new and clean energy technologies, and environmentally responsible domestic energy production.

However, Administrator, even with these measures to increase efficiency that we in Congress push and your agency works to promote on a daily basis, do you believe it is still necessary to increase the environmentally responsive production of domestic natural gas supplies in order to meet short-term carbon reduction targets called for in any climate and to keep our manufacturing jobs here in the United States?

Ms. JACKSON. It is not my job to set that kind of policy; obviously, it is all of you. But I can say that, certainly, natural gas has a lower carbon emission factor intensity and could certainly be very helpful, especially now that we are finding that we have more of a supply than we knew we had.

Mr. GREEN. I appreciate that. In fact, in the last few years, because you and I have talked about the kind of area I represent where we produce and refine and have chemical industries, and we have seen such a difference because of the success in expanding our long-term ability to produce domestic natural gas.

On a similar subject, the Energy Information Administration estimates that there is 1,744 trillion cubic feet of technically recoverable natural gas in the U.S., or enough to supply our country for 90 years at current rates of production, according to the industry. Much of it can only be recovered when we use hydrofracking for wells.

In 2004, an EPA study found no evidence that fracking threatens drinking water. And now, for the first time, the EPA has undertaken its own water analysis in response to complaints of contamination in drilling areas. I look forward to the results of your study. And I am confident hopefully you will reach the same conclusion as 2004, and hope that we can come back to discuss your findings in 2012.

In the meantime, can you assure me that the EPA will not make any moves to regulate hydrofracking until you have completed your study?

Ms. JACKSON. As I understand it, sir, we couldn't because it would probably require a change in law of some type.

Mr. GREEN. OK. Thank you.

Mr. Chairman, my last question, and I will give you some time back, I hope.

The EPA recently finalized a rule to implement the long-term renewable fuel standard by Congress under the Energy Independence and Security Act. The renewable fuel standard requires biofuels production to grow from 11.1 billion gallons in 2008 to 36 billion gallons in 2022. However, it is my understanding that refiners are having difficulty meeting these targets due to various factors, but mainly the feasibility of reaching target X by X time.

Please discuss how the EPA plans to work with refiners to be able to resolve these issues. I have long advocated for, rather than setting these targets for years, to instead have the EPA study the

issue for a few years and ensure that the targets are feasible and realistic. Does EPA have a plan, since we can't meet that target, on how we can actually still produce fuel to run our vehicles?

Ms. JACKSON. Right. So, under the Energy Independence and Security Act, EPA has many responsibilities. One of them is to set the target numbers based on supply that is actually out there. I think you are referring to cellulosic ethanol and the fact that this year, in setting the target, EPA lowered it dramatically because there really isn't supply out there. So it would be unfair to ask refiners to try to meet it.

Mr. GREEN. Yes.

Ms. JACKSON. We are closely monitoring that. That is what the law requires us to do, to set those targets as production increases. And we work with sort of a cross-section of the industry on both sides, the refinery side and the producing side, to try to—and of course we work with the Department of Energy to set those numbers. And we will continue to do that, sir.

Mr. GREEN. OK. Well, and I support expansion of research in cellulosic. In fact, one of my frustrations, Mr. Chairman, is we don't have the jurisdiction over the tax incentives for biofuels. But if we ever do that extender, I actually have biofuel refineries that are shut down because they can't economically do it without those tax extenders. And so I appreciate the—we will continue to work on that to help get that product there for us.

Mr. MARKEY. Will the gentleman yield?

Mr. GREEN. I will be glad to yield to my colleague from Pennsylvania.

Mr. DOYLE. Thank you.

And, Mr. Chairman, I was trying to engage my good friend, Mr. Shimkus.

I was just wondering, Mr. Chairman, if you know what percent of your blood is made of platelets.

Mr. MARKEY. No, I don't.

Mr. DOYLE. About 3 to 7 percent of all our blood cells. Yet, you know, without that 3 percent, a small cut would cause you to bleed to death. Did you know that, Mr. Chairman?

Mr. MARKEY. I know I could bleed to death, but I didn't realize it was from such a small percentage of my body could cause such a dramatic change in my overall wellbeing.

Mr. DOYLE. Mr. Chairman, did you know that each member of the Energy and Commerce Committee represents only 2 percent of our collective wisdom?

Mr. MARKEY. That is a very high number, though.

Mr. DOYLE. That is a very high number, yes.

I yield back, Mr. Chairman.

Mr. MARKEY. I thank the gentleman.

The chair recognizes the gentleman from Texas, Mr. Burgess.

Mr. BURGESS. Administrator Jackson, I think in response to some questions from Ranking Member Barton you cited the criteria used in the endangerment finding of acidification of the oceans, agriculture production, and increased weather. Do I recall that correctly?

Ms. JACKSON. Those are some of the criteria I listed.

Mr. BURGESS. But really, for an endangerment finding, aren't we required to see an effect on human health?

Ms. JACKSON. It is public health and welfare. There were two standards.

Mr. BURGESS. Can you give me an idea of the number of deaths in this country, either last year or the year before, the outsize number, that would occur because of the increased acidification of the oceans in those years?

Ms. JACKSON. Well, I don't think we made an assertion that there were deaths associated with increased ocean acidification last year, so I shouldn't have to defend a number. We never——

Mr. BURGESS. But for there to be an endangerment finding, though, there should be human endangerment.

Ms. JACKSON. But that is not the only criteria by which to make that determination, sir.

Mr. BURGESS. Well, what is the amount of carbon dioxide that is safe?

Ms. JACKSON. Well, it depends on what you mean by "safe," sir. People have talked about a level in the atmosphere; I have heard 350 parts per million, I have heard 400, 450. Scientists use very complex models to try to determine, as that percentage of CO_2 increases and CO_2 equivalents increases, what that would mean for rising sea levels, what that might mean for changes in our climate. So they try to work backwards to project what level——

Mr. BURGESS. If I could just stop you there for a minute. OSHA has a level of 5,000 parts per million, or half of 1 percent, as being an acceptable level. NIOSH says 30 parts per million, though I don't know that anyone actually recommends that. So there is a wide degree of latitude amongst the Federal agencies of the level of carbon dioxide which actually causes damage to human health.

Ms. JACKSON. Well, that is apples and oranges, sir. I think the ocean numbers you are looking at are what you could breathe in if you are being occupationally exposed on a short-term basis. Those are probably cell numbers that would make you not able to breathe and, therefore, might harm you permanently and might kill you. Whereas, what I was referring to when we deal with climate change is what numbers would try to stop the trajectory in the changes in our atmosphere.

Mr. BURGESS. Well, maybe then you could help us by saying what does the EPA use to assess the health impacts of, say, carbon dioxide—and any of the other greenhouse gases, but carbon dioxide since that is the one we are talking about.

Ms. JACKSON. Right. EPA did not set a health level per se or an ambient air quality standard. What EPA did was look at what projections of the changing climate would mean on things like diseases that are carried by insects that might now be able to thrive in an environment where once there was winter weather that might kill them off, or exacerbation of impacts that are weather-dependent. So a great example is smog or ground-level ozone, which on warmer days is much, much worse for you and your lungs and causes increased morbidity and——

Mr. BURGESS. OK. Well, let's go to the vector-borne diseases, since you brought that up. Does the EPA have any peer-reviewed

procedures that it uses for assessing the threat from vector-borne diseases?

Ms. JACKSON. What EPA did was use the studies, peer-reviewed studies, by those who for a living study vector-borne diseases and the incidence and potential incidence of those increasing.

Mr. BURGESS. And from a numbers standpoint, what is the impact on human health that we are likely to see?

Ms. JACKSON. Yes, so I think maybe—the endangerment finding is—think of it as a weight of evidence, that all these things move together, but there are no numbers of people who are going to die from vector-borne. There is a belief that it will increase, and that will endanger public health, endanger public welfare.

Mr. BURGESS. Well, let me ask you this. What if the Earth were warming but it wasn't humans that were causing it, it wasn't human-made carbon dioxide, but the Earth were warming and these diseases would increase because of the increase in the vector-borne component? Would there be anything we could do about that? Would there be mitigating factors that we could bring into play?

And the answer is, of course we could. I mean, none of this stuff happens in a vacuum. The fact that we might have more mosquitos because the weather is warmer doesn't mean that we don't have anything else to use to impact that event. Is that correct?

Ms. JACKSON. Certainly. But that wasn't the question we were answering in the endangerment finding. We were asked whether the pollution from greenhouse gases would change our climate; and, if so, whether those changes endanger public health and welfare.

Mr. BURGESS. OK, good.

Ms. JACKSON. And the answer was an affirmative yes. And——

Mr. BURGESS. Great. Well, then how many people have died from the effects of elevated carbon dioxide in the last decade?

Ms. JACKSON. Again, you don't have to have a number of people who have died in order to make a finding of endangerment. If I tell you that it is dangerous to jump off a cliff, you don't have to actually do it to know that that is a dangerous thing. It was a finding——

Mr. BURGESS. No, because somebody else has already done the experiment and proved the theorem. But can you tell how many additional cardiovascular asthma deaths are linked to carbon dioxide increases of 100 parts per million in the atmosphere?

Ms. JACKSON. I think I have explained to you why that is not the analytical approach that was taken. We took the weight of evidence approach, as scientists have done.

Mr. BURGESS. Are you at the EPA doing research on this front currently?

Ms. JACKSON. We do some of our own research. EPA's Office of Research and Development has contributed three reports to the U.S. Global Change program. But we also rely on our partners and on the peer-reviewed work of scientists.

Mr. BURGESS. And what are the results of those?

Ms. JACKSON. The endangerment finding is based on that work, sir.

Mr. BURGESS. But you cannot provide us with numbers of how many people have actually been endangered.

What about how many people died as a result of a 1 degree Fahrenheit temperature rise over the last 100 years?

Ms. JACKSON. I understand your point, but I think we are talking past each other at this point. You know, I can probably quote what other scientists say: that the evidence is that ongoing climate change will have broad impacts on society, including the global economy and the environment.

For the United States, climate change impacts include sea level rise for coastal States, greater threats of extreme weather events, increased risks of water scarcity, urban heatwaves, western wildfires, disturbance of biological systems throughout the country.

And I would add to that the issue of ocean acidification, which is certainly not——

Mr. BURGESS. Can you quantify the number of human deaths, then, from any one of those instances that you just cited?

Ms. JACKSON. The endangerment finding is based on the premise and the belief and, I believe, the scientific fact that the severity of climate change impacts will impact negatively public health and welfare. And scientists agree that that severity is going to increase over time.

Mr. BURGESS. Then how can you be convinced, as a matter of science, that you will be able to reduce the public health risks, and hence the number of deaths, from carbon dioxide when you can't quantify those specific impacts?

Ms. JACKSON. Well, I am convinced of the inverse, which is that, as the models show that increasing amounts of emissions of greenhouse gases are going to change the climate, that mitigation is one method, mitigation of those emissions is one method of addressing——

Mr. BURGESS. Mr. Chairman, I have several more questions along this line. I would just like to submit those in writing for the record, if the chairman will permit.

Mr. MARKEY. The questions will be submitted in writing, and we would ask the administrator to respond in writing to the gentleman from Texas.

Mr. BURGESS. Thank you.

Mr. MARKEY. We thank the administrator.

The chair recognizes the gentlelady from California, Mrs. Capps.

Mrs. CAPPS. Thank you, Mr. Chairman.

Administrator Jackson, thank you for your patience.

And we have heard some of our colleagues today question whether the science of global warming is sound. In particular, some of my colleagues allege that e-mails hacked from the Climate Research Unit at East Anglia University cast doubt on the entire scientific field.

I want to ask you if you have seen the report by the British House of Commons Science and Technology Committee, which, and I quote, "found no reason in this unfortunate episode to challenge the scientific consensus that global warming is happening and that it is induced by human activity," end quote; and the report of the independent Scientific Assessment Panel, which concluded that, and I quote, "We saw no evidence of any deliberate scientific mal-

practice in any of the work of the Climate Research Unit, and, had it been there, we believe that it is likely that we would have detected it"; and, also, the Penn State report clearing Michael Mann, one of its scientists, of any misconduct.

Ms. JACKSON. I have seen both.

Mrs. CAPPS. Thank you.

Mr. Chairman, I would like to put all of these reports into the record, if I may.

Mr. MARKEY. Without objection, so ordered.

Mr. BURGESS. Mr. Chairman?

Mrs. CAPPS. I have them right here, the scientific reports.

Mr. MARKEY. OK, we will withhold. I will make the unanimous consent request, if the gentleman from Texas would like to look at them, and we could then make the unanimous consent request subsequent.

Why don't we just hold right now? If you could continue with your questions, and we will add back 30 seconds.

Mrs. CAPPS. All right. Thank you very much.

My next question: Have you seen the statements by Working Group One of the Intergovernmental Panel on Climate Change, the University Corporation on Atmospheric Research, the American Geophysical Union, the American Association for the Advancement of Science, the American Meteorological Society, and the Geological Society of America, all of which were issued after the hacked e-mails and all of which reaffirm the scientific basis for the threat of climate change? Have you seen these?

Ms. JACKSON. I believe I have seen them.

Mrs. CAPPS. Thank you.

I would like to enter all of those statements, as well, into the record. And, unfortunately, I don't have copies of them today.

Mr. Chairman, may I have your consent to enter these records that I have just mentioned into the record today?

Mr. MARKEY. The chair was distracted. Would the gentlelady make her inquiry again?

Mrs. CAPPS. I asked the Secretary—and I don't want to belabor her time. The various statements which I have just enunciated, if they could be entered into the record in the same way.

Mr. MARKEY. Great. Without objection, so ordered.

[The information appears at the conclusion of the hearing.]

Mrs. CAPPS. So, Administrator Jackson, in light of all of these statements from independent assessments and scientific societies, do you believe that it is safe to say that these e-mails do not in any way undermine the scientific basis of global climate change?

Ms. JACKSON. Yes.

Mrs. CAPPS. Thank you.

And now that we have made the facts on the science clear, I would like to ask some questions about public health and climate change. And, as you know, I am a public health nurse, and the connection between our health and climate change is a subject I care deeply about.

I have introduced legislation that would help the American public adapt to the public health impacts of climate change, and it was included in the House-passed energy bill.

I wondered if you would list briefly, if you can, some of the most important investments that you are considering which would ensure that we promote and protect public health by reducing oil dependence.

Ms. JACKSON. Well, certainly. You know, cars and the burning of oil create pollution, not only climate pollution but certainly pollution as well. In fact, one of the, you know, greatest legacies of the Clean Air Act are the reduction in NO_X and SO_2 pollution and particulate pollution through the Clean Air Act. And huge impacts on public health—in fact, 13 to 1, $13 of benefits in terms of public health to $1 spent.

So my belief is that, while I am certainly not arguing that any one action can achieve all we need, we can see tremendous improvement in public health.

Mrs. CAPPS. And so there are the monitoring and planning and infrastructure education opportunities that have already been in the Clean Air Act that you can adapt and use again, continuously use. Is that what your Department is doing?

Ms. JACKSON. Yes. And we are not using all the pieces of the Clean Air Act, but certainly bringing Clean Air Act regulations to bear.

Mrs. CAPPS. Thank you.

I just have a couple seconds left. Let me ask you how EPA is working with other Federal agencies to align policies in order to reduce oil dependence.

Ms. JACKSON. Well, all of our work—the work on the cars rule was, you know, closely coordinated with the Department of Transportation. But we work very closely with the Department of Energy, with NOAA, with Interior and Agriculture—all of them, by the way, who sat and agreed on the endangerment finding. So all of the work we do is through an interagency process that coordinates our work together.

Mrs. CAPPS. Thank you very much.

I yield back.

Mr. MARKEY. The gentlelady's time has expired.

And we will ensure that the gentleman from Texas sees the scientific data that the gentlelady has. As a matter of course——

Mr. BURGESS. Mr. Chairman, if I might, just with the stipulation and the understanding that in the record that is a limited and provisional report and not the final report that has been prepared, as I understand it. I am OK with it being inserted as long as there is the captioning that it is a preliminary and limited report.

Mr. MARKEY. I think that is how—would the gentlelady from California—is that described as a provisional report? It is not a final report?

Well, let me just say, in general, let's just—on the second panel, there is a witness whose conclusions I do not agree with. And I am sure that that witness is going to make a unanimous consent request that all of his analysis be put in the record. I will accede to that. It will go into the record, but it will be associated with that witness, as any of these reports are identified with the Member who is asking them to be inserted in the record at that point.

So it is not an endorsement by the committee of any of the materials which are put in the record. It is just a further extension of

the remarks and the information which that Member wishes to have included in the record. And that is just something that we do and we honor as a matter of course on this committee as part of a courtesy to any Member that has information which they would like to have included. But it is then up to each individual Member to make their determination as to what weight they wish to attach to it.

Mr. BURGESS. Thank you, Mr. Chairman. With that clear and coherent description, I will withdraw my objection. But thank you for providing the information.

Mr. MARKEY. No, I thank the gentleman.

And, without objection, the gentlelady's information will be included in the record.

[The information appears at the conclusion of the hearing.]

Mr. MARKEY. And the chair will recognize the gentleman from Louisiana, Mr. Scalise.

Mr. SCALISE. Thank you, Mr. Chairman.

Administrator Jackson, a couple of weeks ago, I think you were in New Orleans talking to a group and were talking about how regulations and rules that your agency issues help create jobs. Can you expand upon what you meant with that?

Ms. JACKSON. I am happy to, but first I have to say "Who Dat," right?

Mr. SCALISE. "Who Dat."

Ms. JACKSON. All right.

What I was explaining is that the Clean Air Act—and cars are a perfect example. The catalytic converter is a home-grown technology, a home-manufactured technology—we exported it to the world—to deal with pollution, non-CO_2 pollution but pollution from car exhaust. It is true of scrubbers or flue gas desulfurization units.

So what I said was that we have a whole sector of our economy that is built around making sure we have clean air and clean water and our public health is protected and environmental health is protected.

Mr. SCALISE. Right. Is there an acknowledgement that some of those rules actually cost us jobs? Many companies who are operating by all the rules and doing things the right way, every time rules come out, it changes the way that they have to do business; people who aren't doing anything to hurt public health, but just people who then become burdened with new Federal rules and regulations that cost them money or, in some cases, have caused them to shift jobs overseas, lots of jobs overseas.

So, while you might think that the rules create jobs, I would hope you recognize that some of those rules cost our country jobs at the same time.

Ms. JACKSON. I would certainly stipulate that rules are not free, that they have a cost to them, that we have to invest in having clean air, that we have to invest in having clean water. And that one of the things the laws of our country have said is that the American people demand that, that we could grow without any restrictions on pollution. And, certainly, I consider it a part of my job to ensure that the rules we put in place are——

Mr. SCALISE. But some of this goes beyond pollution, and hopefully I can have time to get into some of that. But right now your

agency has a contest going on where, on your Web site, you claim that you are going to award $2,500 to somebody who makes a YouTube video explaining why rules are important.

Do you really think, in the times that we are facing right now in our country economically, but also with the debt that our country is facing, that it is a wise use of taxpayer money to be giving $2,500 of taxpayer money away to somebody to make a video on YouTube about why rules are important?

Ms. JACKSON. Well, I am happy to take a look at that specific concern. I didn't prepare to look at it for this hearing. But if you would like——

Mr. SCALISE. It is on your Web site.

Ms. JACKSON. I am not disputing that, sir. I am not disputing that at all. What I am saying is that there are lots of things on our Web site that are designed to engage the public in the work that we do. And so——

Mr. SCALISE. Right. Engaging is one thing, but giving away 2,500 taxpayer dollars is a different story.

Ms. JACKSON. I am happy to take a look at it for you, sir.

Mr. SCALISE. So you would consider withdrawing that $2,500 reward.

Ms. JACKSON. I am happy to take a look at it. That is what I——

Mr. SCALISE. Maybe using it to help pay down debt. I would appreciate that.

When we talk about the hydraulic fracturing process—and Congressman Green had asked you a similar question. I just want to make sure that we are correct on this. It is my understanding that you had said that you cannot regulate the fracking process without a change in law?

Ms. JACKSON. My understanding is that we can regulate only, I believe it is, hydrocarbons or diesel fluid injections right now.

Mr. SCALISE. Do you know of any examples—and we have a 2004 report that says that fracking does not contaminate groundwater. Do you have any kind of findings that you have done that disputes that?

Ms. JACKSON. Well, I think there has been some important information that has come out lately. States are doing more and more investigation of complaints by their citizens that their water is being impacted. I think the——

Mr. SCALISE. And the States do regulate that right now.

Ms. JACKSON. Sir, I am not disputing who regulates it. You are asking if I am aware.

Mr. SCALISE. But do you have any reports of——

Ms. JACKSON. I am aware of concerns that there has been misleading information about what is going down wells. That might actually have come out of investigations by this committee. I have right now complaints before me from folks who say they are concerned and want——

Mr. SCALISE. If you can do this, because my time is running out, if you can get me a copy of anything you have that would purport to dispute that. Because you are doing a—your agency is putting a report together right now which—I would hope this Congress doesn't try to do anything to limit the fracking process, especially

when there is no finding and no report from your office. So if you can get me that.

On climate-gate and Himalaya-gate and Amazon-gate, you have not changed any of your conclusions on which EPA has based endangerment findings. What analysis has EPA done that caused you to reach that conclusion in light of these scandals that have erupted over falsified scientific data?

Ms. JACKSON. EPA reviewed the allegations as they were made, and they dribbled out over a period of time. And, in each case, my direction to staff was clear: to review whatever allegations were being made to determine whether they change the foundation for the endangerment finding. Certainly, that is our obligation to do.

And, as I said in response to one of the earlier questions, we have made a determination, and it turns out that others now agree with that——

Mr. SCALISE. When did you conduct that analysis?

Ms. JACKSON. I am sorry?

Mr. SCALISE. When did you conduct that analysis?

Ms. JACKSON. As part of the endangerment finding and as the information became available, because some of this has dribbled out since.

Mr. SCALISE. And if you can get me any information you have on analyses you have done on climate-gate, Himalaya-gate, and Amazon-gate.

Mr. MARKEY. The gentleman's time has expired.

Mr. SCALISE. Thank you. I yield back.

Mr. MARKEY. The chair will recognize the gentleman from Washington State, Mr. Inslee.

Mr. INSLEE. Thank you.

I wonder if our friends could put up that slide I had earlier that talked about this issue of ocean acidification.

It has been astounding to me that we still hear debate about the existence of climate change. And I wanted to ask about what Janet Napolitano, who is the leader of NOAA, calls the evil twin—sorry, Jane Lubchenco. Excuse me. Thank you. I appreciate that. What she calls the evil twin of global warming, which is ocean acidification.

We used to think it was a good thing that when we burned the oil and the carbon dioxide goes into the atmosphere and then it goes into solution and the oceans, we used to think that was a good thing because it got it out of the atmosphere so it would reduce the climate impact.

But the scientific community is now telling me and the rest of Congress that it is an undisputed certainty, with no scientific debate whatsoever, that the carbon dioxide pollution from burning oil is now going into the ocean and creating more acidic conditions.

And it is a scientific fact, I believe beyond dispute—in fact, I have never heard anyone in this room dispute the fact—that the oceans are now about 30 percent more acidic than they were before we started to burn fossil fuels, and that this happens because the pollution goes up, goes in the air, falls out of the sky, goes into the solution of the ocean and creates acid.

Now, the scientists that I am talking about, we have some neuroscientists in Seattle and they have been doing research, they

tell me that this is a certainty. There is just no doubt about this, there is no debate about this. No one has really ever challenged this conclusion that we are acidifying the oceans because we are burning fossil fuels.

Is that a fair characterization of the science?

Ms. JACKSON. Yes. I am going to of course yield to Dr. Lubchenco. But we have talked about this, and I know it is exactly as you describe it, sir.

Mr. INSLEE. So if I can refer to this photograph, this is a photograph demonstrating what the future looks like. And it is a photograph, again, of a terrapod. These are small plankton, and these are the base of the food chain. These are what everything—not everything, but much of what life depends on in the ocean, because small fish eat these terrapods by the gazillions, larger fish eat them, and eventually the largest fish eat those fish. The whales depend, essentially, on the presence of these terrapods. So these are the basis of the entire food chain in the ocean.

And what the scientists are telling me is that, as the oceans become more acidic, the very basis of the food chain is threatened because these terrapods and many other creatures will not be able to exist. For instance, we have not been able to grow an oyster crop in the State of Washington for 2 years, probably because of the acidification of the ocean. That is not totally clear yet, but probably because of that.

So we have evidence before our own eyes that carbon pollution from burning oil has the capacity to actually melt the very basis of the food chain. Because what this experiment shows—and, actually, Dr. Lubchenco showed us this experiment in another committee hearing—that if you expose these shells to water that is as acidic as it will be in 2100, that the shells actually melt.

And this has the fishermen concerned where I live in the State of Washington, because if you destroy the basis of the food chain—this is what salmon eat when they are in the Pacific Ocean. When these things are gone, there is no food for the salmon.

So I guess the question is, is ocean acidification something legitimately to be concerned about from a human health standpoint? Because we get about 15 percent of our protein from the oceans, and the food chain appears to be at risk. Is that something legitimately to be concerned about, in your role?

Ms. JACKSON. I do think that it is a legitimate concern and one on which the science, like much of climate science, continues to just emerge and one that cannot be ignored.

Mr. INSLEE. And if you were going to—maybe this is getting to the personal a little bit, but let me just ask you. When you think of the human impacts of carbon pollution, what personally is most troublesome to you?

Ms. JACKSON. Well, you know, I could cite the $2 trillion in global damages that are estimated to occur from a changing climate. I think you know, we have talked about the fact that, although I do not attribute Hurricane Katrina to climate change, per se, I have seen what it requires of this country and its citizens, who all pulled together to help my hometown after the kind of catastrophe that happened when you saw a very, very severe flood.

And to think about our economy, instead of being a productive economy, constantly having to respond to catastrophes that are induced by a changing climate over time; when I think of my children or my grandchildren spending all their time doing that instead of making new things, innovating, and building a better life, I worry. And I am very, very concerned. And I think—I know that we have an obligation to follow science and do that.

And the good news of it, which I hoped we would talk about more in this hearing, is that we can do it in a way that decreases our dependence on foreign oil. It is something no one seems to want. I can't imagine they would.

Mr. INSLEE. Thank you.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Alabama, Mr. Griffith.

Mr. GRIFFITH. Thank you, Mr. Chairman.

Thank you for being here. I looked at the clock, and it is 10 after 12:00, and I know that we would probably prefer to be on the St. Charles Avenue trolly headed to the Camellia Grill for some chili cheese fries.

Ms. JACKSON. All right.

Mr. GRIFFITH. But anyway.

Ms. JACKSON. Did you go to Tulane?

Mr. GRIFFITH. Yes, I was there.

Anyway, did the EPA do its own analysis of the challenge to the endangerment reviews? And, if so, I don't need to know the result, but we would like for you to provide us with that.

Ms. JACKSON. Yes, I did mention that we would provide it. So I am happy to get you a copy.

Mr. GRIFFITH. OK. My other point—and so many of the questions have already been asked—is that we, as Americans, represent 5 percent of the world's population, maybe 4.5 percent. Does the EPA have any responsibility when it regulates to know the economic impact that it has on our economy as it relates to our global competition? Or are we regulating ourselves in a vacuum and, as you mentioned, children and grandchildren, jobs, economy, recognizing the population of China and the fact that they are probably not having this discussion right now?

So does the EPA have a responsibility to do a global economic impact as it relates to our competitiveness?

Ms. JACKSON. In general, we do economic impacts on our regulations, but they tend to look at our domestic businesses.

It is not true to say we don't care about economic impacts. That has been out there for a while. That is not a true statement. But we don't generally look specifically at a foreign business. So many businesses now are multinational, that we just look at what the impact would be, the cost to our business community.

Mr. GRIFFITH. I yield back the balance of my time, Mr. Chairman.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from California, Mr. McNerney.

Mr. MCNERNEY. Thank you, Mr. Chairman.

Administrator Jackson, I want to thank you for coming today. You knew it wasn't going to be an easy hearing, and you have been graceful, and I appreciate that.

My understanding is that the endangerment finding was based on a preponderance of evidence supported by recognized scientific-based agencies and organizations. Is that correct?

Ms. JACKSON. That is a fair statement.

Mr. MCNERNEY. Could you name a couple of those agencies or organizations?

Ms. JACKSON. I am happy to.

In the U.S. Government, the U.S. Global Change program is composed of NOAA and NASA and DOD and Agriculture and Transportation, so all of the folks who are watching these issues from various aspects of how they would impact us.

And then, of course, there are the international efforts. The IPCC is named, but the IPCC is really made up of several boards that look at various aspects of these issues.

And then there are additional studies, as well. The National Academies did a study that was one that we relied heavily on that brought together much of the science, as well.

Mr. MCNERNEY. Thank you.

I am also thankful to my friend, Mr. Shimkus, for giving us perspective of global warming deniers, and that perspective believes that small changes in chemical composition of a solution couldn't possibly change the physical nature of that solution. So I am thankful for the other side for that perspective.

I have another related question. I represent the Central Valley of California, part of it anyway, and it is a great agricultural region. We have terrific crops and export to the entire world. But we have air quality problems that cause asthma and other health-related issues.

I was wondering what impact the endangerment finding and the subsequent policy rulings by the EPA might have on public health.

Ms. JACKSON. The effort to mitigate greenhouse gas pollution—which, I should just say for the record one time, I believe is best done through legislation, so, obviously, this body has already dealt with that question—would, by mitigating and stopping greenhouse gas emissions, start to put us on a trajectory to see climate change level off.

There would certainly be some need for adaptation, telling populations that are already seeing changes, as well. So it is a system as we level off and stop the increase in changing climate, the heating in the Central Valley and increased droughts, we would—I am sorry, and increased impacts on water—we would start to see a change. But it is not an instantaneous thing. It is not——

Mr. MCNERNEY. But wouldn't that also have a spin-off of protecting public health, in your opinion?

Ms. JACKSON. Absolutely. Absolutely, sir. Yes.

Mr. MCNERNEY. Thank you.

And I am just going to follow up on what you said. Wouldn't it be true that comprehensive energy legislation would be preferable and a superior approach to national security, health, and the economic challenges we are now facing?

Ms. JACKSON. Absolutely. I join the President in that call.

Mr. MCNERNEY. All right.

And thank you. I will yield back.

Mr. MARKEY. We thank the gentleman very much.

And to our audience, we just would like to let you know that 27 members of the subcommittee have come today, which is just about every member of the subcommittee, which is a reflection of the importance of this issue but, you know, has contributed to the length of the hearing. And so we apologize to Members for that, although the information that we are receiving is invaluable.

So the chair now recognizes the gentleman from Oklahoma, Mr. Sullivan.

Mr. SULLIVAN. Thank you, Mr. Chairman. I think that is because of you, that we have so many here.

Mr. MARKEY. I would not want to know how many came if it was just me.

Mr. SULLIVAN. Well, again, thank you for being here. I am from Oklahoma——

Mr. MARKEY. Oh, I apologize to the gentleman. I actually went out of order there.

Mr. SULLIVAN. Oh.

Mr. MARKEY. The gentlelady from California, with the indulgence of the gentleman from Oklahoma, is recognized.

Mrs. BONO MACK. Well, I thank both the chair and my colleague. I hate to have that false start, but also glad to know that I am not last and least at the same time.

But I want to welcome the administrator, as well, and thank her for her patience and say that I have an issue that I am hoping that you can look into further that is specific, at least now, to southern California.

As you know, southern California has faced extremely challenging air quality issues, and, over time, the region established air quality standards in the issuance of permits for those who wish to construct or expand infrastructure projects. Those who seek these permits include everyone from hospitals, schools, fire, police stations, water projects, small businesses, and the list goes on and on.

Recently, the EPA was petitioned to try to halt the issuance of new permits, even though the State acted with overwhelming bipartisan support on legislation to ensure that these could move forward.

Given the nearly 15 percent—I am sure much higher, actually—but the 15 percent unemployment rate in much of California's Inland Empire, the importance of providing new job opportunities is crucial. In fact, holding up the existing permits being requested in parts of southern California will impede the progress of $10 billion in projects that will provide tens of thousands of jobs.

It is my hope that the EPA will reject this petition, as we have had the permit program serving areas throughout L.A. and surrounding counties for decades. Our businesses need the certainties that they can invest, and our public entities like hospitals must expand to meet the growing needs. Again, it is my firm belief that this petition should be rejected, given the high stakes it represents for our regional economy.

Are you able to respond specifically on this matter today, if you know personally about it? And if you don't know, are you willing

to work with me to ensure the effects of this petition are seriously considered?

Ms. JACKSON. I am aware of the petition. I don't have a full briefing. I would be happy to meet with you and discuss it further. Obviously, staff have to review the petition on its merits, but we are happy to work with you on that.

Mrs. BONO MACK. All right. Thank you. It is very, very important.

But changing back now to the issue at hand, in February you testified in the Senate that you would prefer climate legislation over regulation of carbon dioxide emissions under the existing Clean Air Act. I happen to feel the same way, which is one of the primary reasons that I supported the House legislation, as it ensured that the EPA would not move forward unilaterally on a number of fronts, or at least temporarily.

I recognize that there is a proposed enforcement delay being considered for various sources, but that still doesn't solve the problem that moving forward with regulations under existing statutes will be harmful to our economy, whether that is now, in 2011, or in 2020.

As you know, California has its own regulatory regime that is moving forward, as provided by AB–32. And this leads me to my question: Would you support a complete preemption of EPA regulation of greenhouse gases under the Clean Air Act or other existing statutes and comprehensive climate legislation? As you know, the issue is one of the more clear interstate commerce issues we are considering in this committee. And if you don't support this preemption, can you explain why not?

Ms. JACKSON. Well, I haven't seen preemption language from the U.S. Senate. There is certainly a bill that passed this body that included some preemption.

I certainly support the fact that legislation is going to have to deal with the tricky question of how to deal with competing State and Federal standards and try to harmonize all that, which is why I believe we have to have a legislative solution.

But I also have to say that, in the interim, I believe I have to follow the law. And I believe very strongly that the Supreme Court decision wasn't an "if you feel like it." It was, "EPA must make a finding." And everything we have done since making that finding and, in fact, even leading up to it has been about trying to ensure that the Clean Air Act unintended consequences are minimized, so that you can have a rule for cars that is a good-news story without immediately having to regulate other sources that you don't want to.

Mrs. BONO MACK. Can I just narrow this down? And I don't know that the clock necessarily started when I started, but I appreciate that I still have 3½ minutes.

Regulate or legislate? I mean, it is not yes or no, but it is close.

Ms. JACKSON. New legislation that puts a market incentive on clean energy is the way to go. What that legislation says is the job of Congress and will be, I am sure——

Mrs. BONO MACK. But you are saying you prefer that route? I mean, that is all I am asking is a simple—that is what—you said it before, and I am just asking you to reiterate it right now.

Ms. JACKSON. Yes, ma'am. Yes, ma'am.

Mrs. BONO MACK. OK.

Ms. JACKSON. I prefer legislation.

Mrs. BONO MACK. Thank you. And would you support Federal preemption of State greenhouse gas regulations?

Ms. JACKSON. All I can say is I prefer legislation. And the details of legislation are to be discussed.

Mrs. BONO MACK. But this is very simple, especially in your capacity, a very simple question. Would you support Federal preemption of State greenhouse gas regulations? What do you support? It is very simple.

Ms. JACKSON. The administration, the Obama administration, has said over and over that we need legislation, that we prefer it. But that I do not have the luxury of ignoring the law. And so I, as I do my job at EPA——

Mrs. BONO MACK. This is a second question from the first. Would you support Federal preemption of States? It is not regulate or legislate; it is now Federal or State preemption.

Ms. JACKSON. I support legislation. And I believe that that is one of the issues that good legislation is going to have to deal with. And, in the interim, I think I should do my job, which is to uphold the Clean Air Act as the Supreme Court has interpreted it.

Mrs. BONO MACK. All right. Well, I don't think that is much of an answer for me.

Ms. JACKSON. Well, I also don't believe that it is an either/or question entirely. I also believe very strongly that the Clean Air Act can be used to do good things that are entirely consistent with legislation. And I think the clean cars rule is a perfect example of that.

Mrs. BONO MACK. Well, it is a simple question, though. In fact, if California continues to move the bar, then where does that leave Federal legislation or regulation? If California—and as a proud Californian, but not necessarily agreeing and not necessarily agreeing that what California does is good for the rest of the country—but if California changes their standards, are you saying that we should then once again meet California standards?

Ms. JACKSON. I think the cars rule was a great example of a way to make sound and smart legislation. And, in fact, much of what happened in the bill that passed this committee and the House talks about how to meld the Clean Air Act authorities in with the new authorities that would come under legislation.

So, again, I don't think I can simply say one or the other, because I think the trick of legislation will be to figure out how to put those two authorities together in a way that gets you things like the clean car rule. And, yes, California may look at even cleaner cars. And I think, when I spoke to the chairman emeritus, he asked me to go back and start thinking about what we are going to do for 2017 and beyond. And I think that is a fair question.

Mrs. BONO MACK. Thank you.

I yield back. Thank you.

Mr. MARKEY. OK. The gentlelady's time has expired.

The chair recognizes the gentleman from Pennsylvania, Mr. Doyle.

Mr. DOYLE. Thank you, Mr. Chairman.

Administrator Jackson, you have been most generous with your time, and we have covered a lot of ground, so I really just have one question. I want to follow up on something that Representative Green talked to you about.

In my State of Pennsylvania, we are sitting on a vast supply of natural gas in the Marcellus Shale. Geologists estimate it could be somewhere between 168 and 516 trillion cubic feet. And I get asked every day—I know that Representative Green referenced the EPA study on the effects of hydraulic fracking on drinking water. And we are starting to see a lot of wells go up in southwestern Pennsylvania and throughout our State. So we hear from our constituents every day about that.

So we know there is a study, but could you give us an idea about the scope of this study? What all is the EPA looking into with regard to fracking? And when might we anticipate this study being made available?

Ms. JACKSON. EPA recently held a meeting of its Scientific Advisory Board. It is the Federal FACA that advises the EPA administrator on the scope of the study, how best to design a study of hydraulic fracking, primarily to look at potential impacts on drinking water, on water. And, of course, that would be, in this case, groundwater for the most part.

And that study, I believe, is now scheduled to not have any results until either late in 2011 or early in 2012. I will double-check on the date. I mean, we haven't quite finished scoping it, so we haven't begun the actual study yet.

We are designing it to be transparent, to use information that is being collected. Many States and localities are getting information and complaints on potential issues with respect to contamination. And it is being done primarily to serve as a resource to EPA but, of course, also to Congress and others, the States, in terms of what we know.

One of the concerns is that there was a 2004 literature review. There were no samples taken. That study is widely cited as saying, "See, that proves it is safe." And I don't think that is a fair or accurate summation of that study. I think that is an overbroad reading. And so I have said I believe we need to take some more data.

Mr. DOYLE. Having said that and given the fact that we might not have the study until 2011 or 2012, do you think it is wise for Congress to consider legislation to regulate hydraulic fracking in advance of the completion of this study?

Ms. JACKSON. Certainly, I would leave the legislative decisions to you. And I would certainly say that we will be happy to provide information, as we get it, to Congress in helping to inform your deliberations.

Mr. DOYLE. Thank you.

Thank you, Mr. Chairman.

Mr. MARKEY. Great. The gentleman's time has expired.

And all time for—oh, I am sorry. I apologize again to the gentleman from Oklahoma. Mr. Sullivan——

Mr. SULLIVAN. That is OK. I am used to it, Mr. Chairman.

Mr. MARKEY [continuing]. Is recognized.

Mr. SULLIVAN. Thank you, again, for being here.

And, you know, the economy is not doing so well right now. I guess we can all agree to that. And unemployment levels are pretty high. And why did the administration choose to embark on the endangerment finding amidst all this?

Ms. JACKSON. The Supreme Court ruling, which mandated that EPA make a finding one way or the other, was in 2007. As you heard, the work had been done under the Bush administration, but the White House didn't open the e-mails. And that really didn't comport with the way I saw my responsibilities as the EPA administrator and, frankly, as the White House, you know, wanted us to do our jobs. And so we have moved affirmatively in response to a Supreme Court decision that is now 3 years old.

Mr. SULLIVAN. Well, what analyses were performed to determine whether a positive endangerment finding would be beneficial for the economy or energy security? Did you do any?

Ms. JACKSON. That isn't what the Clean Air Act requires us to do. The Clean Air Act requires us to make a determination as to whether pollutants—in this case, greenhouse gases—endanger public health and welfare.

Mr. SULLIVAN. Whether we lose jobs or people——

Ms. JACKSON. Well, let me be very clear. Any regulation of a pollutant is certainly done only after an economic analysis. So I do not want anyone to think that means we don't look at the economy. No one is more sensitive to the economic impacts of our rules than me; I have to sign off on them.

But I think the clean car rule is a perfect example of the kind of smart regulation we can make under the Clean Air Act that reduces our dependence on oil, reduces pollution, and actually helps in job growth because the automakers want it so that they can get back to making cars.

Mr. SULLIVAN. Congressman Doyle talked about hydraulic fracking. And I think that is a really good method to use. That is how we have been able to get over 120-year reserves of natural gas. He talked about the Marcellus in his area. That is why they have been able to get so much. And I think that helps us from a national security perspective but also jobs. And it is American-made energy, and we can use it in vehicles, and it burns clean and all of that.

But are you aware of how many hydraulic fracks have occurred in this country since it has been implemented over decades and decades and decades?

Ms. JACKSON. I know it has been used in the oil industry for all that period of time. I don't know——

Mr. SULLIVAN. Well, if you are involved in something like that, don't you think you should know, though?

Ms. JACKSON. Well, we are doing a study specifically because citizens and their representatives have said that they are concerned that, as this Marcellus Shale, which is a tighter formation than we have been producing natural gas from and which could potentially impact groundwater in areas that are quite densely populated, they want to know it is safe. And I think that is a fair question.

Mr. SULLIVAN. You know that much. But also, there have been a million hydraulic fracks, over a million hydraulic fracks in the United States. Are you aware, since you do know a lot about that,

are you aware of any instance where it has ever gotten in the groundwater?

Ms. JACKSON. Well, we have several allegations and concerns raised in places like——

Mr. SULLIVAN. No, I mean concrete evidence.

Ms. JACKSON. —Wyoming and Colorado and Pennsylvania.

Mr. SULLIVAN. As the EPA director, administrator——

Ms. JACKSON. But that is why we are doing the study, Mr. Sullivan.

Mr. SULLIVAN. I know. But, over the decades, has there ever been in your research—I am sure you do research and put information together to determine this as you move forward with this study. Have you seen any instance in the past, any court case, anyone suing someone, any verifiable evidence—that is what I think you have to go back towards—to see if there is any precedent that shows that this——

Ms. JACKSON. No, but I would say that we have seen cases where people have raised concerns and we haven't been able to say conclusively "absolutely not." And that is why, rather than saying, "Take our word for it," we are saying, "Let's do a study; we will involve the industry in it, but——

Mr. SULLIVAN. What if I raise concerns I think that this endangerment finding could be detrimental to our economy, sending jobs overseas, losing jobs overseas; would you address my concern in that?

Ms. JACKSON. We did an 11-volume copy to address concerns.

Mr. SULLIVAN. There are a lot of Americans concerned about this legislation, this endangerment finding, and that they will lose their jobs. I mean they are concerned about that, especially my district where I have 100,000, 300,000 some-odd people working in the energy industry. They are scared to death. This is, I believe, an attempt to curtail that business. But I think that if we have a million of these facts and they are willing to list all the things that are used, mainly water and sand, but any chemical that is used listed, what is the problem? A million; I mean, that is pretty good data to use in your study.

Ms. JACKSON. Well, we have already seen a couple of cases where we can't get the data because it is confidential. So we don't have all the chemicals that are being injected in the wells.

Mr. MARKEY. The gentleman's time has expired.

Mr. SULLIVAN. Thank you, I do appreciate being here.

Mr. MARKEY. All members of the subcommittee have asked questions, and I am sure everyone remembers vividly the unanimous consent request which I made 3 hours ago that Mr. Latta, if he appeared as a member of the full committee, would be allowed to ask questions of our witness.

The gentleman from Ohio is recognized for that purpose.

Mr. LATTA. I appreciate the chairman's graciousness and unanimous consent and for being around to participate here today. Thank you very much. And also to our ranking member, thank you very much for allowing me to be here. And I appreciate the opportunity, Administrator, to—I think last time we had a discussion was on transportation infrastructure.

But kind of to give a background again, I represent the largest manufacturing district in the State of Ohio and also the largest agricultural district. It is kind of an interesting vein that I run on. And Ohio, with our neighbors just to my west Indiana, we get 87 percent of our energy is coal-based, and Indiana 94 percent coal-based. And the reason I always bring up Indiana because I run halfway down the State of Ohio, along the Indiana line, so I have a lot of people working in Indiana and vice versa.

As we are talking about the cap-and-trade legislation, especially as it is being renewed over in the Senate, as we are looking at it, how would this legislation benefit the farmers and the manufacturers and the citizens of my district? Because, again, when we look at the cost that is being associated with coal, what do I tell my folks back home? Because, again, I also have areas in my district that had over 18 percent unemployment because it is on the manufacturing sector.

Ms. JACKSON. Well, I am not going to speculate what the legislation in the Senate says because I haven't seen it yet. I can very briefly answer the question with respect to the legislation, for example, that passed this committee in the full House. And that is that because agriculture was exempt from much of the regulated activities, the activities, the agricultural industry would be able to use many actions like no-till farming as credits, as offsets. So there was actually an opportunity for farmers to make money off of decisions they would make about whether to keep acreage in agriculture or forests or how they tilled. I am certainly not an agricultural expert, but the opportunities were certainly there, I have heard Secretary Vilsack speak of them.

Mr. LATTA. Now briefly, no-till—a lot of our folks back home had gone to no-till, but a lot of them now are going out of no-till, because it is different ways of crop production that they are in right now. In some areas they find it is not conducive; they will always be in the no-till situation. So on a situation with credits there wouldn't be a lot of benefit.

But we are looking at the unemployment rates, like I said, we have in our district. It is very, very difficult to attract jobs at this stage of the game out there to our area. Now, we have had some good news in the last week with some companies that are going to be expanding right now, but our fear out there as, I talk to people, there is a lot of angst especially on the business sector, small business or large business. It is kind of interesting, my businesses I have in my district go from either very, very large, from stamping plants all the way down to your mom and pop and tool and die jobs. A lot of folks out there I have talked to are very, very fearful about getting into increasing production or hiring people right now, because they just are very fearful of what could happen on the legislation right now.

Again, as we do this and talk about this, it is folks back home that we talk to. But again it is highly, highly manufacture, again, in my district and folks are just very, very concerned.

Ms. JACKSON. Thank you. And I do appreciate that concern. I want you and them to know that that is something that I think certainly all of us as policymakers have to be quite sensitive to, the state of our economy. I certainly am. I do believe that to replace

those manufacturing jobs, you need sectors to put them in. The ones that have gone, and gone overseas, when you ask yourself what we can be manufacturing, I think the clean cars of the future, clean energy, renewable energy. The President has talked about huge investments in nuclear power, and he also certainly talked about domestic energy resources. All of those are opportunities to replace those jobs. All of those are the kind of clean energy jobs that so many of us believe are part and parcel of this revolution.

Mr. LATTA. Let me ask, we were talking about on the manufacturing side, again, with the Chinese and Indians out there right now, because there is a lot of talk that they are not going to go down this path, and that is who our competitors are going to be. Again, the fear out there is that they will put us at an unfair disadvantage on the manufacturing side.

But just coming off of the Budget Committee one of the things we have out there—thank you very much, Mr. Chairman, I yield back.

Mr. MARKEY. No, I appreciate the gentleman. Thank you for your patience as well in waiting for the end of the hearing.

Actually in the legislation, the Waxman-Markey bill, we exempt the agricultural sector from regulation, while providing opportunities are offset income; that is, it could be generated by practices engaged in by the farming community. So the exemption from being covered, combined with the economic opportunity of these new agricultural practices being adopted, we think makes it something that should be viewed by the farming community as a great opportunity.

But we thank the gentleman for coming, and we also note that Ohio is now in the lead as a new solar technology manufacturing base for America. They have taken over the lead, so we are grateful for that as well.

So we thank you, Madam Administrator. You did a marvelous job here with our committee today, and I think all members will say that they are impressed with your comprehensive knowledge of this subject.

And again, I just want to restate the Supreme Court of the United States mandated that the EPA had to make a determination on this endangerment issue and that the Bush ERA sent arguably the most important climate e-mail of all time to the Bush White House, making this finding of endangerment, but that Dick Cheney was in denial and refused to accept the e-mail; which then necessitated you and the Obama administration having to go through that whole process again in order to make a determination, which we are now dealing with, but it is legally mandated by the Supreme Court of the United States.

So it is I think it is helpful for us to know that, and to also know that on the decisions which are already made in conjunction with the White House, that any reversal of that would be objected to by the United Auto Workers and by the automotive manufacturers of the United States. And I think it is important for all of that to be out here and on the record.

But we can't tell you how much we thank you for your appearance, how much we admire the work that you do, and we look for-

ward to seeing you and your work here in the future. Thank you so much.

Again, we apologize to the second panel. It was an incredibly distinguished panel. It actually should have its own day at 9:30 in the morning, with all the members here. Nonetheless, we are going to go right to it, and we know that members will return to participate in this hearing as well.

STATEMENTS OF FRED SMITH, CHAIRMAN, PRESIDENT AND CHIEF EXECUTIVE OFFICER, FEDEX CORPORATION; JASON WOLF, VICE PRESIDENT FOR NORTH AMERICA BETTER PLACE; ROBERT DIAMOND, FORMER LIEUTENANT, U.S. NAVY, SECURITY FELLOW, TRUMAN NATIONAL SECURITY PROJECT; AND CHARLES DREVNA, PRESIDENT OF THE NATIONAL PETROCHEMICAL AND REFINERS ASSOCIATION

Mr. MARKEY. If the witnesses could take their seats we will begin by hearing from Mr. Fred Smith. Fred Smith is the Chairman, President, and CEO of Federal Express. He founded FedEx in 1971 and he has recently become one of our Nation's most important advocates for vehicle efficiency standards and for a national energy policy.

Mr. Smith also serves as a member of the Electrification Coalition and as cochairman of the Energy Security Leadership Council. The Council brings together business and military leaders in support of a comprehensive long-term policy to reduce U.S. oil dependence and improve energy security.

Mr. Smith, we are honored to have you here today and we welcome your testimony.

STATEMENT OF FRED SMITH

Mr. SMITH. Well, thank you very much, Mr. Chairman. I submitted testimony for the record. I am just going to make a few summary remarks.

Mr. MARKEY. Without objection, so ordered. Your written testimony will be included in the record. I think you might have to turn on your microphone.

Mr. SMITH. Oh, sorry. Excuse me.

As you mentioned, Mr. Chairman, I am the CEO of FedEx Corporation, which employs about 300,000 people in our four major operating units: Federal Express, FedEx Ground, FedEx Freight, and FedEx Office. We operate 670 airplanes, over 70,000 vehicles. We deliver through our networks almost 8 million shipments a day. So we have been extremely interested in the issue of energy consumption and energy independence. And as you mentioned I cochaired, with General P.X. Kelley, the Energy Security Leadership Council, which produced a series of recommendations, many of which were incorporated in the 2007 act. And from that work came the Electrification Coalition, which is a group of companies which have significant interest in the matter of electrifying short-haul transportation in the United States.

The reason that we got involved with the Electrification Coalition after the work that the Energy Security Leadership Council did is because we came to the conclusion that it was the most promising

single area to reduce United States dependence on imported petroleum, and has been widely discussed here in this committee.

We use about 20 million barrels of oil a day. We import now almost 60 percent of our oil. It was 30 percent when the first air embargo took place in 1973. And absent some significant change in our energy profile, we will continue to be subject to highly volatile energy prices like we experienced in the summer of 2008 when a barrel of oil went for $147 a barrel. And though it has come down today, it is still over $80 a barrel, and the potential for economic and national security challenges is very great because of that.

We are very confident that the electrification of short-haul transportation, including in our industry sector, is very real, not the least reason of which I came over here today in a new FedEx Express, zero-emissions, electric-powered vehicle. It was made by JD of Modec, a European company which has supplied us 15 of these vehicles in Europe; and Navistar in Illinois; and the batteries are produced by A123 in Michigan. The vehicle has about a 100-mile range, has very low operating economics.

The issue is simply the capital cost of the vehicle relative to conventional vehicles. We feel very strongly that the price of these batteries, contrary to some other people who have looked at the matter, are going to come down. And in fact we believe in the next 2 to 5 years, the price of these lithium ion batteries will be at least be halved, and significantly more energy production per unit of density as well.

So we think for the industrial sector in which we operate, as well as personal short-haul transportation where the vast majority of it is conducted with less than 40 miles of utilization per vehicle per day, should be a national goal.

We have laid out a series of recommendations in the report of the Electrification Coalition which we commend to the committee. It has an enormous payback for the Nation. It significantly reduces our need to import petroleum by millions of barrels per day.

The scholarship has been verified by the University of Maryland, and we believe that it is a very promising area. And I think I will stop there, if it is acceptable to you, and answer questions or wait until after the other testimony.

Mr. MARKEY. Thank you, sir, very much.

[The prepared statement of Mr. Smith follows:]

Testimony of Frederick W. Smith
Chairman, President and CEO, FedEx Corporation
Co-Chairman, Energy Security Leadership Council
Member, Electrification Coalition
Before the U.S. House
Subcommittee on Energy and the Environment
April 28, 2010

Good morning, Chairman Markey, Ranking Member Upton, and members of the Committee. I would like to thank you for giving me this opportunity to speak to you regarding one of the great challenges facing our country today: ending the very real and pressing threats posed to our nation by our dependence on petroleum.

I am proud to serve both as co-Chairman of the Energy Security Leadership Council and as a member of the Electrification Coalition, two organizations dedicated to facing these threats head on.

The Energy Security Leadership Council, formed in 2006, is a coalition of business executives and retired national security leaders who believe that our dependence on oil, much of it imported from unstable and hostile regimes, poses an unacceptable economic and national security threat.

The Electrification Coalition, as you know, Chairman Markey, was formed in 2009, and is made up of a group of business leaders who represent the entire value chain of an electrified transportation sector and who are committed to promoting policies and actions that facilitate the deployment of electric vehicles on a mass scale. Chairman Markey was part of that launch event, and we very much appreciated your participation and support.

I became involved in these organizations for a single reason: it is my belief that after terrorism and the proliferation of weapons of mass destruction, our increased dependence on petroleum represents the biggest single threat to our nation's economy and national security.

I can speak to this issue personally. FedEx delivers more than 7 million packages and shipments per day to more than 220 countries and territories. In a 24 hour period, our fleet of aircraft flies the equivalent of 500,000 miles, and our couriers travel 2.5 million miles. We accomplish this with more than 275,000 dedicated team members, 670 aircraft, and some 70,000 motorized vehicles worldwide.

FedEx's reliance on oil reflects the reliance of the wider transportation sector, and indeed the entire U.S. economy. Oil is the lifeblood of a mobile, global economy. We are all dependent upon it, and that dependence brings with it inherent and serious risks.

In 2008, when oil prices spiked, Americans consumed nearly 20 million barrels of oil a day—one-fourth of the world's total. We imported 58 percent of the oil we consumed, leading to a U.S. trade deficit in crude oil and petroleum products that reached $388 billion—56 percent of the total trade deficit.

A year later, with oil prices averaging just $62 per barrel and oil consumption down, the United States still ran a $200 billion trade deficit in crude oil and petroleum products.

At the crux of America's oil dependence is the energy demand of the transportation sector. Transportation accounted for almost 70 percent of American oil consumption in 2008. Cars and trucks were 94 percent reliant on oil-based fuel for their energy, with no substitutes immediately available in anything approaching sufficient quantities.

The volatility of oil prices affects every American. At the beginning of 2001, oil prices were steady at $30 per barrel. Over the subsequent five years, prices steadily rose, reaching $75 per barrel in June of 2006. After retreating slightly, benchmark crude prices jumped 50 percent in 2007, from $60 per barrel in January to more than $90 in December. In 2008, oil prices soared rapidly, eventually reaching their all-time high of more than $147 per barrel on July 3.

We are all aware of the sharp financial burden on U.S. households that faced—and still face—resets in their adjustable rate mortgages. But it is important to understand that increases in energy costs have been on equivalent, or even greater, order of magnitude for the entire American economy. A typical subprime borrower with a poor credit history who bought a $200,000 house in 2006 with a 2 year/28 year ARM with a 4 percent teaser interest rate for the first two years would have seen monthly mortgage payments increase from about $950 a month before the reset to about $1,330 after the reset—an increase of about $4,500 a year. In the meantime, between 2001 and 2008, the average retail price of gasoline increased from $1.46 to $3.27, costing typical households $1,990 a year in increased fuel expenses. And that increase in energy costs affected *all* U.S. households—not just the one household in 20 that held a subprime mortgage.

This burden, multiplied across millions of households, was a major contributor to the ensuing economic slowdown. We saw an explosion in home ownership, with many purchases being made by people who had heretofore not qualified for mortgages. When the price of oil and the price of gasoline began to rise, and inflation on commodities began to take hold, and interest rates began to increase, you had a tremendous diminution in purchasing power and cash flow, which contributed to people having to walk away from their mortgages. The rise in oil prices was the match that lit the fuse of the mortgage mess and the subsequent recession. The U.S. economy lost more than 700,000 jobs between December 2007 and the beginning of September 2008, and the unemployment rate increased from 4.5 percent to 6.1 percent—all before the financial crisis truly hit later in September.

And the steps we usually would take to help strengthen the economy and create jobs in times of weakness are just as easily overcome by oil price volatility. The total effect of changes to the federal tax code from 2001 to 2008 code was a decrease in annual federal income and estate taxes by about $1,900 for the median household. But a typical household's energy costs rose more than that. In other words, every penny that the most Americans saved due to federal income and estate tax cuts over the past eight years was spent on higher gasoline bills.

All told, U.S. families and businesses spent more than $900 billion on refined oil products in 2008, representing 6.4 percent of GDP. Today, prices are off their highs. But for how long? Oil is back above $80 per gallon. Many of the underlying fundamentals that pushed oil prices up are

still present today, and once demand—temporarily reduced due to the recession—begins to pick up again, prices are likely to follow. Our oil dependence could strangle an economic recovery just as it is beginning to take hold.

The threat to American national security is equally as urgent. The vulnerability of global oil supply lines and infrastructure has driven the United States to accept the burden of securing the world's oil supply. Much of the infrastructure that delivers oil to the world market each day is exposed and vulnerable to attack in unstable regions of the world. According to the U.S. Department of Energy, each day more than 50 percent of the world's oil supplies must transit one of six maritime chokepoints, narrow shipping channels like the Strait of Hormuz between Iran and Qatar. Even a failed attempt to close one of these strategic passages could cause global oil prices to skyrocket. A successful closure of even one of these chokepoints could bring economic catastrophe.

To mitigate this risk, U.S. armed forces expend enormous resources patrolling oil transit routes and protecting chronically vulnerable infrastructure in hostile corners of the globe. This engagement benefits all nations, but comes primarily at the expense of the American military and ultimately the American taxpayer. A 2009 study by the RAND Corporation placed the cost of this defense burden at between $67.5 billion and $83 billion annually.

Oil dependence also constrains U.S. foreign policy. Whether dealing with uranium enrichment in Iran or a hostile regime in Venezuela, American diplomacy is distorted by the need to minimize disruptions to the flow of oil. Too often, oil dependence requires us to accommodate hostile governments that share neither our values nor our goals, putting both the United States and its allies at risk.

Finally, petroleum consumption poses a long-term threat to global environmental sustainability. Curbing emissions is a global issue, and there is not yet an international consensus on a long-term stabilization objective or on the changes in emissions trajectory needed to meet such a goal. International discussions are increasingly centered on a stabilization level that ranges between 450 and 550 parts per million (ppm) CO2 equivalent (CO2-eq). In a recently released report, the International Energy Agency assessed the make-up of U.S. new passenger vehicle sales that would be required to meet a 440 ppm target. The analysis found that by 2030, more than 60 percent of new vehicle sales would need to be based on some form of electrification, ranging from traditional hybrids to pure electric vehicles

We cannot continue down this path. We cannot continue to send untold billions of dollars and jobs overseas to pay for our addiction. We cannot continue to send men and women into harm's way to protect an increasingly vulnerable supply line. We cannot continue to put our future in the hands of hostile nations or fanatical terrorists who can turn off our crucial oil lifeline at the drop of a hat.

There is a solution. The lynchpin of any plan that is serious about confronting oil dependence must be the transformation of a transportation system that today is almost entirely dependent on petroleum. The solution can be found in something that nearly every single one of you has either on your belt or on the table in front of you. The lithium ion batteries that power our cell phones

and laptop computers can one day form the nucleus of an electrified transportation sector that is powered by a wide variety of domestic sources: natural gas, nuclear, coal, hydroelectric, wind, solar, and geothermal. No one fuel source—or producer—would be able to hold our transportation system and our economy hostage the way a single nation can disrupt the flow of petroleum today.

Electricity represents a diverse, domestic, stable, fundamentally scalable energy supply whose fuel inputs are almost completely free of oil. It would have clear and widespread advantages over the current petroleum-based system:

1) **Electricity is Diverse and Domestic:** Electricity is generated from a diverse set of largely domestic fuels. Among those fuels, the role of petroleum is negligible. In fact, just 1 percent of power generated in the United States in 2008 was derived from petroleum. An electricity-powered transportation system, therefore, is one in which an interruption of the supply of one fuel can be made up for by others. This ability to use different fuels as a source of power would increase the flexibility of an electrified light-duty vehicle fleet. As our national goals and resources change over time, we can shift transportation fuels without having to overhaul our transportation fleet again. In short, an electrified transport system would give us back the reins, offering much greater control over the fuels we use to support the transportation sector of our economy. Moreover, while oil supplies are subject to a wide range of geopolitical risks, the fuels that we use to generate electricity are generally sourced domestically. All renewable energy is generated using domestic resources. We are a net exporter of coal, which fuels about half of our electricity. Although we currently import approximately 16 percent of the natural gas we consume, more than 90 percent of those imports were from North American sources (Canada and Mexico) in 2008. And in fact, recent advancements in the recovery of natural gas resources from unconventional reservoirs like shale gas, coal bed methane, and tight gas sands have led to wide consensus that our domestic undiscovered technically recoverable reserves are well in excess of 1,000 trillion cubic feet. We do import a substantial portion of the uranium we use for civilian nuclear power reactors. Forty-two percent of those imports, however, are from Canada and Australia.

2) **Electricity Prices are Stable:** Electricity prices are significantly less volatile than oil or gasoline prices. Over the past 25 years, electricity prices have risen steadily but slowly. Since 1983, the average retail price of electricity delivered in the United States has risen by an average of less than 2 percent per year in nominal terms, and has actually fallen in real terms. Moreover, prices have risen by more than 5 percent per year only three times in that time period. This price stability, which is in sharp contrast to the price volatility of oil or gasoline, exists for at least two reasons. First, the retail price of electricity reflects a wide range of costs, only a small portion of which arise from the underlying cost of the fuel. The remaining costs are largely fixed. In most instances, the cost of fuel represents a smaller percentage of the overall cost of delivered electricity than the cost of crude oil represents as a percentage of the cost of retail gasoline. Second, although real-time electricity prices are volatile (sometimes highly volatile on an hour-to-hour or day-to-day basis), they are nevertheless relatively stable over the medium and long term. Therefore, in setting retail rates, utilities or power marketers use formulas that will allow them to

recover their costs, including the occasionally high real-time prices for electricity, but which effectively isolate the retail consumer from the hour-to-hour and day-to-day volatility of the real-time power markets. By isolating the consumer from the price volatility of the underlying fuel costs, electric utilities would be providing to drivers of grid-enabled vehicles (GEVs) —vehicles propelled in whole or in part by electricity drawn from the grid and stored onboard in a battery—the very stability that oil companies cannot provide to consumers of gasoline.

3) **The Power Sector has Substantial Spare Capacity:** Because large-scale storage of electricity has historically been impractical, the U.S. electric power sector is effectively designed as an 'on-demand system.' In practical terms, this has meant that the system is constructed to be able to meet peak demand from existing generation sources at any time. However, throughout most of a 24-hour day—particularly at night—consumers require significantly less electricity than the system is capable of delivering. Therefore, the U.S. electric power sector has substantial spare capacity that could be used to power electric vehicles without constructing additional power generation facilities, assuming charging patterns were appropriately managed.

4) **The Network of Infrastructure Already Exists:** Unlike many proposed alternatives to petroleum-based fuels, the nation already has a ubiquitous network of electricity infrastructure. No doubt, electrification will require the deployment of charging infrastructure, additional functionality, and increased investment in grid reliability, but the power sector's infrastructural backbone—generation, transmission, and distribution—is already in place.

5) **Electric Miles are Cleaner Than Gasoline Miles:** Vehicle miles fueled by electricity emit less CO2 than those fueled by gasoline. Several well-to-wheels analyses conclude that vehicles powered by the full and proportionate mix of fuel sources in the United States today would result in reduced carbon emissions. As renewable power increases its share of the electricity portfolio, and to the extent that new nuclear power comes on line, which I believe is important, the emissions profile of the U.S. power sector and the GEVs powered by it will continue to improve over time. Moreover, to the extent that GEVs are charged overnight using power from baseload nuclear or off-peak renewable power, their emissions footprint can be nearly eliminated. In 2007, the Natural Resources Defense Council and the Electric Power Research Institute published a well-to-wheels analysis of several different automotive technologies fueled by a range of sources commonly used to generate power. Their analysis concluded that using a PHEV would reduce carbon emissions as compared to a petroleum-fueled vehicle *even if all of the exogenous electricity used to charge the PHEV was generated at an old (relatively dirty) coal power plant.* Whereas a conventional gasoline vehicle would be responsible for emissions, on average, of 450 grams of CO2 per mile, a PHEV that was charged with power generated at an old coal plant would be responsible for emissions of about 325 grams of CO2 per mile, a reduction of about 25 percent. Emissions attributable to the vehicle could be reduced to as low as 150 grams of CO2 per mile if the exogenous power was generated at a plant without carbon emissions and ranged between 200 and 300 grams of CO2 per mile if the power used was generated using other fossil fuel generation technologies. In

other words, no matter where the power consumed by a PHEV is generated, the overall level of emissions attributable to its operation is lower than that of a conventional gasoline vehicle.

In short, high penetration rates of GEVs could radically minimize the importance of oil to the United States, strengthening our economy, improving national security, and providing much-needed flexibility to our foreign policy while clearing a path toward dramatically reduced economy-wide emissions of greenhouse gases.

No other alternative to petroleum can claim these widespread advantages. This is not to say that other alternatives have no role to play in a post-petroleum transportation sector. On the contrary. Natural gas, for example, may be used successfully in fleet vehicles, particularly those that can be centrally refueled, such as taxis, buses, specialized harbor and airport vehicles, and refuse-collection trucks. Even more importantly, natural gas will play a crucial role in providing electricity, a role in which it can be far more efficiently deployed than in actual vehicles. Other alternatives may also offer advantages in niche uses. But none offers the array of advantages that electricity does.

We also recognize that there may be unforeseen challenges to an entirely new transportation system. For example, some have raised concerns about the supply of lithium, which is crucial for the batteries that will drive the cars and trucks of the future. We have examined this issue and found that, because the vast majority of material in lithium ion batteries is recyclable, the increased use of grid-enabled vehicles does not present the United States with additional resource dependency. Particularly when recycling is assumed, global lithium reserves are adequate to support even the most bullish GEV deployment scenarios. Moreover, at a structural level, dependence on lithium is unlike dependence on oil. Vehicles do not deplete batteries as we drive; they deplete the energy stored within them. In other words, batteries are like the engines in conventional vehicles of today; though their life span is finite, they last for many years. Coupled with the fuel diversity of the electric power sector, grid-enabled vehicles generally insulate consumers from volatile commodity markets.

The logical next question is how we can successfully devise and deploy an electrified transportation system.

Make no mistake: electrification at a mass scale is a complex undertaking. We are not only talking about cars here. We are talking a highly-integrated system of batteries, vehicles, generation, transmission and charging, in which every part depends on the other. We would see few results if we improved transmission in the northeast, created a smart grid in the northwest, deployed a network of chargers in the Midwest, and introduced more electric cars in the deep south.

In November 2009, the Electrification Coalition released its *Electrification Roadmap*, a sweeping report outlining a vision for the deployment of a fully integrated electric drive network. The report details the dangers of oil dependence, explains the benefits of electrification, describes the challenges facing electric cars—including battery technology and cost, infrastructure financing, regulatory requirements, electric power sector interface, and consumer

acceptance issues—and provides specific and detailed policy proposals to overcome those challenges.

Perhaps most importantly, the *Roadmap* proposes the selection and creation of specific geographic areas in which all of the elements of an electrified transportation system are deployed simultaneously and beyond early adopters, thus providing a crucial first step toward moving electrification beyond a niche product into a dominant, compelling, and ubiquitous concept. These geographic concentrations of electrification would:

1) **Drive Economies of Scale:** Concentrating resources in a limited number of geographic areas will allow participants in the GEV value chain to take advantage of economies of scale, particularly with respect to the deployment of charging infrastructure. Utilities will incur fixed costs to support the operation of GEVs; those costs will be more affordable if spread over a greater number of vehicles. Power providers also can reduce the cost of charging infrastructure through economies of scale. While it is unclear how many public vehicle chargers will be necessary for a GEV transportation system to operate smoothly in a given community, it is clear that some public charging facilities will be needed. Previous pilot studies demonstrate that the cost of installing charging facilities can be reduced significantly when groups of facilities are installed at once. Furthermore, these geographic concentrations will stimulate demand for grid-enabled vehicles at a rate that is likely to be far greater than if the vehicles are simply purchased by early adopters scattered around the United States. Early on in the process, this higher level of demand will simply be the result of magnified consumer incentives. Subsequently, as individual metropolitan areas gain exposure to GEVs and confidence increases, adoption rates should be measurably expedited.

2) **Demonstrate Proof of Concept Beyond Early Adopters:** By demonstrating the benefits of grid-enabled vehicles in a real world environment, this deployment plan will make consumers, policymakers and industry aware of the tremendous potential of electrification of transportation. Most Americans are familiar with traditional hybrids, having seen them on the road for most of the past decade; far fewer drivers are familiar with electric vehicles. In general, consumers are probably unaware that GEVs have evolved to the point where they can meet most individuals' daily driving needs. In addition, electric drive vehicles generally have faster acceleration and operate more quietly than internal combustion engine vehicles. They hold out the promise of offering drivers a wide range of features, based on the electronic package in the vehicle, that are beyond our imagination today in the same way that iPhone applications would have been beyond our imagination a decade ago. The problem is that consumers are not aware of the opportunities presented by GEVs and are not yet convinced that they can operate reliably and affordably at scale. Concentrating investments and other efforts in a limited number of communities will accelerate the opportunity to demonstrate that grid-enabled vehicles can meet drivers' needs. In addition, these projects will demonstrate that a community is capable of putting the infrastructure in place, operating the vehicles over their lifetimes, and disposing of them after their useful life has ended, all in a manner that profits the participants in the value chain.

3) **Facilitate Learning by Doing:** While GEVs present a great opportunity, their deployment also raises a number of questions. Deploying large numbers of GEVs in concentrated areas will allow for the collection of information and experience that is needed to successfully deploy GEVs nationwide. It will help automakers learn how much consumers are willing to pay up front for a car that costs less to operate and has a lower total cost of ownership over its lifetime. It will allow utilities and charging station providers to learn when and where drivers want to charge their vehicles. It will allow utilities and other aggregators to learn who can best sell power to drivers and what types of rate structures meet both drivers' and utilities and aggregators' needs. It will help determine whether there is a viable business model for public charging infrastructure. It is clear that for GEVs to succeed there must be a model in which each party in the value chain is able to operate profitably, or in which the government determines that, as a matter of public policy, certain aspects of the system should be publicly supported in a manner that facilitates further competition. Deploying GEVs in a series of geographic regions around the country where resources can be concentrated and data can be collected and studied will ultimately accelerate wide-scale GEV deployment. Therefore, rather than allowing the market to develop scattershot across the country, it is critical that the market be encouraged to develop at a deliberate pace in clearly identified geographic regions in which a large number of vehicles can be deployed in a relatively short period of time.

The success of this path will require focused and sustained public support. Ideally, the technology and deployment of electric vehicles would emerge through regular market mechanisms. Unfortunately, events conclusively demonstrate that this path to wide-spread electrification is unlikely.

We understand that this is a challenging time for suggesting increased government expenditures for any project, no matter how worthwhile. We also, however, believe that certain aspects of the threat of oil dependence and the solutions we recommend make this a unique issue.

First is the urgent national security threat posed by our dependence on oil. While we cannot and should not ignore costs, threats to national security have always occupied a unique place of priority in our budget considerations. And make no mistake: the dangers posed by our oil dependence are not theoretical. Our safety and security are threatened by oil dependence, and every single day that we do not act is another day that we remain vulnerable.

Second is the economic cost of inaction. If our plan works, there will be 7 million GEVs on the road by 2018, and the nation will be well on its way to electric transport. And if that occurs, the maximum fiscal exposure of the federal government—largely through tax credits—would be approximately $120 billion spread over eight years. But Department of Energy researchers have estimated that U.S. oil dependence costs were *$577 billion in 2008 alone*, including $333 billion from transfer of wealth, $168 billion from economic dislocation, and $76 billion in foregone GDP.

Shortly after completing the *Electrification Roadmap*, the Electrification Coalition commissioned the Interindustry Forecasting Project at the University of Maryland and Keybridge Research to study the long-term economic effects of our policy proposals. This expert modeling

team collectively has decades of experience building and performing simulation studies with large-scale econometric models and conducting public policy research on energy and macroeconomic issues. Our goal was to produce a detailed, sober analysis based on conservative, realistic assumptions stretching out over the next 20 years.

I would like share with the Committee some of the key findings of this analysis.

If the policies we recommend were passed today, the resulting effect on the annual federal deficit would turn positive by 2020. Even more importantly, on a cumulative basis, the budget effect would turn positive by 2025. By 2030, the total positive impact on the federal budget would be $336 billion (in between $135 and $156 billion in current dollars).

It is important to remember that one of the results of our oil dependence is the direct transfer of enormous amounts of wealth and capital overseas. Our economy benefits when we reduce oil dependence because we are using more of our own wealth productively here at home instead of sending it to others.

Job creation would also benefit. Enacting these proposals would result in a total of 1.9 million new jobs by 2030, mostly in the manufacturing sector and in direct or indirect support of the motor vehicle industry. Job creation would start immediately with 227,000 in 2010 alone, growing to 700,000 in 2015 and almost 900,000 in 2020. Most importantly, these would not be jobs that we stimulate once and go away once the stimulus is gone. These are jobs that would be a permanent part of a new, ongoing industry.

The trade deficit would also improve, by $127 billion a year. By 2030, we would be importing 3.2 million fewer barrels of oil per day than if we did not enact these policies. Between 2010 and 2030, the United States would import nearly 11.9 billion fewer barrels of foreign oil total.

U.S. households would see their annual incomes increase by 2.2 percent, and would be spending less per year on energy for transportation. The combination of higher income and less spending on energy means that by 2030, the typical household would have 3,687 more real dollars every year to spend or save as they see fit.

And perhaps most importantly, we found that the U.S. economy would be far more able to withstand future oil shocks under the EC policy plan. We cannot control the price of oil, but we can insulate ourselves against volatility by decreasing our dependence on it. By 2025, this program would prevent the loss of 1.4 million jobs in the first year alone of an oil price shock-induced recession.

We believe that this plan will strengthen our nation's economy and our families' pocketbooks. That is why we are encouraged that a comprehensive title on electrification was included in Waxman-Markey that focuses on infrastructure and includes a regional large-scale vehicle electrification program. We think that program is appropriately focused on making very clear the viability of electric transport in a handful of specific geographic regions while driving scale and facilitating critical learning on issues such as standardization and technology protocols. The bill

also provides the assistance to automakers necessary for them to retool manufacturing facilities while remaining competitive in today's marketplace.

These are crucial first steps, and we hope to work closely with any and all interested members to take them even further and truly bring electrification to scale.

Aside from that, let me say this. There is truly only one way to end our nation's dangerous dependence on petroleum, and that is by ending oil's chokehold on our transportation system.

Other energy policies have their strengths and may very well be worthwhile on their own merits and in the pursuit of their own goals, but if they do not include a detailed, well-defined pathway to a post-petroleum transportation sector, then—for all of their other potential benefits—they will not have a significant impact on the economic and national security dangers posed by our oil dependence. If we do not answer that crucial question, then we are not addressing energy security in the way that we must to secure our future. Chairman Markey understands that, which is why he is addressing those crucial transportation questions in his legislative efforts, and why he deserves our thanks.

Now, some may say we are being unrealistic, that electric cars are a pipe dream. But I want to make it very clear: This is not a question of technology. The technology is here. And by here, I don't just mean that it exists. I mean it is right here on Capitol Hill with us today.

On Maryland Avenue, just a few blocks from here, is one of FedEx's first all-electric delivery trucks.

I hope you all have a chance to visit it. We're happy to make arrangements for you to do so.

This particular vehicle has just finished an introductory trip from Chicago to Los Angeles down Historic Route 66.

Four of these trucks—which have a range that will allow many FedEx Express couriers to make a full 8-hour shift of deliveries before needing recharging—will shortly be in service in the Los Angeles area. By the end of 2010, FedEx will have 19 all-electric trucks in service throughout the world.

They are not the only new technology we are employing at FedEx.

Almost 10 years ago, FedEx teamed with the Environmental Defense Fund, Eaton Corporation, and Freightliner to build and introduce the FedEx hybrid-electric truck. Today, more than 300 of these vehicles are in service. They have logged more than four million miles of service, reducing fuel consumption by 150,000 gallons.

Now, some of you may have seen Saturday Night Live a few weeks ago. They had a little fun at our expense, saying that four electric trucks isn't exactly enough to change the world. They would probably say the same about 300 hybrids.

Of course, they are exactly right. In fact, that is precisely my point here today. I'm proud of what we at FedEx are doing, but it is not enough. Four vehicles, or four thousand, or even four hundred thousand, will not be enough. What we need is the support to create in a few short years an entirely new transportation system with millions, and then tens of millions, electric cars and trucks. That is why we need to take action.

This is not pie-in-the-sky. It's simply a matter of organization, and—more importantly—a matter of national will and a matter of execution

Here is what I know, as the leader of a company that both depends on and helps to strengthen the mobility upon which our global economy is built: If the government supports this new path, if it helps to build these concentrations of electrification that are so crucial to jumpstarting a new, national transportation system, then that is a game changer. It is a game changer for businesses like mine, for employees, for consumers, for the economy, and for the country. A new future is ours for the taking, but only if we choose it and support it.

Thank you for your attention.

Mr. MARKEY. Our next witness is Jason Wolf. He is the Vice President of North America, Better Place. Mr. Wolf is responsible for overseeing the company's electric vehicle efforts in California, Hawaii, Ontario, and other developing North American markets. We thank you, sir.

From 1986 to 1993 he served as an officer in the Israeli military, a country notable for having no oil. And so, obviously, there is an imperative from the national security perspective to find a solution to that problem, and technology is the answer.

So we welcome you, Mr. Wolf. Whenever you are ready, please begin.

STATEMENT OF JASON WOLF

Mr. WOLF. Thank you. And my text says good morning, but I guess we ran a little late. So good afternoon, Chairman Markey, Ranking Member Upton and committee members, whoever is left.

My name is Jason Wolf. As you said, I lead Better Place, North America.

Mr. MARKEY. Mr. Wolf, you still have your C–SPAN audience, so do not assume that——

Mr. UPTON. Twenty-five million people.

Mr. WOLF. No pressure.

So Better Place is the global leader in electric vehicle networks and services, and our mission is to end dependence on oil.

Thank you for the opportunity today to come and speak about how we can solve the U.S.'s dependence on oil by leading a global transition to electric vehicles and why it is imperative to do so right now.

Two years ago our founder, Shai Agassi, was here; came before Congress, and described a choice for our country between continued reliance on a single strategically vulnerable source of energy that fuels, as people said to you, more than 95 percent of our transportation and an imminently feasible alternative path of rapid transition to electric vehicles.

Sadly, 2 years later, the U.S. remains paralyzed at the same juncture, while the rest of the world in many places are making tremendous progress towards electrification. For example, as you mentioned, Israel 2 years ago made a national commitment to end its commitment on oil. And since, there have been more charge spots installed for electric vehicles in Israel, a small country, as there are in the entire U.S. Over these 2 years.

China plans to leap-frog the combustion engine directly to electric vehicles, and what we are seeing is that electrification is not only a solution, it is the only plausibly possible solution that is accepted across the board. But even more importantly, electrification is now globally inevitable.

The question before you today is will the U.S. lead this inevitable transition or will we land behind China, France, Japan and other committees in capitalizing on this commercial opportunity.

Better Place's business model really enables mass production of electric vehicles by removing the three key barriers of high cost: limited range and compromised convenience. As a validation of that business model—and it is not the only one—we have raised over $700 million in the last 2 years from private investment. We

partnered with Renault to deliver at least 100,000 vehicles in major markets around the world; and we have established operations in countries around the world, not only Israel, Denmark, but also Australia, the U.S., Canada, Japan and, recently, China and France.

Just this last week we announced collaboration with Cherry Automotive, which is the largest auto independent manufacturer and exporter. This past Monday, we launched a taxi demonstration in Tokyo with switchable EVs that are working around the clock. What this shows us is that this inevitable transition to EVs means for the automotive industry that their future is settled. The next vehicle will be driven by electricity.

So the question is no longer if, but how fast will this transition to EVs take, and who will lead the transition? What is critical to understand and what we are seeing around the world is that governments have made a conscious choice towards electrification. The primary motivations for each country differ, from oil independence, to automotive industry leadership, to integrating renewable electricity into the grid. But the conclusion is the same. Electrification enables all these benefits if done correctly at scale.

Let's talk about how the U.S. can lead. If the U.S. was able to reflect the true cost of gasoline, private capital would no doubt flow to mass transportation solutions as were seen elsewhere. But we have not been able to do so as a country, so the only way forward is to make clear national commitment to electrification.

First, set an explicit national electrification policy to signal the market and provide clear direction towards the massive option of EVs.

Second, invest in regional EV ecosystems with the goal of catalyzing mass market deployments that address the three barriers I mentioned.

Finally, continue to fund consumer and fleet EV purchases. And these should be done through the year 2015. As a country, we can wean ourselves off oil dependency at a fraction of the 440 billion we export every year.

I thank you and look forward to working with you to put the U.S. in the lead on what we think is an inevitable transition to electric vehicles.

Mr. MARKEY. Thank you, Mr. Wolf, very much.

[The prepared statement of Mr. Wolf follows:]

Testimony of Jason Wolf
Vice President, North America, Better Place
Before the United States House Energy & Commerce Committee
Subcommittee on Energy & Environment

Hearing on "Clean Energy Policies That Reduce Our Dependence on Oil"

April 28, 2010

Good morning, Chairman Markey, Congressman Upton, and members of the Committee. My name is Jason Wolf, and I lead Better Place North America. As you may know, Better Place is the world's leading global provider of electric vehicle networks and services, and our mission is to end dependence on oil.

Thank you for the opportunity to speak with you on the critical issue of how the US can solve its dependence on oil by leading the global transition to electric vehicles (EV's). And why it is imperative we do so *now* to grow our economy.

Two years ago, our Founder and our global CEO, Shai Agassi, came before you and said that the US was at a critical juncture. He described the choice for our country. Between continued reliance on a single, strategically vulnerable energy source – petroleum – to fuel more than 95% of our transportation. And an alternative path of a rapid transition to electric vehicles that is imminently feasible with technologies available today.

Sadly, two years later the US remains paralyzed at that same juncture.

Now, there are signs of progress. The Recovery Act has planted the seeds of much needed investment in automotive retooling and scaling battery manufacturing, but as I will discuss, these two elements alone are not enough to succeed.

And in the last two years, much of the rest of the world has begun to move in a faster and more comprehensive way to lead in electrification.

For example, in 2008 Israel had just made a national commitment to end its dependence on oil to protect its national security. Two years later, Israel has seen private investment flow into development and deployment of clean technologies, and Israel's economy is booming. In two more years, Israel will have the world's densest operational network of electric vehicles.

And this pales in comparison to the aggressive commitment China is making to leapfrog the combustion engine to electric vehicles, as it is doing with landlines to cell phones. A front-page headline in the New York Times told it last year, "China Vies to be World's Leader in Electric Cars." As we speak, automakers in the Beijing Auto Show are displaying their mass production electric vehicles, including battery switch technology.

We all know why it is imperative the US address its dependence on oil. Electrification of transportation is the only plausibly scalable way to get there at present. But even more importantly – electrification is now globally inevitable.

So the only question before you today is – will the US lead this transition or will we lag behind China, Japan, France and others in capitalizing on this economic opportunity? Entirely new industries with the potential for millions of new jobs hang in the balance.

Better Place global progress

I'd like to take a moment to update you on the progress of my company, Better Place.

As background, Better Place is a leading electric vehicle services provider accelerating the global transition to sustainable transportation. Better Place is building the charging infrastructure and intelligent networks to deliver a range of services to drivers, enable widespread adoption of electric vehicles, and optimize energy use. We work with all parts of the transportation ecosystem, including automakers, battery suppliers, energy companies, and the public sector, to make EVs affordable and desirable. Based in California and privately held, Better Place has operating companies in Israel, Denmark, and Australia.

Better Place's business model is to enable electric vehicles on mass scale by removing the 3 key barriers to adoption: cost, range and convenience. We do that by:

- Providing an intelligent network of charging infrastructure, including charge spots and an "instant charge" option through the battery swap for range-extension.
- Making the EV competitive with the gasoline car by eliminating the upfront cost of the battery and selling clean e-miles to the customer on an on-going basis.
- Optimizing the energy use of electric vehicles for the customer and the grid, while managing the life of the battery.

Our path is not a science experiment – it is based on integrating proven technologies that are here and now (see Figure 1). As a validation of our business, in the past two years we have raised over $700M in private investment from leading financial institutions – like HSBC, Morgan Stanley, Lazard Capital and others.

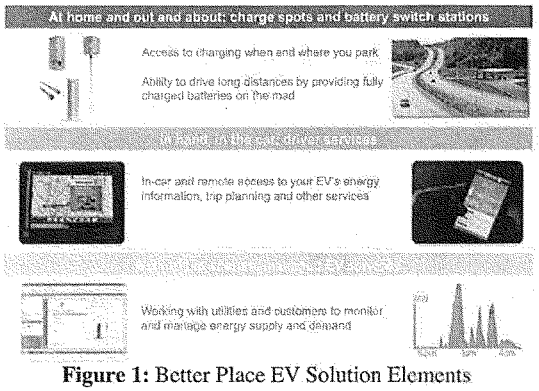

Figure 1: Better Place EV Solution Elements

In the last two years, we have also deployed more charge spots in Israel than have been deployed across the entire US over the same time period. And we have reached agreement with Renault to bring 100,000 switchable electric vehicles to **Israel and Denmark** over the next several years.

Besides Israel and Denmark, we've established operations in Australia, US, Canada, Japan, and most recently China and France.

In **France,** which has committed $2B to EV infrastructure, we will demonstrate the battery switch as part of a project by Renault-Nissan, EDF and others to demonstrate carbon-free transportation.

Just this week, Better Place unveiled the world's first commercial demonstration of electric taxis with switchable batteries in **Tokyo, Japan**, developed in partnership with Japanese Ministry of Economy, Trade and Industry, and Tokyo's largest taxi operator (Figure 2). Electric taxis are at this hour ferrying passengers around Tokyo, operating non-stop except for a few minute stop every 100 miles to switch batteries at our station.

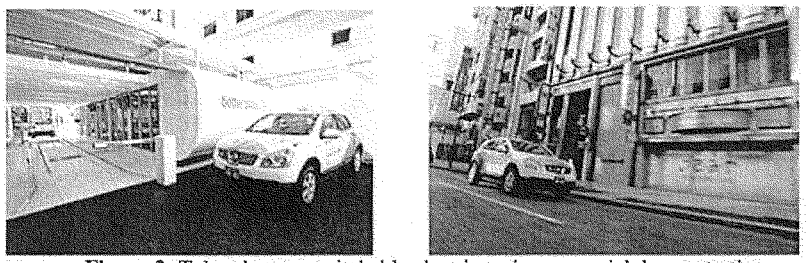

Figure 2: Tokyo battery switchable electric taxi commercial demonstration

Even though taxis account for just 2% of total passenger vehicles in Japan, they are responsible for 20% of overall passenger-vehicle emissions, and they typically travel ten times the number of miles as the average Japanese passenger vehicle. Therefore, converting to electric vehicle taxis provides a concrete solution to reducing CO2 and urban pollution for a small, but high-emitting segment of vehicles.

Also just in the last few days, Better Place has announced collaboration with Chery Automobile, **China's** largest independent auto manufacturer and exporter, to prototype battery switchable EV's. The announcement took place at the Beijing Auto Show, where several major Chinese automakers displayed their EV's with a battery switch.

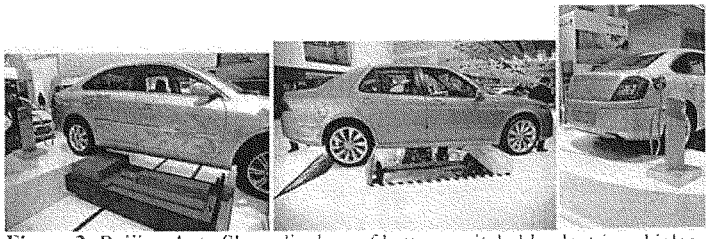

Figure 3: Beijing Auto Show displays of battery switchable electric vehicles.

By the end of 2010, Better Place will test all components of its solution in Israel as we continue to gear up for commercial launch in Israel and Denmark in 2011. The complete Better Place solution integrates charge spots, in-car software, operations centers, cars, and batteries, in addition to switch stations, all managed as an intelligent network.

These are some of the signs of the disruptive innovation and competitiveness that will come from countries making a serious commitment to electrification.

Now, let's look at what this means for the automotive future.

Global trends indicate electrification is inevitable

As to what comes after oil, the issue is settled. The future of the vehicle is electric. That is not just our view. That is the nearly unanimous consensus across the global automobile industry today.

As Bill Ford stated publically two weeks ago, "the electrification of the US fleet is inevitable." Similar statements have been made by automotive executives from GM, Renault-Nissan, BMW and others. So the question is no longer if, but when and how fast the transition will take place, and who will lead that transition.

What's critical to understand is this global momentum is being led by governments that have made *the choice for electrification*, and followed through with policies to enable this transition.

The primary motivations for each country differ – from oil independence, to building globally dominant automotive industries, to integrating large amounts of renewable electricity into the grid.

But the conclusion is the same. Electrification enables all of these benefits, if it is done at scale.

One the one hand, there are countries that for security or environmental reasons have the economic and policy signals in place.

- For example, Israel and Denmark have priced gasoline at $6-7/gallon and have set taxes on combustion engine cars that are higher than electric vehicles.
- With 20% of its electricity generation coming from wind, Denmark is looking at electric vehicles as demand and storage potential to support excess renewables generation, which is otherwise sent at a loss to other markets.

On the other hand, there are large industrial economies that look to dominate the global automotive industries, such as France and China.

- China has made electrification a top national priority, setting an industrial policy with the goal of becoming the global leader in manufacturing and deployment of EVs, moving from less than 3% today to capturing over 30% of the global market by 2020.
- With foreign oil imports expected to reach 65% of China's consumption by 2020, China is moving aggressively to turn an economic and national security liability into a global economic opportunity.
- To achieve it's goal, China is funding a 13-city demonstration to test mass-adoption electrification models.
- And it is providing an $8,800 rebate for consumers to purchase EV's.
- France is also leading, with $2B committed to funding EV charging infrastructure and funding for large-scale demonstration projects.

Unfortunately, the US is stuck somewhere in the middle, with no clear policy direction and insufficient economic signal to drive *private investment* into electrification.

We've been here before. After the oil crisis of the 1970's, we allowed Japanese automakers to emerge as the global leaders, and dominate the last three decades with high quality, fuel-efficient cars.

Now we are seeing the same trend shaping up with China's emerging dominance in cleantech. Recently, John Doerr, one of the leading cleantech venture capitalists, framed this trend by looking at the top 10 companies in solar, wind, and battery technologies. Out of the 30 leading companies only 4 are US-based.[1] Furthermore, Doerr stated that China has grown

[1] Green Economy Coming Faster than Expected: http://techpulse360.com/2009/11/18/green-economy-coming-faster-than-expected-john-doerr-says/

its solar PV share of the global market from 2% to over 40%, while during the same timeframe the US has moved from over 40% to about 16%.[2]

Let's look at what is happening with cars in China today. With only 2% of China's population owning cars and 80% of sales in 2009 to first-time car buyers, China has the opportunity to create and lead an entirely new category around clean transportation. According to HSBC research, China's share of the global EV market will grow from 2.7% this year to 35% by 2020.

To keep pace with the world and have the potential to lead, the US needs a clear national commitment to electrification and the policy to support it on mass scale.

In fact, sustained economic growth cannot return *until* we have disconnected our economy from oil. As a University of Michigan economist, Lutz Killian, told the Financial Times this month, "You can't have a global recovery without the price of oil recovering as well. The only way to keep oil prices down is to remain in recession which hardly sounds attractive." So succeeding in stimulating economic recovery will mean a return of triple-digit oil prices that could then drag the economy back into slow growth or recession. And in the past 12 months, we've seen oil prices rise by 70% to reach over $85 last week.

The only permanent fix is to disconnect the transportation sector, and thus the economy, from oil dependence. This also happens to be the only permanent fix to ills as diverse as our trade deficit, global warming emissions and national security.

Last week, an oil platform exploded and sunk in the Gulf of Mexico, which, aside from being a tragic loss of life, also illustrates the ever-increasing difficulty in accessing oil. We have to ask ourselves – what will be the stimulus cost next time we have a major oil price spike? Wouldn't it be more diligent to invest a fraction of that today on a "cure"?

Domestic manufacturing jobs depend on the creation of an EV market in the US

In the last two years, the US has made a $2B investment in battery technology through the Recovery Act, and billions more for automotive retooling. The only way to ensure that investment pays off for taxpayers and creates the long-term growth and jobs in the automotive sector domestically is to create mass-market demand for electric vehicles.

According to Johnson Controls Inc, if market demand for electric vehicles in the US is not catalyzed in the near-term, between 2010-2015, domestic capacity in vehicle units will exceed demand by about 1.35 million units by 2015, a gap of 62%. Globally, the demand vs. capacity gap for batteries and electric drive components manufacturing would be about 48%.[3] If the US is to see long-term jobs growth in manufacturing, then we need to create the domestic markets to sustain these products.

[2] China beating US cleantech: http://blogs.wsj.com/dispatch/2010/03/04/doerr-china-beating-us-in-clean-tech/
[3] Testimony of Mary Ann Wright, Johnston Controls Inc, US Senate Committee on Appropriations Energy & Water Subcommittee, February 23, 2010.

Electrification gives new momentum to our automotive industry. All we have spoken of for the last decade is how Detroit has to "downsize" to be competitive. In a world where the global car park is expected to double in the next decade and a half, there is no reason the US automotive industry should have to downsize. Instead, let's help it build the cars for the post-oil age.

US needs a national commitment to electrification on a mass scale

The only alternative to gasoline that is commercially viable today is electrification. It is also one of the single most effective steps we can take toward a low carbon economy.

Mr. Chairman, you often express your frustration with those who keep their head in the sand and deny the scientifically proven fact that manmade pollution is contributing to changing the earth's climate.

Mr. Chairman, let me say I feel the same frustration when people express the view that electrification of transportation represents "choosing" one technology over another.

Electrification breaks the stranglehold of petroleum in the transportation sector and opens up a full menu of power sources, including zero-carbon resources. In fact, based on our experience in Israel, Australia and particularly Denmark, I would assert that the notion that we have to first clean the grid before we can bring electric cars is exactly backwards.

As we see it, electric cars enable the scaling of renewable electricity — once widespread, distributed, centrally managed and cost-effective storage is available, then you will see private investment flow into renewable generation on an order of magnitude we have not seen to date.

As FERC Chairman, Jon Wellinghoff, has described: "Electric vehicles, deployed in mass volume, and unmanaged represent a tremendous threat to the stability of the grid. Electric vehicles, deployed in mass volumes and intelligently managed by a utility or network operator represent a huge opportunity to add grid stability and versatility, and exploit the storage capacity to stimulate private investment in intermittent renewable electricity."

That is why electrification should not only be a top national security and economy priority, but a centerpiece of our energy and climate policy as well.

Mr. Chairman, thanks to your leadership and that of others on this Committee, the energy and climate bill passed in the House contained important first steps that would start us on the road of a national investment in electrification, including the creation of a DOE program to fund regional electric vehicle infrastructure deployment and demonstration.

We commend your leadership on this issue, and we offer the following recommendations to move us forward with a concerted national effort on electrification.

Policy recommendations

If the US were able to price gasoline in concert with the security, economic and environmental impacts of petroleum dependency, private capital would easily flow to mass-market solutions for transportation.

We have not been able to so as a country.

As a result, we must put focused support and investment behind electrification on a mass scale. We can do that by:

(1) **Setting a national electrification policy to signal the market and provide coherent policy direction toward mass-market adoption of electric vehicles.**

By setting an *explicit US policy in support of electrification*, we can unleash private investment and guide the market beyond technology development to meaningful commercial deployment of electric vehicles and infrastructure.

(2) **Investing in multi-regional electric vehicle ecosystems, with the explicit goal of proving out mass-market models that can support EV adoption at scale.**

A number of DOE programs have been proposed to develop regional EV demonstrations, including in the Waxman-Markey bill, the Senate energy bill, and the Electrification Coalition roadmap.

We agree with the approach of building out regional ecosystems. However, to ensure the investment leads to successful larger-scale deployment, the program should be *aggressively aligned with mass adoption as the goal.*

Additionally, our experience globally shows us that third party operators have a critical role to play in enabling EV adoption, and should therefore be recognized in the policy framework. Ultimately, the cost of going electric will be much lower if private entities are allowed to play in this market with innovative business models that break down the barriers to EV adoption.

(3) **Continuing to bolster consumer demand for EV's by ensuring the current $7500 EV purchasing tax credit scales to the rest of the US consumers.**

To further support EV adoption, the tax credit should be extended and provided as a rebate directly to consumers. With incentives and infrastructure in place, electric vehicles can be made a cost-effective, desirable alternative to the gasoline car.

Thank you, and we look forward to working with you to put the US on a path of leading the global transition to electric vehicles.

Mr. MARKEY. Our next witness is Mr. Robert Diamond, a Security Fellow at the Truman National Security Project. He is a former lieutenant in the United States Navy, and completed deployments in support of Operation Iraqi Freedom and Operation Enduring Freedom. We welcome you, sir.

STATEMENT OF ROBERT DIAMOND

Lieutenant DIAMOND. Thank you, Mr. Chairman. And I respectfully request to submit my written testimony for the record.

Mr. MARKEY. Without objection, so ordered.

Lieutenant DIAMOND. Chairman Markey, Ranking Member Upton, members of the committee, I am deeply honored to have the opportunity to appear before this panel to discuss the critically important topic of promoting clean energy policies that will reduce America's dependence on oil and the impact that dependence is having on our national security.

America's reliance on oil is our Achilles heel. I fundamentally believe that a comprehensive strategy, one that cuts our addiction to fossil fuels, boosts clean energy technology, and moves our Nation dramatically towards energy independence is vital to our national security, the safety of our men and women in uniform, and to the fight against terrorism. The bottom line is this: We must put America in control of the energy future.

I make these arguments before you today as a fellow citizen, deeply concerned about ensuring the future prosperity and security our country.

I am a Security Fellow with the Truman National Security Project and have been deeply engaged in the debate about our energy security. And I am a veteran in the United States military, having served as an officer in the Navy for 7 years.

In 2004, I deployed to the northern Arabian Gulf. My ship, a guided missile destroyer, was assigned a mission of defending two Iraqi oil terminals just off the southern coast of that country. These two terminals are the economic crown jewels of that country, with 90-plus percent of Iraq's oil flowing through them onto supertankers to take that oil to the global market.

It was no secret that these terminals would be prime targets for an insurgent attack. In April 2004, the attack came in the form of the wave of two suicide boats. We lost two U.S. Navy sailors and one U.S. Coastguardsman, as well as four other service members who sustained serious injuries. The oil terminals, however, were safely defended.

I tell this story because it speaks directly to why we are here today. At the very core of my wartime deployment was an energy security mission. Brave sailors and coastguardsmen gave their lives defending a global oil infrastructure half a world away. My experience is just a recent chapter in the U.S. Military's decade-long role of defending our global oil supplies, and I am not alone in feeling this way.

Over the course of the last year, I have been part of a national coalition of hundreds of veterans, called Operation Free. These veterans have criss-crossed the country by biodiesel powered bus, over 25,000 miles, with one simple message: Secure America with clean energy.

Retired Vice Admiral Dennis McGinn captured the national security dangers of our addiction to oil in testimony he gave before the Senate last year. He said in 2008 we sent $386 billion overseas for oil, much of it going to nations that wish us harm.

This is an unprecedented and unsustainable transfer of wealth to other nations. It puts us in the untenable position of funding both sides of the conflict and directly undermines our fight against terror.

Former CIA director Jim Woolsey explains it this way: Except for our own Civil War, this is the only war that we have fought where we are paying for both sides. We pay Saudi Arabia $160 billion a year for its oil, and 3- to 4 billion of that goes to Wahabbis who teach their children to hate. We are paying for these terrorists with our SUVs.

A Truman project colleague of mine conducted an analysis which concluded that for every $5 rise in price of crude oil, Putin's Russia receives more than $18 billion annually; Ahmadinejad, Iran, an additional $7.9 billion annually; and Chavez's Venezuela an additional $4.7 billion annually.

This is clearly not in our national interest. No one is more acutely aware of this problem than the Department of Defense, and they were actually leading the efforts on breaking our dependency on oil. DOD is the largest energy consumer in the Nation, and our Nation is the largest energy consumer in the world.

For example, the Navy has set ambitious goals for shifting the fleet to renewable energy sources. Just last week on Earth Day, the Navy successfully conducted the first flight test of the Green Hornet, an SA–18 Super Hornet fighter jet that is still using a 50/50 blend of conventional fuel and biofuels. This test was the first step in achieving Secretary Mabus's goal of sailing by 2012 the Great Green Fleet, a carrier battle group entirely powered by sustainable renewable fuel sources, including nuclear power. But that is just the military.

When it comes to the rest of our Nation, frankly we are simply not doing enough. Congress must act. Without legislation from Congress too many sectors of our economy and our country will continue to stagger along, using the dirty fuels of our past. This is not a problem that can wait for future generations to solve. It is imperative that you, our elected officials, solve this problem now and enact comprehensive clean energy legislation that will put American power back to work.

Part of that solution also involves making sure that our regulatory agencies like EPA continue to have the tools and authority necessary to drive this transition to a clean energy economy. It makes no sense to me to deny these agencies the robust regulatory authority they need. Doing so is the equivalent of pulling your troops off the battlefield before the reinforcements arrive; in other words, it is surrendering the fight.

I close with this simple request: Help us build a new clean energy economy. It will make our country more prosperous, it will help make us more secure, and, once and for all, put America back in control of the energy future. Thank you, Mr. Chairman.

Mr. MARKEY. Thank you.

[The prepared statement of Mr. Diamond follows:]

WRITTEN STATEMENT OF ROBERT DIAMOND, RETIRED US NAVY LIEUTENANT SECURITY FELLOW, TRUMAN NATIONAL SECURITY PROJECT

HOUSE SUBCOMMITTEE ON ENERGY AND ENVIRONMENT ON CLEAN ENERGY POLICIES THAT REDUCE OUR DEPENDENCE ON OIL

APRIL 28, 2010

Chairman Markey, Ranking Member Upton, members of the Committee, Ladies and Gentlemen, I am deeply honored to have the opportunity today to appear before this distinguished panel to discuss the critically important topic of promoting clean energy policies that will reduce America's dependence on oil, and to talk specifically about the impact our oil dependency is having on both our national security and our armed forces.

America's reliance on oil is our Achilles heel. I fundamentally belief that a comprehensive energy strategy—one that cuts our addiction to fossil fuels, boosts clean energy technology, and moves our nation dramatically towards energy independence—is vital to our national security, to the safety of our men and women in uniform, and to the fight against terrorism. The bottom line is this—we must put America in control of its energy future.

I make these arguments before you today first and foremost as a fellow citizen, deeply concerned about ensuring the future prosperity and security of our country. I am a Security Fellow with the Truman National Security Project and have been deeply engaged in the debate about our energy security and about the need to end our dependence on oil. And I come before you as a veteran of the United States military. I am a graduate of the United States Naval Academy and had the honor and privilege of serving on active duty as an officer in the United States Navy for 7 years. As a surface warfare officer stationed onboard a guided missile destroyer, I completed deployments in support of Operation Iraqi Freedom and Operation Enduring Freedom.

In the winter of 2004, I deployed to the Northern Arabian Gulf with the George Washington Carrier Strike Group. My ship, USS BULKELEY was assigned the mission of defending the two Iraqi oil terminals that sit just off the southern coast of Iraq. These two terminals are the economic crown jewels of the country, with—at the time—almost 90 percent of the country's oil flowing through them onto super-tankers waiting to take that oil to market around the world. It was no secret that these terminals would be prime targets for insurgent attack. The US Navy, along with detachments from the US Coast Guard, worked with our coalition and Iraqi partners to keep these assets safe. In April 2004, that attack came in the form of a two-pronged suicide boat attack. We lost 2 US Navy sailors and 1 US Coast Guardsman, as well as four other service members who sustained serious injuries. The oil terminals, however, were safely defended.

I tell this story because it speaks directly to why we are here today. It was obvious to me then, and is even more so today, that at the very core of my war-time deployment was an energy-

security mission. Brave sailors and coastguardsmen gave their lives defending a global oil infrastructure half a world away. My experience is just a recent chapter in the US military's decade long role of defending our global oil supplies.

I am not alone in feeling this way. Over the course of the last year, I have been part of a national coalition of hundreds of veterans called Operation Free[i]. These veterans have crisscrossed the country by bio-diesel powered bus—over 25,000 miles in all—with one simple mission: to secure America with clean energy.

Vice Admiral Dennis McGinn, retired Deputy Chief of Naval Warfare Requirements and Programs, captured the national security dangers of our addiction to oil in testimony he gave before the US Senate last year: He said "In 2008, we sent $386 billion overseas to pay for oil—much of it going to nations that wish us harm. This is an unprecedented and unsustainable transfer of wealth to other nations. It puts us in the untenable position of funding both sides of the conflict and directly undermines our fight against terror."[ii]

Think about that for a second…because of our addiction to oil, we are funding both sides of the conflicts we have sent the young men and women of the US military to fight. Former CIA Director Jim Woolsey explained it this way: "Except for our own Civil War, this is the only war that we have fought where we are paying for both sides. We pay Saudi Arabia $160 billion for its oil, and $3 or $4 billion of that goes to the Wahhabis, who teach children to hate. We are paying for these terrorists with our SUVs." [iii]

The fact is that the one billion dollars a day that Americans send overseas for oil is flooding a global oil market that enriches hostile governments, funds terrorist organizations, and props up repressive regimes. This is clearly not in our national interest.

A Truman Project colleague conducted an analysis on the impact that increases to crude oil prices have on the gross revenue streams of certain nations. This research concluded that for every $5 rise in the price of a barrel of crude oil Putin's Russia receives more than $18 billion annually, Ahmadinejad's Iran an additional $7.9 billion annually, and Chavez's Venezuela an additional $4.7 billion annually.

I am certain that no one in this room today thinks these are the countries where we want to be sending our nation's treasure.

In May of 2009, CNA released a report entitled "Powering America's Defense: Energy and the Risks to America's Security." Signed by 12 retired generals and admirals, this report unequivocally stated that "America's energy posture constitutes a serious and urgent threat to our national security—militarily, diplomatically and economically."

I repeat what I said at the beginning of my remarks: a comprehensive energy strategy—one that cuts our addiction to fossil fuels, boosts clean energy technology, and moves our nation dramatically towards energy independence—is vital to our national security. We must put America in control of its energy future.

There is good news though. No one is more acutely aware of this problem than the Department of Defense, and they are leading the efforts on breaking our dependency on oil. This is critically important. Why? Because DoD is the largest energy consumer in the nation, and our nation is the largest energy consumer in the world. According to the CNA report,[iv] a $10 per barrel rise in the

price of oil will cost DoD over $1.3 Billion dollars annually. That is more than the entire procurement budget for our Marines Corps.

Under the energized leadership of Secretary Roy Mabus, the Navy has set ambitious goals for shifting the Fleet to renewable energy sources. On Earth Day last week, the Navy successfully conducted the first flight test of the "Green Hornet"—an F/A-18 Super Hornet multi-mission fighter jet that flew using a 50/50 blend of conventional fuel and a bio-fuel derived from the camelina plant.

This test was the first step in achieving Secretary Mabus' goal of sailing, by 2012, the "Great Green Fleet"—a carrier battle group entirely powered by sustainable, renewable fuel sources, including nuclear power. Secretary Mabus' has also set the goal of generating half of the power at the Navy's shore installations from alternative energy sources—wind, solar or geothermal—by 2020.

The point of these examples is to show you that the Department of Defense recognizes this strategic vulnerability in our national defense and is working to break our dangerous reliance on oil.

But that is just the military, and frankly, it is simply not enough. Congress must act. Without legislation from Congress too many sectors of our economy and our country will continue to stagger along using the dirty fuels of our past. This is not a problem that can wait for future generations to solve. It is imperative that you, our elected representatives, solve this problem now, and enact comprehensive clean energy legislation that will but American power back to work.

Part of that solution also involves making sure that our regulatory agencies—like the EPA—continue to have the tools and authority necessary to drive this transition to a clean energy economy. It makes no sense to deny these agencies the robust regulatory authority they need. Doing so is the equivalent of pulling your troops off the battlefield before your reinforcements arrive. In other words, it is surrendering the fight.

So I close with this simple request—help us build a new, clean energy economy that will make our country more prosperous, that will help make us more secure, and that will once and for all put America back in control of its energy future.

Thank you.

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[i] www.operationfree.net

[ii] Statement of Vice Admiral Dennis McGinn, USN, Retired, Member, Military Advisory Board, CNA, before the U.S. Senate Environment and Public Works Committee Hearing on "Climate Change and National Security," July 30, 2009

iii Woolsey, James. "The Long War of the 21st Century: How We Must Fight It." Dwight D. Eisenhower National Security Series. 30 January 2006

iv CNA Report on "Powering America's Defense: Energy and the Risks to National Security" (May 2009) http://www.cna.org/documents/PoweringAmericasDefense.pdf

Mr. MARKEY. Our final witness is Mr. Charles Drevna, the President of the National Petrochemical and Refiners Association. He has served as its president since 2007. We welcome you, sir.

STATEMENT OF CHARLES T. DREVNA

Mr. DREVNA. Good afternoon, Chairman Markey, Ranking Member Upton, and the rest of the committee. I really appreciate the opportunity to be here to testify on such critical issues. While the title of this hearing is "Clean Energy Policies that Reduce our Dependence on Oil," I respectfully suggest that you focus on affordable and economically sensible clean energy policies.

Such policies should favor getting more energy of all types from the United States and from reliable sources abroad. With the level playing field, the best, most efficient, and most effective forms in energy will triumph in the marketplace. That means the form of energy that delivers the BTU at the lowest economic cost will win.

Most economists believe that oil and oil-based products provide the winning form of energy for many of our needs today, particularly for transportation. We and the rest of the globe will continue to rely on petroleum-based transportation for much of this century.

We rely on petrochemicals that are the vital ingredients in thousands of products today and far into the future. Some people believe we can end our reliance on oil by simply saying that is what we want to do. They embrace our energy sources like starry-eyed lovers seeing perfection and ignoring the flaws. Unfortunately, there is no miracle source of energy that is clean, affordable, and abundant with no downside. If such a source existed, our Nation would have embraced it long ago and we would all be using it today.

Those who say the United States must show leadership on climate change and related issues are absolutely correct. But we have to lead intelligently to find the way of a bright and prosperous energy and economic future. Leading recklessly in the wrong direction, based on homes and dreams rather than reality, is a plan for failure. We don't want to make a headlong rush into disaster modeled after Pickett's Charge.

America is the land of ideas and freedom and has long been the world's leader in innovation. The government has oftentimes served as a catalyst to stimulate new inventions and new processes. But government leaders have been wise enough to step aside to give private sector entrepreneurs the freedom to transform these good ideas into reality. When governments have tried to pick economic winners by handing out ill-advised and usually expensive subsidies funded by taxpayers, the kind of subsidies some forms of energy depend upon today, the cost has far outweighed the benefits to their citizens.

Thomas Edison literally electrified the world because of the tremendous benefit his light bulbs brought, not because he got funding on a tax on oil lamps, candles, or fireplaces. Alexander Graham Bell succeeded because his telephone revolutionized communications, not because government gave him cash generated by a stamp tax or tax on telegrams. And companies and the Internet have been able to transform our lives without relying on government sub-

sidies paid for by taxes on telephones, typewriters, pens or other printed publications

NPRA members embrace a future where the best ideas and the best products triumph in a free and fair competition and they embrace change. They are not against green jobs. They want to continue to provide jobs that are well-paying, long-lasting, and strengthen our Nation's economy.

The operators of refineries and petrochemical plants want to keep their U.S. manufacturing operations and manufacturing by others in our country strong and thriving. In addition, we recognize a global climate change must be addressed globally. If the Environmental Protection Agency tries to regulate greenhouse gases in our Nation through the Clean Air Act, it risks inflicting a crippling blow to our economy. Many American manufacturers will take your jobs and move to foreign nations to escape carbon limits that limit their growth, their productivity, and their profitability. Those foreign facilities, many with emission controls far less stringent than ours, will generate greenhouse gases that go into the atmosphere shared by every Nation on Earth. The end result: No reduction in global carbon emissions and all gain, no pain, for the American people.

For the refining and petrochemical industries, the question that Congress must now ask itself: Do we want gasoline, diesel fuel, and plastics and other products to continue being manufactured in the United States, or do we want this manufacturing outsourced so that we increase reliance on foreign sources of supply.

I don't believe Congress wants to overtax and overregulate the domestic refining and petrochemical industry, or any other industry, into extinction. But overzealous policies could lead to disastrous effects and become a self-inflicted wound as our country tries to struggle to climb out of this recession. That would be an American tragedy that I ask you help avert.

Thank you for allowing me the opportunity to testify today, and I look forward to any questions that you may have.

Mr. MARKEY. OK, the gentleman's time has expired.

[The prepared statement of Mr. Drevna follows:]

WRITTEN STATEMENT OF

NATIONAL PETROCHEMICAL & REFINERS ASSOCIATION (NPRA)

AS SUBMITTED TO THE

SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT

Committee on Energy and Commerce
United States House of Representatives

on

"Clean Energy Policies That Reduce Our Dependence On Oil."

April 28, 2010

Good morning, Chairman Markey, Ranking Member Upton, and Members of the Subcommittee. I am Charlie Drevna, and I serve as President of NPRA, the National Petrochemical & Refiners Association. I appreciate the opportunity to testify at today's Subcommittee hearing on "Clean Energy Policies That Reduce Our Dependence on Oil." NPRA represents more than 450 businesses, including virtually all U.S. refiners and petrochemical manufacturers, their suppliers, and vendors.

Our member businesses provide the transportation fuels that keep Americans moving on the ground and in the air – safely, reliably and cost-effectively. Our members also supply families with a wide variety of products used daily in their homes and at work, including fuels, lubricants, and chemicals that serve as building blocks for everything from plastics to clothing, medicine, and computers. We appreciate this opportunity to share our first-hand and practical knowledge of our nation's energy needs with you, because meeting these needs is vital.

I. Introduction

The title of this hearing is "Clean Energy Policies that Reduce Our Dependence on Oil." I respectfully submit to you that your focus should be on *affordable* and *economically sensible* clean energy policies. And, more broadly, our nation must focus on securing affordable and economically sensible energy supplies of all types. Getting more oil, and more energy in general, from the United States and from reliable sources abroad makes political, economic and energy policy sense.

Some people think we can reorient our energy supply system and end our reliance on oil simply by saying that's what we want to do – "where there's a will, there's a way." They embrace other energy sources like starry-eyed lovers, seeing perfection and ignoring flaws. The

fact is, however, that there is no miracle source of energy that is clean, efficient, affordable and abundant with no downside. If such a source existed, our nation would have embraced it long ago and we'd all be using it today.

Members of NPRA are not anti-clean energy. They're not anti-green jobs. They are simply believers in an energy policy based on sound economics and sound science rather than science fiction. They want to provide jobs that are well-paying, long-lasting, and that strengthen our nation's economy. And the operators of refineries and petrochemical plants want to keep their own domestic manufacturing operations – and manufacturing by others in the United States – strong and thriving. America rose to prosperity because we became a world leader in making things. Continued outsourcing of this vital activity to other nations is a trend our nation must reverse.

Attached to my testimony is an article from The Washington Post this past Sunday (April 25), by Robert Bryce – a senior fellow at the Manhattan Institute – headlined "Five myths about green energy." Mr. Bryce makes it abundantly clear that there are serious problems facing widespread adoption of solar and wind power, as well as electric cars. He also points out that a good number of green jobs will actually be created in other nations with far lower labor costs.

Let's separate some energy facts from fiction. It's indisputable that petroleum-based fuels are abundant, easily accessible and very efficient. Until alternative energy sources can make that claim, we not only should, but *must* and *will* continue to use these resources wisely and efficiently for decades to come.

There's an overwhelming consensus among economists that we will continue to rely on petroleum-based transportation fuels for much of this century and on petrochemicals that are vital ingredients in thousands of products far beyond that. The question Congress must answer is

whether it wants to legislate and regulate the domestic refining and petrochemical industries out of business so America is dependent on foreign refiners to provide our people with these essential products in the decades ahead.

I know some people advocate using taxes to subsidize our way into new forms of energy. I suppose if money were no object and you Congress was willing to raise taxes to incredibly high levels and run enormous deficits – or both – that might be possible. But that would cripple our economy, send unemployment soaring and raise costs for manufacturers and families, making businesses in our nation less competitive with foreign industries. That would lead to the loss of more jobs and industries abroad. This nightmare chain reaction is hardly a recipe for a new era of prosperity.

America has long been the world's leader in innovation because our government has served as a catalyst to stimulate new inventions and new processes that have revolutionized the world. But government leaders have been wise enough to step aside and give private-sector entrepreneurs and the mighty engine of our free enterprise system the ability to transform good ideas into reality. When governments have tried to pick economic winners and losers the cost in taxpayer dollars has far outweighed the benefit to their citizens, who come out the ultimate losers.

There are countless examples of the American free enterprise success story. Thomas Edison invented the first long-lasting light bulb and formed the company that became General Electric, leading the way to a power revolution that literally electrified the world. Government didn't levy a tax on oil lamps, candles and fireplaces to cut their emissions and enable Edison's new power source to gain consumer acceptance.

Alexander Graham Bell invented the telephone and launched a communications revolution that continues today. He didn't depend on a tax on letters and telegrams to subsidize his new technology. And in our own lifetimes, we've seen computers and the Internet revolutionize the way we communicate. They didn't rely on government subsidies paid for by taxes on telephones, typewriters, pens and paper, libraries and printed publications.

My point is that, with a level playing field, the best, most efficient and most cost-effective form of energy will triumph in the marketplace. The form of energy that delivers a BTU at the lowest economic cost wins. And when our members produce energy for the American people they also pay billions of dollars in taxes – instead of consuming billions of dollars in subsidies paid for by taxes.

I am not arguing for an all-petroleum future, or saying we should consume as much petroleum as possible as quickly as possible. NPRA supports clean energy and policies that enhance energy efficiency. We also believe that the United States requires an energy portfolio that is as broad as possible, encompassing both traditional sources such as petroleum, coal, and nuclear energy, and supplemental sources ranging from wind to geothermal to biofuels.

What we do not support are government policies that are counterproductive, unrealistic, and economically harmful to American families and businesses. Decisions regarding our nation's energy policy need to be based on sound economic theory rather than theories that simply sound good. And these decisions need to be protective of environmental goals. Such decisions should also not be made in a vacuum. We live in an era of ever-increasing global competition; our energy policy will largely determine the role of the United States in relation to other nations in terms of manufacturing, job growth, innovation, and way of life.

II. Endangerment Finding and Greenhouse Gas Regulation

There are several policy initiatives underway designed to regulate emissions of carbon dioxide and other greenhouse gases (GHGs) in the United States. In addition to legislation already enacted and proposals currently being considered by Congress – along with regional- and state-level programs either already in place or under consideration – the Environmental Protection Agency (EPA) is moving towards regulating GHGs under the Clean Air Act (CAA).

While the CAA has proven to be a highly effective statute for the regulation of traditional, or "criteria" pollutants, the law was never intended to regulate GHG emissions and is, in fact, remarkably ill-suited to do so. Regulation under the CAA will have far-reaching and damaging impacts on the American economy and consumers. While it is hard to predict the extent of this, the "Law of Unintended Consequences" will certainly apply.

The CAA has a threshold of 100 to 250 tons per year for defining a "major source" for purposes of its prevention of significant deterioration program (PSD). New or modified major sources that emit a "significant" amount of any pollutant must obtain permits from state permitting agencies. There are no sound legal arguments to suggest it would be acceptable under the CAA to allow emissions nearly an order of magnitude higher than the major source threshold under CAA without triggering permit requirements. Any permits issued with thresholds higher than those in the Clean Air Act (and current state law) would be vulnerable to appeal and litigation, and would impose heavy burdens on state and federal regulatory agencies.

Regulation of stationary sources under the CAA would overwhelm state and local permitting offices, halting business growth and expansion. As the State of South Carolina pointed out in its comments on the PSD proposal, "the permitting process will become so backlogged as to create a permitting moratorium." Economic recovery would be threatened

because construction projects in general would be delayed by an onerous, burdensome and bureaucratically overwhelming permitting process.

EPA itself estimates a dramatic increase in permit applications, with each permit costing an average of $125,000 and taking 866 person-hours to review[1]. If the government regulates all GHG sources requiring regulation under the Clean Air Act – either now or in the future – as many as 6 million sources could eventually be required to get permits. Neither businesses nor states have adequate resources to meet the workload that this extraordinary level of regulation would create.

New business and industry would not be built, and existing business would not expand. Further, refining and petrochemical facility upgrades and related equipment modifications, including those to comply with future fuel regulations and those to modernize facilities, would likely be hamstrung by Clean Air Act GHG control regulations and permitting requirements.

The endangerment finding also allows activist groups and plaintiffs' lawyers to advance litigation challenging standard industry practices, such as changes in operations, as endangering the public health or welfare because those operations emit GHGs. This poses a significant potential liability to industry and American businesses, and will deter expansion or development projects and impede the economic recovery and job creation.

III. Challenges for the United States Energy Sector

As Chart A indicates below, the Energy Information Administration (EIA) projects flat and then declining U.S. demand for gasoline over the next 25 years. However, demand in

[1] Information Collection Request for Prevention of Significant Deterioration and Nonattainment New Source Review (40 CFR Part 51 and 52), Carrie Wheeler, Operating Permits Group, Air Quality Policy Division. *Available at* Docket No. EPA-HQ-OAR-2004-0081.

countries like China and India will continue to grow, no matter what happens to the U.S. economy. Any move the U.S. makes to dramatically alter its energy mix in unrealistic time frames won't reduce the world's reliance on oil.

In the EIA's International Energy Outlook 2009, total world consumption of marketed energy is projected to increase by 44 percent from 2006 to 2030. The largest projected increase in energy demand is for the economies in countries not part of the Organization for Economic Cooperation and Development (OECD) (Chart B below). China and India are the fastest-growing non-OECD economies, and they will be key world energy consumers in the future. Since 1990, energy consumption as a share of total world energy use has increased significantly in both countries.

As Chart C below demonstrates, China and India together accounted for about 10 percent of the world's total energy consumption in 1990, but in 2006 their combined share was 19 percent. Strong economic growth in both countries continues over the period projected to 2030, with their combined energy use increasing nearly twofold and making up 28 percent of world energy consumption in 2030 in the reference case. In contrast, the U.S. share of total world energy consumption falls from 21 percent in 2006 to about 17 percent in 2030. [2]

As the data below indicates, energy efficiencies in our economy are going a long way to create a new energy future. Many businesses in our industry are investing in supplemental forms of energy that will be part of this future. For example, the oil and gas industry invested $58 billion in technology to reduce carbon dioxide emissions in the United States between 2000 and 2008 – more than the federal government and other industries combined.[3] Regulations and voluntary programs designed to improve vehicle and engine technology are greatly reducing

[2] http://www.eia.doe.gov/oiaf/ieo/world.html
[3] American Petroleum Institute. "Companies Address Climate Change." January 20, 2010. Http://www.api.org/ehs/climate/new/companiesaddress.cfm

vehicle emissions. EPA studies show that today's cars emit 75 to 90 percent less pollution for each mile driven than their 1970 counterparts, thanks largely to advances in vehicle and fuel technology.

Chart A: Gasoline Demand (million/barrels per day)[4]

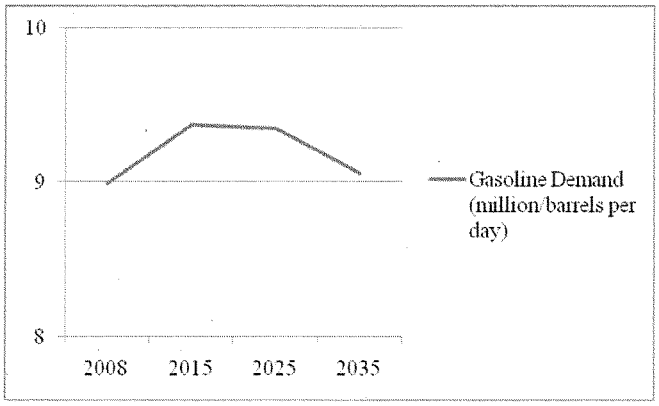
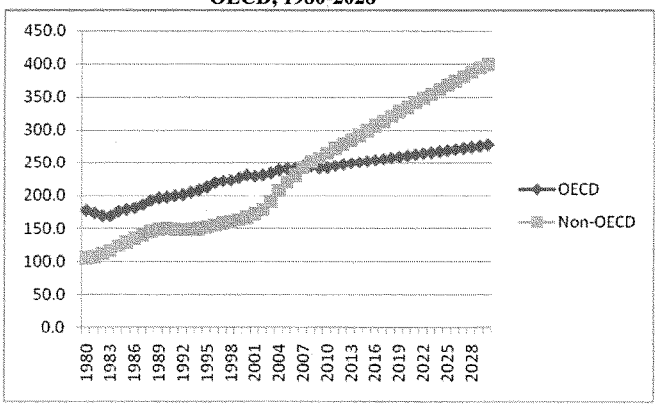
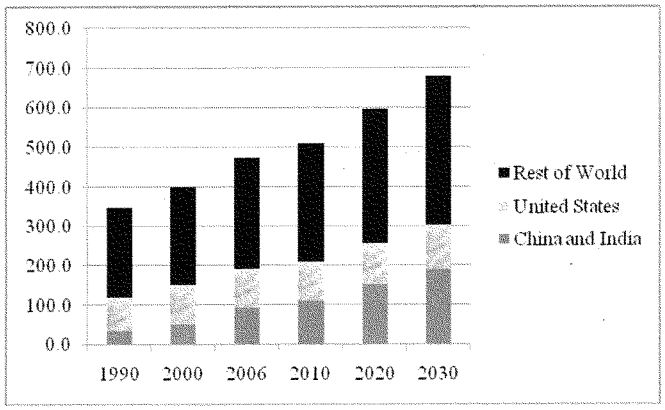


Chart B: World Marketed Energy Consumption Quadrillion BTU, OECD and Non-OECD, 1980-2028[5]



[4] http://www.eia.doe.gov/oiaf/ieo/world.html
[5] http://www.eia.doe.gov/oiaf/ieo/world.html

Chart C: Marketed Energy Use by Region, Quadrillion BTU [6]



Recently enacted laws aimed at reducing both petroleum use and GHG emissions in the transportation sector are also shaping our energy future. The United States currently has in place what I call the 36-36 Plan.

Federal fuel mileage standards approved for new cars and light-duty trucks require them to be able to go an average of 36 miles on a gallon of fuel by 2016. That alone will save billions of gallons of gasoline and diesel fuel each year, sharply reducing carbon emissions.

Additionally, the Energy Independence and Security Act (EISA), which was enacted in 2007, will require American refiners to mix 36 billion gallons of biofuels (such as ethanol) with gasoline and diesel fuel each year by 2022. American refineries are expected to produce 180 billion gallons of gasoline and diesel fuel this year, so the law already in place would substantially cut the amount of petroleum used to fuel vehicles.

[6] http://www.eia.doe.gov/oiaf/ieo/world.html

When the 36-36 Plan is fully implemented, according to government statistics the current Renewable Fuels Standard (RFS) and Corporate Average Fuel Economy (CAFE) programs are on track to reduce GHG emissions from the transportation sector by more than 26 percent by 2030 and also cut the use of petroleum transportation fuels significantly. Aspects of these policies pose their own challenges and we should let such programs take full effect before Congress attempts to overlay any complex, costly regulations above and beyond these mandates.

The current RFS, for example, will soon lead to challenges regarding the "blendwall," or the point at which the use of mandated amounts of biofuels, in particular ethanol, will require motor fuels blends containing greater than the 10 percent of ethanol currently allowed by law to be blended into gasoline. Federal, state and local rules and industry standards governing fuel composition would thus have to be changed to accommodate higher-level ethanol blends. This process could take years.

The United States is only a small net importer of gasoline now, bringing in about 10 percent of our finished petroleum products from overseas. However, regulation of GHGs under the Clean Air Act threatens to supplant domestic supply with additional foreign products because many American refiners, faced with additional costs, will be forced to curtail their production or shut down.

Domestic refinery expansion projects totaling at least 231,000 barrels per day (b/d) – an amount close to 3 percent of U.S. gasoline demand – have already been delayed due to financing or liquidity challenges brought on by the recession. Some refining companies have even filed for bankruptcy or debt protection. In 2009 and 2010, the North American market saw the closure of 678,000 b/d, of which 443,000 b/d was based in the U.S. These closures have caused the loss of nearly 1,400 direct jobs and thousands more indirect jobs.

IV. Petroleum Yields Numerous Products Aside from Fuel

It is important to note that oil does not just mean fuel. Petroleum products, both fuels and petrochemicals, play a key role in our lives and economy. A barrel of oil yields many different products – not just gasoline and diesel, but products such as jet fuel, lubricants, asphalt, and petrochemicals. All are critical to our economy. Without the capacity to affordably refine petroleum and produce natural gas, the capacity to make petrochemical products in the United States will be threatened.

Petrochemicals are used to make products ranging in applications from healthcare to military supplies, seat belts and other safety products, pharmaceuticals, food packaging, and clothing. Petrochemicals also play a major role in transportation and alternative energy innovation. They are essential for helping vehicles meet Corporate Average Fuel Economy (CAFE) standards without compromising vehicle safety. All solar energy panels are derived from petrochemicals, as are 15 percent of wind turbine blades.

Imposing additional costs on petrochemical manufacturers will do nothing to help our economic recovery. Instead, it will help our international competitors by making the U.S. industry less competitive, prompting international firms to build new facilities in countries without these policies and equivalent environmental controls. The petrochemical industry has already lost hundreds of thousands of jobs over the last decade. In 2001, the industry employed more than 1.5 million people directly and indirectly. This was reduced to 1.3 million workers in 2005 and 1.1 million workers in 2009. North America has also lost approximately 10 million metric tons of chemical production capacity over the past decade. This represents the equivalent of approximately 50 facilities closing in the United States, while overall global production capacity has drastically increased.

V. Domestic Policy Should Focus on Increasing Energy Security

Policies to increase our nation's energy security must be based on a realistic combination of the development of our own resources and the utilization of resources from abroad that are stable and beneficial to the United States. Right now, no nation on the planet limits its access to its own oil and natural gas deposits as much as the United States. Continuing these severe restrictions – and then complaining about our reliance on unstable foreign sources of petroleum – is illogical. Our policies need to be pragmatic and flexible.

Policies that would restrict the use of Canadian oil would undermine our energy security by increasing our reliance on petroleum – and ultimately, refined petroleum products – from less stable parts of the world. Furthermore, if we exclude ourselves from importing those resources, Canada will develop them regardless. China is already an investor in these Canadian oil development projects, and those resources will go overseas if they are not used in the United States. This is referred to as "crude shuffle," and the nation that stands to lose is the United States.

VI. Conclusion

As a nation, we need energy that's affordable, abundant and reliable. Ensuring such an energy supply is critical for an economy recovery that will drive the wealth necessary for investments in all forms of energy – including both traditional fossil fuels and alternatives.

NPRA supports policies that promote all forms of energy as long as those policies don't choose winners and losers in the marketplace. We are solidly in favor of policies that promote a move toward even cleaner, more efficient energy production.

As I have stated, for the refining and petrochemical industries, the question that Congress must now ask itself is whether we want gasoline, diesel fuel, plastics and other products to be

manufactured in the United States or whether we want to increase our reliance on foreign sources of supply. In my lifetime I've seen an exodus of manufacturing industries and millions of jobs to other parts of the world. Hard-working men and women and their loved ones have been devastated, losing homes and seeing their piece of the American Dream fade into nothingness. Communities have been hit hard by plant closings and small businesses have been shuttered when their customers are thrown into unemployment.

I don't believe Congress wants to over-tax and over-regulate the domestic refining and petrochemical industry into extinction, only to see them replaced by their foreign competitors exporting their products to our shores. But make no mistake: overzealous policies could have disastrous effects and become a self-inflicted wound as our country struggles to climb out of the Great Recession. That would be an American tragedy that I ask you to help avert.

ATTACHMENT 1

The Washington Post

Five myths about green energy

By Robert Bryce
Sunday, April 25, 2010; B04

Americans are being inundated with claims about renewable and alternative energy. Advocates for these technologies say that if we jettison fossil fuels, we'll breathe easier, stop global warming and revolutionize our economy. Yes, "green" energy has great emotional and political appeal. But before we wrap all our hopes -- and subsidies -- in it, let's take a hard look at some common misconceptions about what "green" means.

1. Solar and wind power are the greenest of them all.

Unfortunately, solar and wind technologies require huge amounts of land to deliver relatively small amounts of energy, disrupting natural habitats. Even an aging natural gas well producing 60,000 cubic feet per day generates more than 20 times the watts per square meter of a wind turbine. A nuclear power plant cranks out about 56 watts per square meter, eight times as much as is derived from solar photovoltaic installations. The real estate that wind and solar energy demand led the Nature Conservancy to issue a report last year critical of "energy sprawl," including tens of thousands of miles of high-voltage transmission lines needed to carry electricity from wind and solar installations to distant cities.

Nor does wind energy substantially reduce CO2 emissions. Since the wind doesn't always blow, utilities must use gas- or coal-fired generators to offset wind's unreliability. The result is minimal -- or no -- carbon dioxide reduction.

Denmark, the poster child for wind energy boosters, more than doubled its production of wind energy between 1999 and 2007. Yet data from Energinet.dk, the operator of Denmark's natural gas and electricity grids, show that carbon dioxide emissions from electricity generation in 2007 were at about the same level as they were back in 1990, before the country began its frenzied construction of turbines. Denmark has done a good job of keeping its overall carbon dioxide emissions flat, but that is in large part because of near-zero population growth and exorbitant energy taxes, not wind energy. And through 2017, the Danes foresee no decrease in carbon dioxide emissions from electricity generation.

2. Going green will reduce our dependence on imports from unsavory regimes.

In the new green economy, batteries are not included. Neither are many of the "rare earth" elements that are essential ingredients in most alternative energy technologies. Instead of relying on the diversity of the global oil market -- about 20 countries each produce at least 1 million

barrels of crude per day -- the United States will be increasingly reliant on just one supplier, China, for elements known as lanthanides. Lanthanum, neodymium, dysprosium and other rare earth elements are used in products from high-capacity batteries and hybrid-electric vehicles to wind turbines and oil refinery catalysts.

China controls between 95 and 100 percent of the global market in these elements. And the Chinese government is reducing its exports of lanthanides to ensure an adequate supply for its domestic manufacturers. Politicians love to demonize oil-exporting countries such as Saudi Arabia and Iran, but adopting the technologies needed to drastically cut U.S. oil consumption will dramatically increase America's dependence on China.

3. A green American economy will create green American jobs.

In a global market, American wind turbine manufacturers face the same problem as American shoe manufacturers: high domestic labor costs. If U.S. companies want to make turbines, they will have to compete with China, which not only controls the market for neodymium, a critical ingredient in turbine magnets, but has access to very cheap employees.

The Chinese have also signaled their willingness to lose money on solar panels in order to gain market share. China's share of the world's solar module business has grown from about 7 percent in 2005 to about 25 percent in 2009.

Meanwhile, the very concept of a green job is not well defined. Is a job still green if it's created not by the market, but by subsidy or mandate? Consider the claims being made by the subsidy-dependent corn ethanol industry. Growth Energy, an industry lobby group, says increasing the percentage of ethanol blended into the U.S. gasoline supply would create 136,000 jobs. But an analysis by the Environmental Working Group found that no more than 27,000 jobs would be created, and each one could cost taxpayers as much as $446,000 per year. Sure, the government can create more green jobs. But at what cost?

4. Electric cars will substantially reduce demand for oil.

Nissan and Tesla are just two of the manufacturers that are increasing production of all-electric cars. But in the electric car's century-long history, failure tailgates failure. In 1911, the New York Times declared that the electric car "has long been recognized as the ideal" because it "is cleaner and quieter" and "much more economical" than its gasoline-fueled cousins. But the same unreliability of electric car batteries that flummoxed Thomas Edison persists today.

Those who believe that Detroit unplugged the electric car are mistaken. Electric cars haven't been sidelined by a cabal to sell internal combustion engines or a lack of political will, but by physics and math. Gasoline contains about 80 times as much energy, by weight, as the best lithium-ion battery. Sure, the electric motor is more efficient than the internal combustion engine, but can we depend on batteries that are notoriously finicky, short-lived and take hours to recharge? Speaking of recharging, last June, the Government Accountability Office reported that about 40 percent of consumers do not have access to an outlet near their vehicle at home. The electric car is the next big thing -- and it always will be.

5. The United States lags behind other rich countries in going green.

Over the past three decades, the United States has improved its energy efficiency as much as or more than other developed countries. According to data from the Energy Information Administration, average per capita energy consumption in the United States fell by 2.5 percent from 1980 through 2006. That reduction was greater than in any other developed country except Switzerland and Denmark, and the United States achieved it without participating in the Kyoto Protocol or creating an emissions trading system like the one employed in Europe. EIA data also show that the United States has been among the best at reducing the amount of carbon dioxide emitted per $1 of GDP and the amount of energy consumed per $1 of GDP.

America's move toward a more service-based economy that is less dependent on heavy industry and manufacturing is driving this improvement. In addition, the proliferation of computer chips in everything from automobiles to programmable thermostats is wringing more useful work out of each unit of energy consumed. The United States will continue going green by simply allowing engineers and entrepreneurs to do what they do best: make products that are faster, cheaper and more efficient than the ones they made the year before.

Robert Bryce is a senior fellow at the Manhattan Institute. His fourth book, "Power Hungry: The Myths of 'Green' Energy and the Real Fuels of the Future," will be out Tuesday, April 27.

Mr. MARKEY. The chair now recognizes the gentleman from Washington State, Mr. Inslee.

Mr. INSLEE. Thank you, Mr. Drevna. What I want is the electric cars to be built here and not just in China. I am overjoyed to see the opening of the first manufacturing plant of lithium ion batteries in Holland, Michigan, which is going to open with Johnson Controls this fall, due to the Federal policy that we adopted in the stimulus bill this February.

I am also overjoyed to tell you that on Earth Day, the 40th anniversary, I got to drive the first production model of the Chevrolet Volt which we manufactured in America. It is a plug-in car. You plug it in, you go 40 miles on total electricity, which would cover 60 percent of all our trips on an average American day.

The Ford Focus under Alan Mulally's leadership is coming out in a while. Having driven that car, tremendous acceleration. If you want to drive a rocket, drive the Tesla. And if you want a car that is on the market right now, the Renault Leaf. There are great things happening. We just have to make sure it happens here and not in China.

Mr. Wolf and Mr. Smith, I want to ask you about sort of what you see as the slope of technology and cost associated with electric drivetrains. We know every technology has a path it goes on where we get better technology and decreasing costs. And I would just like to address what you foresee in electric drivetrains in the next couple of decades as far as costs. Mr. Wolf—you guys decide who starts.

Mr. WOLF. I will start, actually. Mr. Smith mentioned one thing in his remarks about the cost of the batteries. The cost of the battery in the electric vehicle is the most expensive component, 30 percent; 50 to 60 percent in the higher, bigger truck-type deployment. But what we are seeing today is, if a year ago or 2 years ago people were talking about $1,000 per kilowatt hour—that is how they measured the density of the energy—those prices are already, 2 or 3 years later, in half. And the projection by DOE, not ourselves, is to $350 and below.

Mr. INSLEE. Mr. Smith, you are a hard-headed businessman. What do you think of those projections?

Mr. SMITH. We concur. The vehicle that I drove over here today, and which is all electric, as I mentioned built, by Navistar with the 123 battery, about 70 percent—is that right—about 70 percent of the cost is the battery. It is a very sturdy industrialized vehicle so there is no issue with the vehicle. We have been operating similar vehicles in Europe for a couple of years.

We also operate 300 hybrids which we develop. It is just simply a cost of the batteries, and our guess is that in the next 2 to 5 years the cost of the batteries will come down, just as Mr. Wolf said. And at that point in time, that vehicle will be very cost-effective on a straight ROI basis. In other words, you will be able to afford it without any other incentive other than the fact that the reduction in fossil fuel consumption and the low maintenance cost of the vehicle will drive you to buy it.

Mr. INSLEE. Thank you for your leadership. Mr. Drevna, I wondered if you could put up the picture of the Terrapods again. I appreciate it.

I want to ask an issue of Mr. Drevna about ocean acidification. Mr. Drevna, you represent the National Petrochemical and Refiners Association. There are a lot of great people who work in your organization; hardworking, diligent Americans. We respect their work.

But I want to ask you about the consequences of our burning of oil, for our oceans specifically. The scientific community that I am talking to are telling me that when you burn oil, carbon dioxide goes out of your tailpipe; it goes into the atmosphere and into the oceans and into solution in the oceans. And when it goes into solution in the oceans it makes acid. And the scientific community that I have talked to said it is scientifically, absolutely clear, with zero doubt, that our oceans are 30 percent more acidic than they were before we started to burn fossil fuels, and that there is a likelihood of disruption in certain critters of the sea that could be very, very significant.

We had a picture I showed earlier of what happens when you expose the very base of the food chain. It melts, because the waters are becoming so acidic by the year 2100. I guess the question is: Does your industry recognize ocean acidification as a problem, and do you agree that the science is clear in this regard that carbon dioxide does acidify the ocean, and it comes in part from your industry?

Mr. DREVNA. Mr. Inslee, I am not a climate scientist and never portrayed myself as one. What I am discussing today is what we have to do in, I believe, a systematic approach on energy policy. I think the question has to be asked. And I could maybe categorically state if this were a Lower 48 climate problem, perhaps some of these things that we are talking about today would be beneficial. It is a global—my understanding is it is global climate.

My understanding also is that in EIA projections between now and the next 4, 5, 6 decades, the globe is going to continue to be dependent upon fossil fuels, including petroleum, to a great extent. Our position is, let's look at what makes economic sense for the country.

I have described our energy policy here in the United States as a children's soccer team. We look at the energy source de jour, and we all gather around that. And 5 or 6 years ago, it was hydrogen; then it was ethanol.

Hey, the electric vehicle, all these things have benefits; but let's do it in a systemic, economically viable way and not rush to get ourselves off on something the rest of the world is going to do, to our economic detriment.

Mr. INSLEE. Thank you. If you hear anything different than all the best of the world scientists, let me know because I think we have got a problem. Thanks.

Mr. MARKEY. The gentleman's time has expired.

The chair recognizes the gentleman from Michigan, Mr. Upton.

Mr. UPTON. Thank you. Mr. Smith welcome, nice to see you again. I am cochair of the Auto Caucus, second largest caucus, a bipartisan caucus, and I am a very strong supporter of electric hybrids. And for me—I stepped out briefly to talk to the president of Western Michigan University. He was in town, really on this issue to a degree, but one of the things that I have seen Western Michi-

gan University do is they have begun to transform their utility fleet in fact to electric vehicles. They have their own power plant in Kalamazoo, they charge them up at night. They are perfectly quiet. I think they operate, as I recall, at about 2 cents a mile versus the old costs. Obviously they are perfectly quiet; they are able to do all of the activities within the campus, and it is a sizable campus. And the cost for these new vehicles was almost the same—meaning the initial cost, purchase price—as the older vehicles that they replaced.

I am also very fortunate to have Eaton in my district, a very large truck engineering firm in Galesburgh, Michigan, just outside of Kalamazoo. I have gone to see their electric hybrids and what they want to do with the utilities, so you don't have to have the vehicle with the arm up as they are fixing the wires—or whatever it is that they are doing—running on that diesel all the time. It has got the hybrids and it is significant savings, but the cost is higher per vehicle.

Mr. Smith, you have indicated about, what, 15 vehicles, electric hybrids, that are now within your operation?

Mr. SMITH. We have 15 all-electric, but——

Mr. UPTON. I know you have a zillion vehicles.

Mr. SMITH. We do have over 70,000 in our operation. But I am not sure you are aware of this; that the hybrid that you mentioned in Eaton was developed in partnership with FedEx.

Mr. UPTON. I have seen them.

Mr. SMITH. We have about 300 of those in service. We have one of our express pick-up and delivery locations in the New York City area which is completely hybrid. They are very——

Mr. UPTON. The range is 100 miles; is that right?

Mr. SMITH. The all-electric is a hundred miles. The hybrid electric is the same as the conventional powered vehicle. We get about 40 or 50 miles on the electrical charge, and then you use the conventional engine. The problem with the hybrid that we are just discussing is the capital costs, because you in essence have two power plants reciprocating. I mean, internal combustion and electric make the capital cost very difficult to overcome unless the price of diesel is up in the $5–1/2 area.

The all electric, on the other hand, which would be obviously shorter range, the one I came over in here today, has about a 100-mile range. But presumably if the battery cost performance goes down on a curve, Mr. Wolf and I think that it—I should say, in my case, our experts think; he probably has real knowledge. I am just telling you what our people think. Then in about someplace between 2 to 4 years, the all-electric pick-up and delivery vehicle, utilized in an environment where its range is not an issue to us, would have a positive return on investment and be competitive pricewise when you take operating and capital costs. So the hybrid, like the Eaton FedEx truck, has a capital cost barrier that is hard to reach.

Now, there is a third iteration, of course, which is the approach that Chevrolet has taken with the Volt. There you have the electric power as the primary engine, and you have a small internal combustion engine you use as a generator. I personally think that has

an enormous amount of promise. And some combination of all-electrics and the Chevy Volt approach——

Mr. UPTON. They actually think the Volt will be a good number of them. Because of the range, it will never use an ounce of gasoline, and it will always be on the electricity because it uses the backup——

Mr. SMITH. Right.

Mr. UPTON. The question I wanted to get to, even with the Volt, 50,000 vehicles will be sold this year, particularly on the east and west coast and here Washington as well. They still predict that by the end of this decade, they are not going to—with all the electric hybrids—not be able to penetrate more than a 15 or 20 percent market share. And so we will still rely significantly then on the petroleum-based vehicle. So it is going to take some time to get where maybe a lot of us want to go.

Last question, Mr. Drevna, and then I am out of time. We had this testimony last year from Lion Oil, that if the clean air bill goes through, 1,200 jobs that are going to be moving out to a new refinery in India. We all care about the planet, we all do. What is the cost of the regulation per unit of fuel in this country versus someplace else that won't have these regulations, that one of those jobs might go? Do you know?

Mr. DREVNA. I could hope to get that back to you in writing. I don't have that with me today. I can tell you, though, that the market is won and lost on pennies, and just driving up the cost of domestic production, given the state that the domestic refinery and petrochemical industries economic state we find ourselves in today, and for the foreseeable future, that it is no secret that India, with their plant in Reliance, are looking at the United States to export vast quantities of fuel at the domestic refiner's expense.

Mr. MARKEY. The gentleman's time has expired. The gentleman from Vermont, Mr. Welsh.

Mr. WELSH. Thank you very much, Mr. Chairman. A few questions, Mr. Drevna. I am sorry I wasn't here for your testimony, but had a chance to review it. I want to make sure I understand it.

You did testify that the best energy policy is one that creates a level playing field; is that more or less right?

Mr. DREVNA. Absolutely, sir.

Mr. WELSH. It allows the most cost-competitive form of energy to win out.

Mr. DREVNA. Correct.

Mr. WELSH. Page 5 in your testimony stated: NPRA members paid billions of dollars in taxes rather than consume billions of taxpayers subsidies. Correct?

Mr. DREVNA. That is correct, sir.

Mr. WELSH. So here is a question that I think a lot of us struggle with. I want to ask if NPRA would support the removing of several subsidies in the Tax Code which some folks think would provide a level playing field.

Let me go through these. My understanding is that section 199 of the domestic production incentive provides a tax rate reduction on refinery income; and that subsidy is, according to CBO, expected to cost taxpayers about 14.8 billion for 10 years for the oil and gas

industry. Would your association support repeal of that tax subsidy as it applies to energy companies?

Mr. DREVNA. Absolutely not, sir. And let me tell you, if you recall the genesis of the section 199 credit, there was going to be a WTO charge against the United States on the subsidizing unfairly domestic manufacturing, of which refining is, all manufacturers, whether you are producing gasoline or loaves of bread. So in the Jobs Act——

Mr. WELSH. Let me interrupt you, and welcome back. I just want to go down some of these. What I understand you saying is you think there is a reason——

Mr. DREVNA. There is a very valid reason.

Mr. WELSH. So you oppose repeal?

Mr. DREVNA. Yes.

Mr. WELSH. The Tax code, as you know, includes a bonus depreciation provision for oil refineries, and it allows refiners to immediately write off 50 percent of the capital cost of certain refinery expansions. That is the benefit that the CBO estimates will cost taxpayers 3.5 billion over the next 5 years. Would your association support repeal of that energy tax subsidy?

Mr. DREVNA. No, sir. And the history of that was the EPAC 05, in the negotiations in this very room on the best path forward to continue to provide domestic——

Mr. WELSH. So you not only oppose repeal but you defend extension?

Mr. DREVNA. Yes, sir.

Mr. WELSH. Finally, I understand that until recently a tax credit was available for complying with EPA's low-sulfur diesel requirements, and an extension of this credit is included in a pending Senate tax extenders bill, which I am sure you are aware of. That is estimated to be a $20 million cost to the taxpayers. Does your association oppose the extension of this energy tax subsidy.

Mr. DREVNA. Oppose the extension? No, sir.

Mr. WELSH. So you like that one, too?

Mr. DREVNA. Again, sir, in a vacuum you look at each one of these things and say, what are they? But when you look at the history of them——

Mr. WELSH. Well, I get it; you are here doing your job and you have a case to make for why these tax subsidies should be extended to your industry. And you are representing the refiners, and it is your job to help them look out for their viability and bottom line.

Obviously, we in Congress, both sides of the aisle, have a broader set of concerns. The energy policies have to factor in the things you raise—national security, environmental protection and consumer protection. So what is one person's subsidy is a competitor's disadvantage.

So the question that I think is begging is whether there is a level playing field when there are taxpayer subsidies that apply to one form of energy but are denied to another form of energy.

Mr. Chairman, I yield back.

Mr. MARKEY. The gentleman's time has expired. The chair recognizes the gentleman from Texas, Mr. Burgess.

Mr. BURGESS. Thank you. Mr. Smith, if I understood the figures you gave us a few minutes ago correctly, you have 70,000 vehicles in your overall fleet and, of that, 300 hybrids; is that correct?

Mr. SMITH. [Nonverbal response.]

Mr. BURGESS. Peterbilt Company in Denton, Texas makes a great hybrid. I would encourage you to look at that. They get great mileage, and they are quiet, and low-emission vehicles, which is critical in our part of the world, because we do have some air quality issues. Did you give us a figure on the number of total electric vehicles you currently have in your fleet?

Mr. SMITH. We have, I think, 15 in Europe that we are running experiments on in prototype, and we have four that we just put out in Los Angeles which we will be running the experiments on. Again, they are definitely not cost-effective from a capital standpoint at this point.

Mr. BURGESS. Out of curiosity, what is the cost currently of an all-electric vehicle for your purposes?

Mr. SMITH. I think we have a non-disclosure with the manufacturer, but let me put it this way. If you take an equivalent size van, which is roughly a Freightliner or Sprinter, and you take the all-electric vehicle, it is about 2–1/2 times the capital cost; but 70 percent, perhaps more, of all-electric is the battery cost. So if it comes down the price performance curve that we projected, you get out about 4 or 5 years and you have a positive return from the all-electric.

Mr. BURGESS. Sure. The cost of chassis and the frame is not going to be any different.

Mr. SMITH. No, it is not any different.

Mr. BURGESS. And with electric vehicles, ultimately, at least in my part of the world, you are charging that with electricity; but the electricity is not a gift, it is generated by burning natural gas and coal in most Texas power plants.

We have one nuclear plant in Comanche Peak which I understand is going to be expanded, and I am grateful for that. But we have lost 25 or 30 years of nuclear technology by taking ourselves out of that. And it would seem to me that a power grid, supplied by a nuclear plant which was providing the baseload, really would be—if we were talking about a carbon-neutral environment and a fleet that is of electric vehicles for the type of deliveries that you do, that would be the almost ideal situation, would it not?

Mr. SMITH. Well, in the Energy Security Leadership Council report that I referenced, we strongly endorse nuclear power. And you are completely correct that that would be a zero-emissions production of power and a zero-emissions from the vehicle that was powered by the nuclear power plant.

But it is also important, which is in the Electrification Coalition's report that I mentioned, we have the capability in this country to power many, many millions of electric and hybrid electric vehicles with the off-peak power production that we already produce with the coal plants or natural gas plants or what have you. And the reason for that is that the power can't be stored during the night, so it is just a matter of relatively. And I don't mean to minimize the complexity of it. But it is relatively easy to modify the infra-

structure and the charging stations at the homes or the apartment to do it.

Mr. BURGESS. Let me move on quickly now. Have you looked at those in your business—have you looked at the use of natural gas for your heavy vehicles, your cross-country vehicles?

Mr. SMITH. We have. And our belief is that the best use of natural gas is for heavy, centrally fueled vehicles, like garbage trucks, buses, and so forth, or for the generation of electric power. Long-haul truck transportation, whether it is fine products or Peterbilt or Freightliner or so forth, are probably better served, in our opinion, by the advanced diesel technologies because of the infrastructure problems.

Mr. BURGESS. But of course the infrastructure problem is something that, regardless of the fuel of the future and recognizing that hydrocarbons are going to be the transitional fuel for a while, but the fuel of the future is going to require an infrastructure investment. And whether we call it investment or subsidy, it is going to be required.

But I do agree that we, in Congress, really should not try to pick winners and losers. That ultimately should be decisions based, just as you are doing it right now, based upon what is economically viable for your company. It is hard enough to make a living today without us complicating it for you.

If I could just ask you one quick question. And we understand the problem with climate change is a global problem. And I certainly appreciate your service and appreciate the wisdom that you have brought for us today.

When I visited with the Iraqi oil minister, I believe his name is Dr. Shahirstani, he is a Harvard-educated petroleum engineer, he assured me that none of Iraq's oil was going to be—was involved—there were no Chinese contracts involved with Iraqoil. And yet I hear from individuals like yourself coming back that the Chinese were all over Basra in 2005, 2006, looking to tie up oil contracts.

Do you have any insight for us as to what is going on there?

Lieutenant DIAMOND. I don't have any firsthand knowledge of Chinese presence on the ground in my time in the country, sir.

Mr. BURGESS. And, again, I appreciate the problem. We want to produce American energy for a security standpoint. But on a global standpoint, from the carbon production and the pollution, we do have to be mindful of what is happening in those other countries.

Lieutenant DIAMOND. Absolutely. You see a Chinese Navy now that is looking to make a global presence and building itself aircraft carriers and submarines that are defending their own energy, free flow of energy around the world. Yes, sir.

Mr. BURGESS. Thank you, Mr. Chairman. I yield back.

Mr. MARKEY. Great. The gentleman's time has expired. The chair recognizes himself for a round of questions.

Let me ask you this, Mr. Smith. And I think it is important for us to say because the gentleman from Texas and the gentleman from Louisiana who are here obviously want to protect the oil industry and Texas and Louisiana. We don't have any problem with the 8 million barrels of oil a day that are produced here in the United States. Do we?

Mr. SMITH. No, Mr. Chairman. In the Energy Security Leadership Council report, which we produced—and, remember, there were 10 four-star generals and admirals who had spent a great percentage of their careers protecting the oil trade, as the Lieutenant exemplifies in more recent times, and the businesses were large energy consumers like us and Southwest Airlines, Royal Caribbean. The basis of the recommendations we made were, number one, maximize U.S. domestic production of oil and gas for sure. So it is definitely not in conflict with that at all.

Mr. MARKEY. You support President Obama's decision to begin to open up additional parts of the Outer Continental Shelf?

Mr. SMITH. Absolutely.

Mr. MARKEY. So your problem is with the OPEC oil.

Mr. SMITH. Our problem is that the oil market is not a free market. It is managed by OPEC in a manner which, if it were done in the United States, would be illegal with supplies withheld and the market price—with their attempt to set the market price. The problem is it then becomes a social geopolitical weapon or an issue between us and China. And, by the way, we have huge operations in China. Been there 25 years, fly many 777 flights there every day.

So this oil problem for the first time is different, because it is being driven by demand increase and not just by supplies being withheld. And those are the seeds of a future confrontation among the nations of the world and why we need to minimize the importation of petroleum and fossil fuels in this country from potentially unfriendly regimes.

Mr. MARKEY. So could you talk a little bit as a result about the economic impact on the United States of having the price of oil set overseas in terms of its equivalence from being attacks on individual Americans. Because I think that is an important translation for the American people to hear. They are economically impacted by having this price of oil set overseas.

Mr. SMITH. Well, the costs are incredible, really. The Department of Energy did a study, and the estimate in real dollars between 1970 and 2008 of our dependence on foreign petroleum was over $5 trillion. In 2008, when the price of oil ran up to $147 per barrel in the summer, the price that year was about $600 billion total to our economy, and it was $388 billion in terms of adverse balance of trade and it was about 56 percent of our total trade deficit. It was enormous.

Mr. MARKEY. So this oil that we import—again, and this is just for the members from Louisiana or Texas or other oil producing States. We are not talking about that oil. None of this discussion is about Louisiana or about Texas. It is about Saudi Arabia, it is about other countries that we import the oil from. That is the strategy that we are trying to construct that deals with that issue. So we are not in any way trying to deal with this domestic industry.

So talk a little bit, if you could, about what that balance of payments issue means in terms of the American economy as well. What is the economic impact on our country?

Mr. SMITH. Well, in the summer of 2008—people forget this, at their peril—while the great financial meltdown was because of the subprime mortgage situation, and that was the bonfire that almost

consumed us, the match that lit it off was the run-up in fuel prices, where the subprime borrowers of these mortgages literally had to make the choice between making the mortgage payment or paying for the gas to go to and from work.

It is also important to recognize that each of the four other major recessions that the United States has experienced from 1973 forward was precipitated by a significant run-up in oil prices.

Mr. MARKEY. And you believe that the recession that we are still in was precipitated by that run-up to $147 a barrel?

Mr. SMITH. No question that that was, as I said, the match that lit off the financial meltdown in the summer of 2008.

Mr. MARKEY. And, again, that didn't have anything to do with Louisiana or Texas or Arkansas' oil production. That had to do with what was going on overseas that put us at the mercy of OPEC.

Mr. SMITH. No question.

Mr. MARKEY. So I just think that is important going forward, that we continually divide this question between the 8 million barrels of oil that we produce here and the 11 or 12 million barrels of oils a day that we import, again, as Lieutenant Diamond said, from places that we probably should not be importing them from.

Lieutenant Diamond, would you care to comment?

Lieutenant DIAMOND. Just a fact, Mr. Chairman, when you talk about cost, for every $5 increase in the price of a barrel of oil, that costs the Department of Defense $1.7 billion. That is larger than the procurement budget of the United States Marine Corps. So when you talk about the scope of price impact on the Department of Defense, it is tremendous.

Mr. MARKEY. So repeat that again. And that goes right down to the American taxpayers.

Lieutenant DIAMOND. Exactly.

Mr. MARKEY. So explain that a little bit more.

Lieutenant DIAMOND. So for every $5 increase in the price of a barrel of oil, that costs the Department of Defense an additional $1.7 billion in energy costs. That is more money just spent on energy costs than we actually are spending on procuring equipment and bullets and tanks for the Marine Corps.

Mr. MARKEY. So that comes right out of our defense budget?

Lieutenant DIAMOND. Right out of our troops' pockets, is what I am trying to say, sir.

Mr. MARKEY. So that is terrible. So there is no question that we need a plan that we put in place to have a different pathway for our consumption of oil from a national security perspective.

And, Mr. Wolf, Israel has made that decision: They do not want to import oil.

Mr. WOLF. Israel has made the decision that, by 2020, to be oil independent, which doesn't mean that their local production, which someone said is zero, they have some production. It doesn't mean that they are going to stop producing locally.

And one point to just clarify the linkage between economics and oil, in the last 12 months we have seen the most nascence of economic recoveries, and the price of oil has recovered 70 percent in the last 12 months. So we have to see that linkage and ask our-

selves, what is the size of the next stimulus that we have to put if we reach those heights that we did in 2008.

Mr. MARKEY. My time has expired. Let me turn and recognize the gentleman from Louisiana, Mr. Scalise.

Mr. SCALISE. Thank you, Mr. Chairman. I am glad we are talking about this issue, because in fact many of the policies that are being proposed by this administration that are threatening America's energy security. And when we talk about wanting to reduce our dependence on foreign oil, and especially Middle Eastern oil, I strongly agree with that. The problem is, many of these policies, like cap-and-trade, this energy tax, like the removal of tax incentives to explore in America, are going to make us more dependent on foreign oil. And so some of the same people who keep saying, because it sounds good to them, I guess, that they want to reduce our dependence on foreign oil, are proposing policies that would make us more dependent on foreign oil. And so we have got to be clear about how the policies adversely affect our energy security. And we are seeing some of those things play out right now.

And I want to ask Mr. Drevna, when we talk about this EPA finding—and we had EPA Administrator Jackson here earlier today—as they try to regulate greenhouse gases, what kind of impact does that have on American energy exploration?

Mr. DREVNA. Well, I can talk about what impact it will have on American domestic refinery production. What the—and the tailoring rule will do is naturally it will exempt for a while a lot of sources, and it will focus on larger sources. And we can debate whether that is legal or not and whether it is congressional intent or whatever.

However, just to simply have a greenhouse gas CO_2 requirement will automatically—on these resources and refineries and petrochemical facilities, it will automatically make you go through a PSD review. Now, PSDs are going to say, well, whatever you increase, whatever it is above that threshold, you have got to put the best available control technology on. Well, in a refinery or petrochemical facility, what is best available control technology for CO_2?

At the same time, where we are making cleaner and cleaner fuels that require more and more robust kinds of processes, hydrotreaters, that actually increase CO_2.

So we are caught in this vicious circle that says, OK, we are going to put back on a refinery that doesn't exist—that the back doesn't exist. But you are going to have to increase your CO_2 emissions because we want you to make cleaner and cleaner fuels. There is only one way of doing it, and you are going to have to reduce production. And the question——

Mr. SCALISE. And if we reduce production, where would that go?

Mr. DREVNA. Well, it is going to go overseas.

Mr. SCALISE. What countries would be primarily the beneficiaries of a cap-and-trade energy tax?

Mr. DREVNA. As I said before, India and that Reliance Refinery there is a massive, massive facility with a target on the United States.

Mr. SCALISE. And so, in walking all the way through this, as countries like China and India take more of our jobs from these reckless policies, what are the environmental regulations that a

country like India has on refining? Would they be refining with these same kind of emission standards?

Mr. DREVNA. Not when it comes to CO_2 or not when it comes to the other myriad of environmental rules that we have here.

Now, I am not saying that these plants aren't efficient and clean. But they don't have the myriad of rules that we do. And this is a good hearing to talk about this, because we are talking about reducing our reliance on foreign oil, but a lot of these policies are going to increase our reliance on foreign imported products, finished product, not crude oil, but the gasoline and the components that make up gasoline.

Mr. SCALISE. And the irony is the jobs that would go to those countries, I mean, we have seen numbers. National Association of Manufacturers says cap-and-trade energy tax or similarly some kind of EPA ruling would cost millions of jobs just in the first year that would leave our country. But the irony is, for the folks who say they want to go and reduce greenhouse gas emissions because that is destroying the planet with global warming, you would have increased greenhouse gas emissions, because when China gets those jobs, when India gets that refinery, they are actually going to be emitting more greenhouse gases than if that was done here in the United States.

So we lose jobs and we lose billions of dollars in our economy, surely at a time when we want to be doing the opposite; we should be creating jobs. But what is worse is we have an increase in greenhouse gas emissions. So the folks that are running around saying manis destroying the earth, we need to have cap-and-trade, what they are going to do in effect is increase greenhouse gas emissions through their policies.

And I know you have talked about it. We have other companies and industries that have come and laid it out, and we are seeing it. We are seeing companies already pull back and start moving operations overseas.

In south Louisiana there is a steel plant that is going to go one of two places, they are going to go in south Louisiana or they are going to go to Brazil. And the irony is, in Brazil they would get over 700 good high-paying jobs that we otherwise would have had, $2 billion, with a B, $2 billion of private investment, not government bailouts, private investments. And it takes four times the amount of carbon—four times the amount of carbon—to produce steel in Brazil than it would in the United States under our current rules. And so you would actually increase emissions.

And one last thing. The National Highway Traffic Safety Administration, they have said that they have the authority to establish their own CAFE standards without the EPA doing their own thing. I have got a letter from the National Automobile Dealers Association talking about that that I would like to have unanimous consent to enter it into the record. I know we don't have time to talk about it.

Mr. MARKEY. Without objection, it will be included in the record.

[The information was unavailable at the time of printing.]

Mr. SCALISE. Thank you. And I yield back.

Mr. MARKEY. The chair recognizes the chairman of the full committee, the gentleman from California, Mr. Waxman.

Mr. WAXMAN. Thank you very much, Mr. Chairman.

I am trying to think through the cost to this country of ever increasing oil prices. Between 2001 and 2008, the average household doubled its spending on gasoline. That is 7 years. And many of us remember the soaring costs that we had in the fall of 2008 when gasoline prices reached more than $4 a gallon, and may be coming back as our economy improves.

Now, there are companies that rely on oil in the course of their everyday business, and they certainly feel the impact. If these companies feel the impact, they have to figure out how to deal with it and may have to close up. That is a loss of jobs.

Now, there is a cost not just to the individuals and the businesses, but to the taxpayers. For instance, the RAND Corporation estimated that the cost to American taxpayers of protecting oil interests abroad at between $67 billion and $83 billion per year. That is a lot of money.

So, Mr. Smith, let me start with you. You testified that while oil prices are lower today than they were last summer, many of the fundamentals that pushed oil prices up are still present today. Can you tell us how important fuel costs are to a company like yours and why it is in the Nation's economic interest to adopt a clean energy policy?

Mr. SMITH. Well, Mr. Chairman, FedEx Corporation is about a $36 billion corporation, and we are one of the largest fuel users in the country. I think combined jet fuel, obviously our express company is an enormous user of that. It is the biggest air transportation system in the world and certainly the biggest all-cargo network in the world. So we burn in excess of 1.5 billion gallons of fuel every year, and the cost is a major consideration for us.

But the consideration is much greater in the damage that it does when prices run up to the overall economy than to just our company, because what we do is we have an established fuel price and then we adjust it each month based on the run-up or the run-down on fuel prices. Now, over the years we have had to vastly increase that base price.

But as I mentioned a moment ago, the difference this go-round compared to the other major oil crises since 1973—and I have lived through all of them. It is for the first time this is a demand-driven situation, where the rise of China and India and the other developing nations and geopolitical considerations mean that there is likely to be significant spikes in the price of oil like we experienced in 2008, right before the financial meltdown, or military confrontations over the issue. People forget at their peril that World War II for this country was triggered by the United States embargoing oil to the empire of Japan. That is what caused—the proximate cause of the war.

So we need as a country to reduce our dependence on petroleum imported from unstable and unfriendly regimes in parts of the world. And with that, not only do you get increased national security, better economic productivity, but as far as we can see, the technologies that can do that will vastly improve the environment as well. So you get a troika there.

Mr. WAXMAN. It is a win-win.

Mr. SMITH. It should be a win-win.

Mr. WAXMAN. Do you buy this argument that Mr. Drevna is making that the oil companies will have to go overseas, they will have to locate overseas, we will lose domestic jobs?

Mr. SMITH. Well, I am not an expert on his sector. I think it is the chemical processing companies that are probably, and the refineries, that are most at risk.

What we have advocated is maximization of U.S. oil and gas, as well as nuclear power, battery power, wind, solar. In fact, we have I think with our installation in New Jersey at our Woodbridge FedEx ground hub, I believe that is the largest solar industrial location in the country at present.

So we have got to do all of those things. I just don't know enough to speak authoritatively about his sector.

Mr. WAXMAN. Well, you are looking at it from the impact on your company and the economy and Mr. Wolf is looking at what it will cost consumers if we move away from oil, and it would be a huge benefit. And, Mr. Diamond, you have firsthand experience in the military guarding Iraqi oil terminals. And I want to commend you for your service to this country. I guess your salary was part of that what RAND estimates $83 billion per year protecting our access to oil. And I think, if we reduced our dependence on oil, that can mean a lot in terms of savings for the Armed Services and limiting our involvement in places where we will not need to be. Is that right?

Lieutenant DIAMOND. Absolutely, Mr. Chairman. And also, not to sound over dramatic, but the military also measures its cost in human lives when you are talking about our involvement overseas, not just dollars or jobs.

Mr. WAXMAN. Well, clean energy legislation would deprive Iran of $100 million a day in oil revenues. And what are they using that $100 million a day to do? It is not in our interest that they have that money to spend to become a military force that can threaten our allies like Israel and interests of the United States elsewhere in the Middle East, and maybe even the United States itself.

Thank you very much, Mr. Chairman. I yield back the balance of my time.

Mr. MARKEY. The gentleman's time has expired. The chair recognizes the ranking member of the full committee, Mr. Barton.

Mr. BARTON. Thank you, Mr. Chairman. The beauty of television, I could watch Mr. Waxman in my office and for once I timed it just right. I had a very nice lunch, too. So I am glad you all were here while I was eating lunch.

Mr. MARKEY. I don't think our witnesses wanted to hear that.

Mr. BARTON. I know. We do appreciate each of you gentlemen being here. I know it has been a long day.

I want to start with Mr. Drevna. You talked in your statement about the form of energy that delivers a BTU at the lowest economic cost and that a free market economy wins. Does economic growth in this country depend on the source of the BTU or the cost of the BTU?

Mr. DREVNA. I think it depends upon the cost. I mean, the American consumer deserves the most efficient, the least cost approach. So I would like to clarify something here. Let's make a difference between the imported crude and its effect on the economy.

The domestic refining industry is the first customer to be impacted by high-priced oil, and you have seen the results of this impact and what the state of the industry has been since it went up to $147 a barrel, and then with the recession. You know, we don't like paying high prices for oil any more than the consumer at the pump.

So, I mean, the programs—and I agree wholeheartedly with Mr. Smith's comment. I think I said it, and if I didn't state it clearly enough, I will try to repeat it. We have to cover the field. We have to make sure that the U.S. energy policy provides the proper incentives for the entrepreneurs to develop these kinds of technologies. But we can't flip a switch and automatically transform ourselves into a non-oil reliant country. We have plenty of resources here in the United States. Let's start using them and end that reliance on so much imported oil.

But even at that, you have got to realize where the imported oil comes from. Most of it comes from North and South America. And if we do our own resources, we can put a big dent in that, in the rest of our imports.

Mr. BARTON. Mr. Smith, I didn't read your testimony, so I am kind of shooting in the dark here, which is not a good thing. You should know the answer to the question you ask before you ask it. But I know a lot of your reputation as a straight shooter, so I am going to take a shot and see how you respond.

Have you followed the endangerment process that the EPA has used to come up with their endangerment finding?

Mr. SMITH. Not to the extent that I was exposed to it this morning. But I got a pretty good tutorial on it.

Mr. BARTON. Well, Administrator Jackson admitted that if you find that the endangerment finding is not done properly; in other words, if you repeal that or dispose of it, under current law the EPA does not have the authority to regulate CO_2 as a pollutant under the Clean Air Act. If you put a price on carbon because of this endangerment finding, it is obvious that you are going to raise the price of doing business for a business like yours, which I don't know what your cost of aviation fuel is, but it has got to be—and your trucks on the ground, but it has got to be a considerable cost of business. So anything to regulates CO_2 is going to raise your business cost.

Do you feel you know enough to give an opinion whether the endangerment process that the EPA has used is appropriate or not?

Mr. SMITH. I am not qualified to make that statement one way or the other.

Mr. BARTON. That is fair. Did you put in your testimony anything about what the cost to your business would be of putting a price on carbon under the proposed Waxman-Markey bill?

Mr. SMITH. No. I didn't put anything in the testimony. I did say, when you were out of the room, though, that FedEx Corporation is roughly a $36 billion company, and we are the largest air cargo, air transportation system by far and we operate over 70,000 vehicles. So we burn north of 1.5 billion gallons of fuel. So anything that increases the cost of energy obviously would affect us. But, much more importantly, since the way we handle this is to have

a base price of fuel in our rates and then pass along increases with fuel surcharges, the effect would be to our customers even more than us.

Mr. BARTON. Is there anything in the research phase that takes the place of hydrocarbon aviation fuels as a fuel source for your airplanes?

Mr. SMITH. Well, the answer to that is, from a technical standpoint, absolutely yes. The aviation industry has shown that jet fuel is made from Jatropha, from Camolina, and from algae can be intermixed with Jet-A. And the fuel efficiency, in other words per BTU of power produced by the gallon of the biojet, is actually greater than the Jet-A and it burns cleaner.

So the technical issue is really not much in question. I think the Lieutenant mentioned that the Navy flew an F–18 Hornet and they called it the Green Hornet just the other day.

So from a technical standpoint it can be done. The issue is whether you can get the cost of production to a cost effective level.

Mr. BARTON. Thank you. Thank you, panelists, and thank you, Chairman Markey.

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

We were about to complete the hearing, but the gentleman from Illinois.

Mr. SHIMKUS. Mr. Chairman, I said, with respect to you and the staff in the next hearing that is supposed to be starting in about 1 minute, I will forego any further questions.

Mr. MARKEY. And will the gentleman from Kentucky also take that position?

Then let's do this. We will wrap up the hearing this way. We are going to ask each one of you to give us the 1 minute you want us to remember from your testimony. We are going to do it in reverse order of your original testimony. We will begin with you, Mr. Drevna.

Mr. DREVNA. Thank you, Mr. Chairman. One minute. OK. I think that there is a lot of misunderstanding and miscommunication as to where the energy is going to come from for this country going forward. I think—I believe that, as I said before, we have got to make a decision: Do you want to continue a strong, robust domestic refining and petrochemical industry here? And, if we do, we can certainly work toward alternatives and we can certainly work toward supplements. But for a long time we are going to be dependent upon the hydrocarbon molecule. And the people who can deliver that molecule at the least cost are going to be the economic winners, and I sure hope it is the good old USA and not some foreign nation.

Mr. MARKEY. Thank you, Mr. Drevna. Lieutenant Diamond.

Lieutenant DIAMOND. It would certainly be the takeaway, sir, that, again, these current conflicts where America has put itself in a position of funding both sides of this war on terrorism due to its reliance on overseas energy supplies, sir.

Mr. MARKEY. Thank you. Mr. Wolf.

Mr. WOLF. I think the thing we might be missing here, which is important, is we are looking very internally focused on the U.S. The electric mile today versus a gasoline mile, which is that cost

element that is so important, is actually cheaper in most of the world and is also cheaper in the U.S. today.

So I would leave you with the fact that at $3 a gallon—even at $3 a gallon, which is half the price of Western Europe and a lot of developed countries that are moving ahead, the electric mile is cheaper. It is that history of infrastructure around gasoline that is not being developed. And once you develop that infrastructure, you can actually access those marginal electric miles.

Mr. MARKEY. Thank you. And Mr. Smith.

Mr. SMITH. Well, I would simply reiterate that we feel strongly that the electrification of short-haul transportation with plug-in electric and hybrid electric vehicles offers a substantial opportunity for the United States if the Electrification Coalition's recommendations were adopted by the Congress to reduce our petroleum consumption per unit of GDP, reduce the emissions as a consequence of that even when looking at the power generation of the electrical power for the electrified vehicles; and, finally, would significantly reduce the economic and national security challenges that will undoubtedly occur if we do not take some very strong measures to accomplish the goals that we have been discussing today.

Mr. MARKEY. Thank you, Mr. Smith, very much.

And I would just like to say to you, Mr. Smith, that we very much appreciate your leadership in increasing the fuel economy standard from 25 to 35 miles a gallon. I don't think it would have happened without you and your organization, Mr. Diamond—the other Mr. Robert Diamond in the room behind you back in 2007. We had that fight in 2001 on the House floor, only 155 votes; 2003, 168 votes; 2005, 178 votes. I know, because I was making that amendment with Mr. Boehlert. When the price really started to spike in 2006, we were not allowed to have that vote up on the House floor. But because of you and your organization, we have made that breakthrough. And I think we have seen the technological revolution already unfold. And the same thing we saw in telecommunications. Alexander Graham Bell invented his phone, and we were all still using black rotary phone 100 years later. It was only after this committee and the Justice Department acted that we changed the incentives that moved us from black rotary dial phones to BlackBerries. It only happened in 10 years after everyone said we could not do it.

So I think when America has a plan, America wins. And I saw you checking that BlackBerry in the course of this hearing. And, by the way, the members of the committee are very proud that you can check your BlackBerry.

Mr. SMITH. I was afraid I said something wrong, and Gene sent me a message saying shut up.

Mr. MARKEY. No more tapping on the shoulder.

Mr. WOLF. That is a Canadian technology. This is an American technology.

Mr. MARKEY. But that revolution in telecom happened because we changed the policies in this committee. And what we are seeing in the automotive sector is the same thing. And I think if we just put together a plan America won't have to try to keep China out because we will be taking them on. We will have a plan, and we will win. America wins when it has a plan.

Anyway, thank you all so much for your testimony today. With that, and with the thanks of the committee, this hearing is adjourned.

[Whereupon, at 2:05 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

Dave McCurdy
President and CEO

March 17, 2010

The Honorable Nancy Pelosi
Speaker
H-232
United States House of Representatives
Washington, DC 20515

The Honorable John Boehner
Minority Leader
H-204
United States House of Representatives
Washington, DC 20515

The Honorable Harry Reid
Majority Leader
S-221
United States Senate
Washington, DC 20510

The Honorable Mitch McConnell
Minority Leader
S-231
United States Senate
Washington, DC 20510

Dear Speaker Pelosi, Leader Reid, Leader Boehner, and Leader McConnell:

On behalf of the Alliance of Automobile Manufacturers and its 11 member companies, I am writing to express concern over proposed Resolutions of Disapproval that would overturn the Environmental Protection Agency's Endangerment Finding on greenhouse gas emissions. Automakers agree with the fundamental premise that Congress should determine how best to reduce greenhouse gas emissions. However, if these resolutions are enacted into law, the historic agreement creating the One National Program for regulating vehicle fuel economy and greenhouse gas emissions would collapse.

At this time last year, the auto industry faced the alarming possibility of having to comply with multiple sets of inconsistent fuel economy standards. First, NHTSA was in the process of promulgating new fuel economy standards as required by Congress under the Energy Independence and Security Act of 2007. Second, EPA was preparing to propose greenhouse gas standards under the Clean Air Act, in the wake of the Supreme Court's decision in *Massachusetts v. EPA*. Finally, California and 13 other states were planning to enforce their own state-specific greenhouse gas standards. (As a practical matter, greenhouse gas standards are the functional equivalent of fuel economy standards, since the amount of greenhouse gases emitted by a vehicle is proportional to the amount of fuel consumed.) These multiple standards would not have been aligned with each other, presenting all automakers with a compliance nightmare across the country. The state-by-state standards were especially problematic for the industry, as manufacturers generally faced the likely prospect of having to implement product restrictions in some states, but not others, in order to comply. Clearly, the industry wanted - then and now - a "one regulation fits all" resolution to this problem.

To achieve that result, the Obama Administration brokered a historic agreement in May 2009 to create the One National Program for fuel economy and greenhouse gas standards. Under that agreement, NHTSA and EPA committed to coordinate their rulemaking processes and promulgate a joint regulation establishing consistent fuel economy and greenhouse gas standards for the 2012-2016 model years. California agreed that manufacturers who complied with the federal greenhouse gas rules would be deemed to be in compliance with the state standards for model years 2012-2016. The auto industry agreed to suspend litigation seeking to overturn the state standards, and ultimately to dismiss such litigation once the conditions agreed to by the manufacturers have been met.

In a letter to Senator Rockefeller dated February 22, 2010, Administrator Jackson stated that the disapproval resolutions would have the unintended effect of "prevent[ing] EPA from issuing its greenhouse gas standard for light-duty vehicles, because the endangerment finding is a legal prerequisite of that standard." This, in turn, would likely result in the disintegration of the One National Program agreement. It is our understanding that California would not abide by the agreement if EPA is unable to regulate greenhouse gases. If the One National Program agreement were dissolved, the manufacturers would be back where they started last May with a NHTSA regulation coupled with a patchwork of states adopting regulations inconsistent with NHTSA's. As we stated in a letter to Senator Feinstein on September 24, 2009, this would present a myriad of problems for the auto industry in terms of product planning, vehicle distribution, adverse economic impacts and, most importantly, adverse consequences for their dealers and customers.

The Alliance believes that the One National Program resolution fostered by the Obama Administration is critical to the efficient regulation of motor vehicle greenhouse gas emissions and related fuel economy in the United States, not only for the 2012-2016 model years, but also for the 2017 model year and beyond. The ongoing existence of a national program for motor vehicle fuel economy and greenhouse gas standards for all future model years should be the shared goal of not only the Administration and the industry, but also Congress and the States, for the benefit of the environment, the public, and the ability of the industry to create and maintain high quality jobs.

It is time for Congress and the Administration to enact and implement measures to make a national program permanent for 2017 and beyond. However, given what appears to be the inevitable consequence of the proposed Resolutions of Disapproval, we do not believe they are the proper vehicles for Members of Congress to express their legitimate concern that Congress, and not EPA or the states, design the national response to climate change. Instead we urge Congress to move quickly to ensure that the national program does not end in 2016, and we stand ready to work with members to develop a federally-led process to achieve a permanent national program.

Thank you for the opportunity to explain the impact of these resolutions on the auto industry. Please feel free to contact me if you have any questions or need additional information.

Sincerely,

Dave McCurdy

March 17, 2010

The Honorable Nancy Pelosi
Speaker of the House
United States House of Representatives
235 Cannon House Office Building
Washington, DC 20510

Chairman
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Nissan

President
M. STANTON

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Dear Madam Speaker:

Re: Joint National Fuel Economy/Greenhouse Gas Emissions Program

The Association of International Automobile Manufacturers[1] would like to clarify its views concerning the potential impact the Resolution of Disapproval introduced by Senator Murkowski (S.J. Res. 26) and the similar resolution brought by Representative Barton in the House (H.J. Res. 77) may have on the joint rulemaking proposed by the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA).

On May 19, 2009, President Obama announced an historic agreement among the automobile industry, California and the States that have adopted its greenhouse gas emissions program, and environmental organizations to improve vehicle fuel economy and reduce greenhouse gas emissions in a coordinated national approach. On September 15, 2009, EPA and NHTSA jointly proposed regulations to implement the agreement. These regulations are expected to be finalized by the end of March 2010.

If EPA fails to finalize their portion of the joint federal regulation, whether as a result of a legislative reversal of EPA's endangerment finding or for any other reason, the May 2009 agreement could essentially fall apart, leaving NHTSA to implement required fuel economy regulations nationwide, and California and various other states to regulate vehicle greenhouse gases on a state-by-state basis. In short, the industry would once again face a patchwork of state and federal regulations it sought to avoid in reaching the May 2009 agreement.

AIAM has long believed that a coordinated national approach to fuel economy and greenhouse gas emissions regulation is vastly superior to a balkanized, inefficient state-by-state approach in terms of its benefits to consumers, the environment and workers employed by the auto industry. AIAM hopes and expects a joint national program will serve as a model for continued cooperation between the industry, the States and the

[1] AIAM is a trade association representing 15 international motor vehicle manufacturers who account for over 40 percent of all passenger cars and light trucks sold annually in the United States.

ASSOCIATION OF INTERNATIONAL AUTOMOBILE MANUFACTURERS, INC.
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Federal government in the development of post-2016 vehicle standards and will relieve manufacturers from the needless, less effective and inefficient burden of complying with a complicated patchwork of individual state regulations.

Best Regards,

Michael J. Stanton
President & CEO

INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE & AGRICULTURAL IMPLEMENT WORKERS OF AMERICA - UAW

RON GETTELFINGER, President ELIZABETH BUNN, Secretary-Treasurer

VICE PRESIDENTS: GENERAL HOUEFIELD • BOB KING • CAL RAPSON • JIMMY SETTLES • TERRY THURMAN

IN REPLY REFER TO

1757 N STREET, N.W.
WASHINGTON, D.C. 20036
TELEPHONE: (202) 828-8500
FAX (202) 293-3457

March 15, 2010

Dear Representative/Senator:

A number of disapproval resolutions have been introduced in the House and Senate to overturn the EPA's endangerment finding on greenhouse gas emissions. It is also possible that riders could be offered to upcoming appropriations bills in an effort to accomplish the same result. The UAW opposes these misguided efforts and urges you to vote against any such disapproval resolutions or riders.

In our judgment, Congress should move forward to enact comprehensive climate change legislation that will reduce greenhouse gas emissions. Although we recognize the difficulties involved in this effort, we believe that legislation can be crafted that will reduce global warming pollution while at the same time creating jobs and providing a boost to our economy. In particular, we believe such legislation can help to provide significant investment in domestic production of advanced technology vehicles and their key components, as well as other energy saving technologies. But such progress will be undermined if a disapproval resolution or rider were to overturn EPA's endangerment finding.

The UAW understands the concerns that have been expressed about EPA attempting to use is authority under the Clean Air Act to regulate greenhouse gas emissions from various industries. However, we believe the best way to address these concerns is for Congress to move forward with comprehensive climate change legislation that properly balances concerns of various regions and sectors, and establishes a new coherent national program to combat climate change.

The UAW also is deeply concerned that overturning EPA's endangerment finding would unravel the historic agreement on one national standard for fuel economy and greenhouse gas emissions for light duty vehicles that was negotiated by the Obama administration last year. As a result of this agreement among all stakeholders, NHTSA and EPA are proceeding with a joint rulemaking effort that will result in significant reductions in fuel consumption and greenhouse gas emissions by 2016. At the same time, these proposed rules will retain the structural components that Congress enacted in the 2007 energy legislation, thereby providing important flexibility to full line manufacturers and a backstop for the domestic car fleet. Most importantly, California and other states have agreed

to forgo state-level regulation of tailpipe emissions and abide by the new national standard that will be created by these NHTSA and EPA rules. This will avoid the burdens that would have been placed on automakers if they had been forced to comply with a multitude of federal and state standards.

However, the critically important progress that was achieved with this historic agreement will be undermined if EPA's endangerment finding is overturned. Without this finding, EPA will not be able to proceed with its current rulemaking on light duty vehicles. If the joint rulemaking process collapses, NHTSA has indicated that it will not be able to meet the statutory timetable for implementing any fuel economy increases for the 2012 model year. And in the absence of the EPA standard, California and other states would certainly move forward with their standards, thereby subjecting auto manufacturers to all of the burdens that the one national standard was designed to avoid.

For all of these reasons, the UAW opposes any attempt to overturn EPA's endangerment finding, either through a disapproval resolution or through a rider. Thank you for considering our views on this important issue.

Sincerely,

Alan Reuther
Legislative Director

AR:lb
opeiu494
L8667

ipcc

INTERGOVERNMENTAL PANEL ON climate change

Working Group I (WG I) – The Physical Science Basis

Statement by Working Group I of the Intergovernmental Panel on Climate Change on stolen emails from the Climatic Research Unit at the University of East Anglia, United Kingdom

Bern, 4. December 2009

Working Group I of the Intergovernmental Panel on Climate Change (IPCC) firmly stands behind the conclusions of the IPCC Fourth Assessment Report, the community of researchers and its individuals providing the scientific basis, and the procedures of IPCC Assessments.

Comments on blogs and in the media about the contents of a large number of private emails stolen from the Climatic Research Unit at the University of East Anglia, United Kingdom, have questioned both the validity of the key findings of the IPCC's Fourth Assessment Report (AR4) and the integrity of its authors. IPCC WGI condemns the illegal act which led to private emails being posted on the Internet and firmly stands by the findings of the AR4 and by the community of researchers worldwide whose professional standards and careful scientific work over many years have provided the basis for these conclusions.

The key finding of IPCC AR4, "The warming in the climate system is unequivocal [...] ", is based on measurements made by many independent institutions worldwide that demonstrate significant changes on land, in the atmosphere, the ocean and in the ice-covered areas of the Earth. Through further, independent scientific work involving statistical methods and a range of different climate models, these changes have been detected as significant deviations from natural climate variability and have been attributed to the increase of greenhouse gases.

The body of evidence is the result of the careful and painstaking work of hundreds of scientists worldwide. The internal consistency from multiple lines of evidence strongly supports the work of the scientific community, including those individuals singled out in these email exchanges, many of whom have dedicated their time and effort to develop these findings in teams of Lead Authors within the production of the series of IPCC Assessment Reports during the past 20 years.

The IPCC assessment process is designed to ensure consideration of all relevant scientific information from established journals with robust peer review processes, or from other sources which have undergone robust and independent peer review. The entire report writing process of the IPCC is subjected to extensive and repeated review by experts as well as by governments. Consequently, there is full opportunity for experts in the field to draw attention to any piece of published literature and its basic findings that would ensure inclusion of a wide range of views.

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WMO UNEP

In compliance with the procedures of IPCC, the conclusions of AR4 have undergone scrutiny in the form of several stages of reviews by peers and governments, have been revised and refined to take into account these review comments, and have finally been approved word by word by the governments of the world[1].

Every layer in the process (including large author teams, extensive and multi-step reviews, independent monitoring of review compliance, and plenary approval by governments) plays a major role in keeping IPCC assessments comprehensive, unbiased, open to the identification of new relevant literature, and policy relevant but not policy prescriptive. Therefore, no individual scientist in the IPCC assessment process is in a position to change the conclusions, or to exclude relevant peer-reviewed papers and scientific work from an IPCC Assessment Report.

In conclusion, IPCC WGI firmly stands behind its unique procedures and behind the scientific community and their collective work which has been, and continues to be, the basis of unbiased, open and transparent assessments of the current knowledge on the climate system and its changes.

Prof. Thomas Stocker
Co-Chair, Working Group I

Prof. Qin Dahe
Co-Chair, Working Group I

[1] The Working Group I Contribution to the IPCC Fourth Assessment Report, *Climate Change 2007: The Physical Science Basis,* the Drafts, Review Comments and Author Team Responses are available from the WGI website: http://www.ipcc-wg1.unibe.ch/publications/wg1-ar4/wg1-ar4.html

UCAR
University Corporation for Atmospheric Research

Understanding atmosphere, Earth, and Sun

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UCAR statement on hacking of University of East Anglia climate correspondence and files

December 04, 2009

BOULDER—The University Corporation for Atmospheric Research (UCAR) is concerned that emails and data, including personal information about individuals, have been hacked from the University of East Anglia. The selective publication of some stolen emails and other papers taken out of context is not a responsible way to engage on the issue of climate change. Nevertheless, some people have used this material to raise concerns about the conduct and validity of climate research.

NCAR and UCAR take the credibility of science very seriously. Research must be conducted in an ethical manner and be transparent and reproducible. The core science of climate change is based on exhaustive peer review involving hundreds of scientists at many independent institutions in the United States and around the world, and it is in no way changed by the content of the stolen files of East Anglia.

The fundamental scientific conclusion from decades of research is that emissions of carbon dioxide and other greenhouse gases are changing our climate in significant ways. NCAR and UCAR have been prominent institutions in climate science, and the overarching findings from the research conducted by our scientists and our many university and other scientific partners support this conclusion.

Many of the stolen emails deal with the Intergovernmental Panel on Climate Change (IPCC) report from 2007. This report had over 450 lead authors, 800 contributing authors, and over 2,500 reviewers from over 130 countries. Two major reviews were carried out in producing the report, and climate "skeptics" can and do participate, some as authors. All comments from reviewers were responded to in writing. The IPCC process is open and thorough, and we stand by those findings.

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Official Statements

American Association for the Advancement of Science

American Meteorological Society

University of East Anglia

Letter to Federal Agencies from U.S. Scientists

Open Letter from U.S. Scientists on the IPCC (March 2010)

Editorials and Analysis

Nature editorial (December 3, 2009)

Pew Center on Global Climate Change (PDF)

Yale Forum on Climate Change & the Media

About the IPCC

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AGU News

AGU Statement Regarding the Recent Release of E-mails Hacked from the Climate Research Unit at University of East Anglia

The American Geophysical Union (AGU) has received a number of inquiries asking about our response to the release of e-mail hacked from the Climate Research Unit at University of East Anglia. AGU finds it offensive that these emails were obtained by illegal cyber attacks and they are being exploited to distort the scientific debate about the urgent issue of climate change.

AGU's position statement on climate change

AGU reaffirms the **position statement** approved by AGU Council in 2007. This statement is based on the large body of scientific evidence that Earth's climate is warming and that human activity is a contributing factor. Nothing in the University of East Anglia hacked e-mails represents a significant challenge to that body of scientific evidence.

AGU policy requires that all position statements be reviewed after four years and updated as necessary. AGU's position statement on climate change will be reviewed in 2011 and modified as needed to reflect evidence of recent scientific research.

Scientific inquiry and publishing

AGU is, and always has been, firmly committed to maintaining the highest standards of publishing excellence, including the objectivity and integrity of the peer review process for all our publications. We do not censor the authors of papers submitted to our journals or the editors of those journals.

Science and the scientific method is seldom a linear march to the "correct" and indisputable answer. Disagreement among scientists is part of the energy that moves inquiry forward. AGU's publications in Earth and space science provide platforms for scientists to present the results of their original research in scholarly journals with high professional standards. The primary requirement is that the research passes through a rigorous peer review process.

In the area of climate research, AGU has published — and will continue to publish — excellent, peer-reviewed scientific findings without regard to whether those findings might be interpreted as supporting or contradicting prevailing views on climate change and the impact of human activity on climate.

AGU meetings as a forum for scientific exchange

AGU welcomes the participation of all scientists at its professional meetings and conferences. Scientists are not censored in any way, and abstracts are not peer reviewed. We view an AGU meeting as an open forum for scientific discussion. When we organize our meeting activities the conveners strive to put together sessions that are balanced in terms of the numbers of presentations per session, the breadth of treatment they provide on given topics, and the mixture of incremental and breakthrough scientific results they present. This process allows for those with opinions that fall outside the mainstream to present their ideas.

AAAS Reaffirms Statements on Climate Change and Integrity

The American Association for the Advancement of Science (AAAS) has reaffirmed the position of its Board of Directors and the leaders of 18 respected organizations, who concluded based on multiple lines of scientific evidence that global climate change caused by human activities is now underway, and it is a growing threat to society.

"The vast preponderance of evidence, based on years of research conducted by a wide array of different investigators at many institutions, clearly indicates that global climate change is real, it is caused largely by human activities, and the need to take action is urgent," said Alan I. Leshner, chief executive officer of AAAS and executive publisher of the journal *Science*.

AAAS expressed grave concerns that the illegal release of private emails stolen from the University of East Anglia should not cause policy-makers and the public to become confused about the scientific basis of global climate change. Scientific integrity demands robust, independent peer review, however, and AAAS therefore emphasized that investigations are appropriate whenever significant questions are raised regarding the transparency and rigor of the scientific method, the peer-review process, or the responsibility of individual scientists. The responsible institutions are mounting such investigations.

AAAS is not itself an investigative body, Leshner emphasized, but the Association will carefully evaluate the conclusions of appropriate authorities who have been asked to review the emails. Selectively publicized language in messages exchanged over a number of years among several scientists has been interpreted by some to suggest unethical actions such as data manipulation or suppression.

"AAAS takes issues of scientific integrity very seriously," Leshner said. "It is fair and appropriate to pursue answers to any allegations of impropriety. It's important to remember, though, that the reality of climate change is based on a century of robust and well-validated science."

The AAAS Board of Directors asserted in a statement issued 9 December 2006 that "the scientific evidence is clear: global climate change caused by human activities is occurring now, and it is a growing threat to society." Clear evidence of climate change is based upon "accumulating data from across the globe" that reveals "a wide array of effects: rapidly melting glaciers, increases in extreme weather, rising sea levels, shifts in species ranges, and more," the AAAS Board reported. Reliable sensor data show an upturn in average temperatures for at least the past 30 years.

The AAAS Board noted that "the pace of change and the evidence of harm have increased markedly over the last five years. The time to control greenhouse gas emissions is now."

AAAS joined the leaders of 17 other leading organizations in signing a letter sent 21 October 2009 to the U.S. Senate, emphasizing based upon rigorous research that human-induced climate change is ongoing and will have broad impacts on society—including the global economy and the environment.

4 December 2009

Statements of the AMS

AMS Statements in Process

Statement Writing Committee Volunteering

Guidelines for Statements of the AMS (PDF)

Impact of CRU Hacking on the AMS Statement on Climate Change

AMS Headquarters has received several inquiries asking if the material made public following the hacking of e-mails and other files from the Climate Research Unit (CRU) at the University of East Anglia has any impact on the AMS Statement on Climate Change, which was approved by the AMS Council in 2007 and represents the official position of the Society.

The AMS Statement on Climate Change continues to represent the position of the AMS. It was developed following a rigorous procedure that included drafting and review by experts in the field, comments by the membership, and careful review by the AMS Council prior to approval as a statement of the Society. The statement is based on a robust body of research reported in the peer-reviewed literature. As with any scientific assessment, it is likely to become outdated as the body of scientific knowledge continues to grow, and the current statement is scheduled to expire in February 2012 if it is not replaced by a new statement prior to that.

The beauty of science is that it depends on independent verification and replication as part of the process of confirming research results. This process, which is tied intrinsically to the procedures leading to publication of research results in the peer-reviewed literature, allows the scientific community to confirm some results while rejecting others. It also, in a sense, lessens the impact of any one set of research results, especially as the body of research on any topic grows. The AMS plays an important role in the scientific process through its peer-reviewed publications, as well as through its many other activities, such as scientific conferences. The Society strives to maintain integrity in the editorial process for all its publications.

For climate change research, the body of research in the literature is very large and the dependence on any one set of research results to the comprehensive understanding of the climate system is very, very small. Even if some of the charges of improper behavior in this particular case turn out to be true — which is not yet clearly the case — the impact on the science of climate change would be very limited.

The AMS encourages ethical behavior in all aspects of science and has established a record of affirming the value of scientists presenting their research results "objectively, professionally, and without sensationalizing or politicizing the associated impacts" (see AMS Statement on the Freedom of Scientific Expression).

Keith L. Seitter, CCM
Executive Director

25 November 2009

Updated: 02/26/2010
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THE GEOLOGICAL SOCIETY OF AMERICA®

GSA Position Statement

Adopted October 2006; revised April 2010

Climate Change

Position Statement. Decades of scientific research have shown that climate can change from both natural and anthropogenic causes. The Geological Society of America (GSA) concurs with assessments by the National Academies of Science (2005), the National Research Council (2006), and the Intergovernmental Panel on Climate Change (IPCC, 2007) that global climate has warmed and that human activities (mainly greenhouse-gas emissions) account for most of the warming since the middle 1900s. If current trends continue, the projected increase in global temperature by the end of the twenty-first century will result in large impacts on humans and other species. Addressing the challenges posed by climate change will require a combination of adaptation to the changes that are likely to occur and global reductions of CO_2 emissions from anthropogenic sources.

Purpose. This position statement (1) summarizes the strengthened basis for the conclusion that humans are a major factor responsible for recent global warming; (2) describes the large effects on humans and ecosystems if greenhouse-gas concentrations and global climate reach projected levels; and (3) provides information for policy decisions guiding mitigation and adaptation strategies designed to address the future impacts of anthropogenic warming.

Rationale

Scientific advances in the first decade of the 21st century have greatly reduced previous uncertainties about the amplitude and causes of recent global warming. Ground-station measurements have shown a warming trend of ~0.7 °C since the mid-1800s, a trend consistent with (1) retreat of northern hemisphere snow and Arctic sea ice in the last 40 years; (2) greater heat storage in the ocean over the last 50 years; (3) retreat of most mountain glaciers since 1850; (4) an ongoing rise of global sea level for more than a century; and (5) proxy reconstructions of temperature change over past centuries from ice cores, tree rings, lake sediments, boreholes, cave deposits and corals. Both instrumental records and proxy indices from geologic sources show that global mean surface temperature was higher during the last few decades of the 20th century than during any comparable period during the preceding four centuries (National Research Council, 2006).

Measurements from satellites, which began in 1979, initially did not show a warming trend, but later studies (Mears and Wentz, 2005; Santer et al., 2008) found that the satellite data had not been fully adjusted for losses of satellite elevation through time, differences in time of arrival over a given location, and removal of higher-elevation effects on the lower tropospheric signal. With these factors taken into account, the satellite data are now in basic agreement with ground-station data and confirm a warming trend since 1979. In a related study, Sherwood et al. (2005) found problems with corrections of tropical daytime radiosonde measurements and largely resolved a previous discrepancy with ground-station trends. With instrumental discrepancies having been resolved, recent warming of Earth's surface is now consistently supported by a wide range of measurements and proxies and is no longer open to serious challenge.

The geologic record contains unequivocal evidence of former climate change, including periods of greater warmth with limited polar ice, and colder intervals with more widespread glaciation. These and other changes were accompanied by major shifts in species and ecosystems. Paleoclimatic research has demonstrated that these major changes in climate and biota are associated with significant changes in climate forcing such as continental positions and topography, patterns of ocean circulation, the greenhouse gas composition of the atmosphere, and the distribution and amount of solar energy at the top of the atmosphere caused by changes in Earth's orbit and the evolution of the sun as a main sequence star. Cyclic changes in ice volume during glacial periods over the last three million years have been correlated to orbital cycles and changes in greenhouse gas concentrations, but may also reflect internal responses generated by large ice sheets. This rich history of Earth's climate has been used as one of several key sources of information for assessing the predictive capabilities

of modern climate models. The testing of increasingly sophisticated climate models by comparison to geologic proxies is continuing, leading to refinement of hypotheses and improved understanding of the drivers of past and current climate change.

Given the knowledge gained from paleoclimatic studies, several long-term causes of the current warming trend can be eliminated. Changes in Earth's tectonism and its orbit are far too slow to have played a significant role in a rapidly changing 150-year trend. At the other extreme, large volcanic eruptions have cooled global climate for a year or two, and El Niño episodes have warmed it for about a year, but neither factor dominates longer-term trends.

As a result, greenhouse gas concentrations, which can be influenced by human activities, and solar fluctuations are the principal remaining factors that could have changed rapidly enough and lasted long enough to explain the observed changes in global temperature. Although the 3rd IPCC report allowed that solar fluctuations might have contributed as much as 30% of the warming since 1850, subsequent observations of Sun-like stars (Foukal et al., 2004) and new simulations of the evolution of solar sources of irradiance variations (Wang et al., 2005) have reduced these estimates. The 4th (2007) IPCC report concluded that changes in solar irradiance, continuously measured by satellites since 1979, account for less than 10% of the last 150 years of warming.

Greenhouse gases remain as the major explanation. Climate model assessments of the natural and anthropogenic factors responsible for this warming conclude that rising anthropogenic emissions of greenhouse gases have been an increasingly important contributor since the mid-1800s and the major factor since the mid-1900s (Meehl et al., 2004). The CO_2 concentration in the atmosphere is now ~30% higher than peak levels that have been measured in ice cores spanning 800,000 years of age, and the methane concentration is 2.5 times higher. About half of Earth's warming has occurred through the basic heat-trapping effect of the gases in the absence of any feedback processes. This "clear-sky" response to climate is known with high certainty. The other half of the estimated warming results from the net effect of feedbacks in the climate system: a very large positive feedback from water vapor; a smaller positive feedback from snow and ice albedo; and sizeable, but still uncertain, negative feedbacks from clouds and aerosols. The vertical structure of observed changes in temperature and water vapor in the troposphere is consistent with the anthropogenic greenhouse-gas "fingerprint" simulated by climate models (Santer et al., 2008). Considered in isolation, the greenhouse-gas increases during the last 150 years would have caused a warming larger than that actually measured, but negative feedback from clouds and aerosols has offset part of the warming. In addition, because the oceans take decades to centuries to respond fully to climatic forcing, the climate system has yet to register the full effect of gas increases in recent decades.

These advances in scientific understanding of recent warming form the basis for projections of future changes. If greenhouse-gas emissions follow the current trajectory, by 2100 atmospheric CO_2 concentrations will reach two to four times pre-industrial levels, for a total warming of less than 2 °C to more than 5 °C compared to 1850. This range of changes in greenhouse gas concentrations and temperature would substantially alter the functioning of the planet in many ways. The projected changes involve risk to humans and other species: (1) continued shrinking of Arctic sea ice with effects on native cultures and ice-dependent biota; (2) less snow accumulation and earlier melt in mountains, with reductions in spring and summer runoff for agricultural and municipal water; (3) disappearance of mountain glaciers and their late-summer runoff; (4) increased evaporation from farmland soils and stress on crops; (5) greater soil erosion due to increases in heavy convective summer rainfall; (6) longer fire seasons and increases in fire frequency; (7) severe insect outbreaks in vulnerable forests; (8) acidification of the global ocean; and (9) fundamental changes in the composition, functioning, and biodiversity of many terrestrial and marine ecosystems. In addition, melting of Greenland and West Antarctic ice (still highly uncertain as to amount), along with thermal expansion of seawater and melting of mountain glaciers and small ice caps, will cause substantial future sea-level rise along densely populated coastal regions, inundating farmland and dislocating large populations. Because large, abrupt climatic changes occurred within spans of just decades during previous ice-sheet fluctuations, the possibility exists for rapid future changes as ice sheets become vulnerable to large greenhouse-gas increases. Finally, carbon-climate model simulations indicate that 10–20% of the anthropogenic CO_2 "pulse" could stay in

the atmosphere for thousands of years, extending the duration of fossil-fuel warming and its effects on humans and other species. The acidification of the global ocean and its effects on ocean life are projected to last for tens of thousands of years.

Public Policy Aspects

Recent scientific investigations have strengthened the case for policy action to reduce greenhouse gas emissions and to adapt to unavoidable climate change. To strengthen the consensus for action, this statement from the Geological Society of America is intended to inform policymakers about improved knowledge of Earth's climate system based on advances in climate science. Recent scientific investigations have contributed to this improved understanding of the climate system and supplied strong evidence for human-induced global warming, providing policy makers with a unique perspective on which to base mitigation and adaptation strategies. Carefully researched and tested adaptation strategies can both reduce and limit negative impacts and explore potential positive impacts. Future climate change will pose societal, biological, economic, and strategic challenges that will require a combination of national and international emissions reductions and adaptations. These challenges will also require balanced and thoughtful national and international discussions leading to careful long-term planning and sustained policy actions.

Recommendations

- *Public policy should include effective strategies for the reduction of greenhouse gas emissions.* Cost-effective investments to improve the efficient use of Earth's energy resources can reduce the economic impacts of future adaptation efforts. Strategies for reducing greenhouse-gas emissions should be evaluated based on their impacts on climate, on costs to global and national economies, and on positive and negative impacts on the health, safety and welfare of humans and ecosystems.
- *Comprehensive local, state, national and international planning is needed to address challenges posed by future climate change.* Near-, mid-, and long-term strategies for mitigation of, and adaptation to climate change should be developed, based in part on knowledge gained from studies of previous environmental changes.
- *Public investment is needed to improve our understanding of how climate change affects society, including on local and regional scales, and to formulate adaptation measures.* Sustained support of climate-related research to advance understanding of the past and present operation of the climate system is needed, with particular focus on the major remaining uncertainties in understanding and predicting Earth's future climate at regional and global scales. Research is needed to improve our ability to assess the response and resilience of natural and human systems to past, present, and future changes in the climate system.

About the Geological Society of America

The Geological Society of America, founded in 1888, is a scientific society with over 22,000 members from academia, government, and industry in more than 90 countries. Through its meetings, publications, and programs, GSA enhances the professional growth of its members and promotes the geosciences in the service of humankind. GSA encourages cooperative research among earth, life, planetary, and social scientists, fosters public dialogue on geoscience issues, and supports all levels of earth science education. Inquiries about the GSA or this position statement should be directed to GSA's 2009-2010 President, Dr. Jean M. Bahr, at +1-608-262-5513, or president@geosociety.org.

Opportunities for GSA and its Members to Help Implement Recommendations

To facilitate implementation of the goals of this position statement, the Geological Society of America recommends that its members take the following actions:

- *Actively participate in professional education and discussion activities to be technically informed about the latest advances in climate science.* GSA should encourage symposia at regional, national and international meetings to inform members on mainstream understanding among geoscientists and climate scientists of the causes and future effects of global warming within the broader context of natural variability. These symposia should seek to actively engage members in hosted discussions that clarify issues, possibly utilizing educational formats other than the traditional presentation and Q&A session.
- *Engage in public education activities in the community, including the local level.* Public education is a critical element of a proactive response to the challenges presented by global climate change. GSA members are encouraged to take an active part in outreach activities to educate the public at all levels (local, regional, national, and international) about the science of global warming and the importance of geological research in framing policy development. Such activities can include organizing and participating in community school activities; leading discussion groups in civic organizations; meeting with local and state community leaders and congressional staffs; participating in GSA's Congressional Visits Day; writing opinion pieces and letters to the editor for local and regional newspapers; contributing to online forums; and volunteering for organizations that support efforts to mitigate and adapt to global climate change.
- *Collaborate with a wide range of stakeholders and help educate and inform them about the causes and impacts of global climate change from the geosciences perspective.* GSA members are encouraged to discuss with businesses and policy makers the science of global warming, as well as opportunities for transitioning from our predominant dependence on fossil fuels to greater use of low-carbon energies and energy efficiencies.
- *Work interactively with other science and policy societies to help inform the public and ensure that policymakers have access to scientifically reliable information.* GSA should actively engage and collaborate with other earth-science organizations in recommending and formulating national and international strategies to address impending impacts of anthropogenic climate change.
- *Take advantage of the following list of references for a current scientific assessment of global climate change.*

REFERENCES CITED

National Reports

IPCC (Intergovernmental Panel on Climate Change), 2007, Summary for policymakers, *in* Climate Change 2007: The physical science basis: Cambridge, United Kingdom, Cambridge University Press, 18 p.

National Academies of Science (2005). Joint academes statement: Global response to climate change. (nationalacademies.org/onpi/06072005.pdf)

National Research Council, 2006, Surface temperature reconstructions for the last 2000 years: Washington, D.C., National Academy Press, 146 p.

Peer-Reviewed Articles

Foukal, P.G., et al., 2004, A stellar view on solar variations and climate: Science, v. 306, p. 68–69.

Mears, C.A., and Wentz, F.J., 2005, The effect of diurnal correction on satellite-derived lower tropospheric temperature: Science online, doi: 10.1126/science.1114772.

Meehl et al., 2004, Combinations of natural and anthropogenic forcings in twentieth-century climate: J. of Climate, v. 17, p. 3721-3727.

Santer, B., et al., 2008, Consistency of modeled and observed temperature trends in the tropical troposphere: International Journal of Climatology, v. 28, p. 1703–1722.

Sherwood, S., Lanzante, J., and Meyer, C., 2005, Radiosonde biases and late-20th century warming: Science online, doi: 10/1126/science.1115640.

Wang, Y.-M., Lean, J.L., and Sheeley, N.R. Jr., 2005, Modeling the Sun's magnetic field and irradiance since 1713: Astrophysical Journal, v. 625, p. 522–538.

SELECTED WEB SITES

Intergovernmental Panel on Climate Change

IPCC reports: www.ipcc.ch/

U.S. National Academies

Climate Change at the National Academies: dels.nas.edu/climatechange/

Surface temperature reconstructions: www.nap.edu/catalog.php?record_id=11676#toc

U.S. Global Change Research Program

Home page: www.globalchange.gov/

Satellite issue: www.climatescience.gov/Library/sap/sap1-1/finalreport/default.htm

Geologic record of abrupt changes: www.climatescience.gov/Library/sap/sap3-4/final-report/

Global climate change impacts in the United States: www.globalchange.gov./publications/reports/scientific-assessments/us-impacts

Report of the International Panel set up by the University of East Anglia to examine the research of the Climatic Research Unit.

Introduction

1. The Panel was set up by the University in consultation with the Royal Society to assess the integrity of the research published by the Climatic Research Unit in the light of various external assertions. The Unit is a very small academic entity within the School of Environmental Sciences. It has three full time and one part time academic staff members and about a dozen research associates, PhD students and support staff. The essence of the criticism that the Panel was asked to address was that climatic data had been dishonestly selected, manipulated and/or presented to arrive at pre-determined conclusions that were not compatible with a fair interpretation of the original data. The members of the Panel are listed in Appendix A at the end of this report.

2. The Panel was not concerned with the question of whether the conclusions of the published research were correct. Rather it was asked to come to a view on the integrity of the Unit's research and whether as far as could be determined the conclusions represented an honest and scientifically justified interpretation of the data. The Panel worked by examining representative publications by members of the Unit and subsequently by making two visits to the University and interviewing and questioning members of the Unit. Not all the panel were present on both occasions but two members were present on both occasions to maintain continuity. About fifteen person/days were spent at the University discussing the Unit's work.

3. The eleven representative publications that the Panel considered in detail are listed in Appendix B. The papers cover a period of more than twenty years and were selected on the advice of the Royal Society. All had been published in international scientific journals and had been through a process of peer review. CRU agreed that they were a fair sample of the work of the Unit. The Panel was also free to ask for any other material that it wished and did so. Individuals on the panel asked for and reviewed other CRU research materials.

4. The Panel's work began with a detailed reading of the published work. Every paper was read by a minimum of three Panel members at least one of whom was familiar with the general area to which the paper related. At least one of the other two was a generalist with no special climate science expertise but with experience of some of the general techniques and methods employed in the work. Most of the members of the Panel read all the publications. The publications provided a platform from which to gain a deeper understanding of the Unit's research and enabled the Panel to probe particular questions in more detail.

5. Broadly the work of the Unit falls into two parts:
    - Construction and interpretation of tree ring chronologies extending over some thousands of years with a view to gaining information about past climates:
    - Studies of temperatures over the last few hundred years from direct observations.

Dendroclimatology

1. Tree growth is sensitive to very many factors including climate. By piecing together growth records from different trees, living or dead, it is possible to determine the temporal variation of growth patterns going back many hundreds of years. The dendroclimatological work at CRU seeks to go beyond this and to extract from the dated growth patterns the local and regional history of temperature variations. The Unit does virtually no primary data acquisition but has used data from published archives and has collaborated with people who have collected data.

2. The main effort of the dendroclimalogists at CRU is in developing ways to extract climate information from networks of tree ring data. The data sets are large and are influenced by many factors of which temperature is only one. This means that the effects of long term temperature variations are masked by other more dominant short term influences and have to be extracted by statistical techniques. The Unit approaches this task with an independent mindset and awareness of the interplay of biological and physical processes underlying the signals that they are trying to detect.

3. Although inappropriate statistical tools with the potential for producing misleading results have been used by some other groups, presumably by accident rather than design, in the CRU papers that we examined we did not come across any inappropriate usage although the methods they used may not have been the best for the purpose. It is not clear, however, that better methods would have produced significantly different results. The published work also contains many cautions about the limitations of the data and their interpretation.

4. Chronologies (transposed composites of raw tree data) are always work in progress. They are subject to change when additional trees are added; new ways of data cleaning may arise (e.g. homogeneity adjustments), new measurement methods are used (e.g. of measuring ring density), new statistical methods for treating the data may be developed (e.g. new ways of allowing for biological growth trends).

5. This is illustrated by the way CRU check chronologies against each other; this has led to corrections in chronologies produced by others. CRU is to be commended for continuously updating and reinterpreting their earlier chronologies.

6. With very noisy data sets a great deal of judgement has to be used. Decisions have to be made on whether to omit pieces of data that appear to be aberrant. These are all matters of experience and judgement. The potential for misleading results arising from selection bias is very great in this area. It is regrettable that so few professional statisticians have been involved in this work because it is fundamentally statistical. Under such circumstances there must be an obligation on researchers to document the judgemental decisions they have made so that the work can in principle be replicated by others.

7. CRU accepts with hindsight that they should have devoted more attention in the past to archiving data and algorithms and recording exactly what they did. At the time the work was done, they had no idea that these data would assume the importance they have today and that the Unit would have to answer detailed inquiries on earlier work. CRU and, we are told, the tree ring community generally, are now adopting a much more rigorous approach to the archiving of chronologies and computer code. The difficulty in releasing program code is that to be understood by anyone else it needs time-consuming work on documentation, and this has not been a top priority.

8. After reading publications and interviewing the senior staff of CRU in depth, we are satisfied that the CRU tree-ring work has been carried out with integrity, and that allegations of deliberate misrepresentation and unjustified selection of data are not valid. In the event CRU scientists were able to give convincing answers to our detailed questions about data choice, data handling and statistical methodology. The Unit freely admits that many data analyses they made in the past are superseded and they would not do things that way today.

9. We have not exhaustively reviewed the external criticism of the dendroclimatological work, but it seems that some of these criticisms show a rather selective and uncharitable approach to information made available by CRU. They seem also to reflect a lack of awareness of the ongoing and dynamic nature of chronologies, and of the difficult circumstances under which university research is sometimes conducted. Funding and labour pressures and the need to publish have meant that pressing ahead with new work has been at the expense of what was regarded as non-essential record keeping. From our perspective it seems that the CRU sins were of omission rather than commission. Although we deplore the tone of much of the criticism that has been directed at CRU, we believe that this questioning of the methods and data used in dendroclimatology will ultimately have a beneficial effect and improve working practices

Temperatures from Historical Instrumental Records

1. The second main strand of work at CRU has been the collection and collation of instrumental land temperature records from all over the world and the construction of regional, hemispherical and global scale temperature records. These records are irregularly distributed in space and time. Modern records come largely from land-based meteorological stations but their geographical distribution is uneven and strongly biased in favour of the northern hemisphere

where most of the Earth's land masses are located. Oceans cover two thirds of the Earth's surface and away from the main shipping routes coverage is thin. For earlier centuries the record is much sparser. Deriving estimates of past temperatures on a global, hemispheric and regional scale from incomplete data sets is one of the problems faced by the Unit and in consequence an important current interest is the discovery of useable old temperature records from a variety of sources.

2. In the latter part of the 20th century CRU pioneered the methods for taking into account a wide range of local influences that can make instrumental records from different locations hard to compare. These methods were very labour intensive and were somewhat subjective. Much of this work was supported by the US Department of Energy and was published with the details of station corrections several times a year. Since the 1980s the Unit has done no more of this work and have concentrated on the merging and interpretation of data series corrected by others. There have been various analyses of similar publicly available data sets by different international groups. Although there are some differences in fine detail that reflect the differences in the analytical methods used, the results are very similar.

3. The Unit has devoted a great deal of effort to understanding how instrumental observations are best combined to derive the surface temperature on a variety of time and space scales. It has become apparent from a number of studies that there is elevation of the surface temperature in and around large cities and work is continuing to understand this fully.

4. Like the work on tree rings this work is strongly dependent on statistical analysis and our comments are essentially the same. Although there are certainly different ways of handling the data, some of which might be superior, as far as we can judge the methods which CRU has employed are fair and satisfactory. Particular attention was given to records that seemed anomalous and to establishing whether the anomaly was an artefact or the result of some natural process. There was also the challenge of dealing with gaps in otherwise high quality data series. In detailed discussion with the researchers we found them to be objective and dispassionate in their view of the data and their results, and there was no hint of tailoring results to a particular agenda. Their sole aim was to establish as robust a record of temperatures in recent centuries as possible. All of the published work was accompanied by detailed descriptions of uncertainties and accompanied by appropriate caveats. The same was true in face to face discussions.

5. We believe that CRU did a public service of great value by carrying out much time-consuming meticulous work on temperature records at a time when it was unfashionable and attracted the interest of a rather small section of the scientific community. CRU has been among the leaders in international efforts to determining the overall uncertainty in the derived temperature records and where work is best focussed to improve them.

6. The Unit has demonstrated that at a global and hemispheric scale temperature results are surprisingly insensitive to adjustments made to the data and the number of series included.

7. Recent public discussion of climate change and summaries and popularizations of the work of CRU and others often contain over-simplifications that omit serious discussion of uncertainties emphasized by the original authors. For example, CRU publications repeatedly emphasize the discrepancy between instrumental and tree-based proxy reconstructions of temperature during the late 20th century, but presentations of this work by the IPCC and others have sometimes neglected to highlight this issue. While we find this regrettable, we could find no such fault with the peer-reviewed papers we examined

Conclusions

1. We saw no evidence of any deliberate scientific malpractice in any of the work of the Climatic Research Unit and had it been there we believe that it is likely that we would have detected it. Rather we found a small group of dedicated if slightly disorganised researchers who were ill-prepared for being the focus of public attention. As with many small research groups their internal procedures were rather informal.

2. We cannot help remarking that it is very surprising that research in an area that depends so heavily on statistical methods has not been carried out in close collaboration with professional statisticians. Indeed there would be mutual benefit if there were closer collaboration and interaction between CRU and a much wider scientific group outside the relatively small international circle of temperature specialists.

3. It was not the immediate concern of the Panel, but we observed that there were important and unresolved questions that related to the availability of environmental data sets. It was pointed out that since UK government adopted a policy that resulted in charging for access to data sets collected by government agencies, other countries have followed suit impeding the flow of processed and raw data to and between researchers. This is unfortunate and seems inconsistent with policies of open access to data promoted elsewhere in government.

4. A host of important unresolved questions also arises from the application of Freedom of Information legislation in an academic context. We agree with the CRU view that the authority for releasing unpublished raw data to third parties should stay with those who collected it.

Submitted to the University 12 April 2010

Addendum to report, 19 April 2010

For the avoidance of misunderstanding in the light of various press stories, it is important to be clear that the neither the panel report nor the press briefing intended to imply that any research group in the field of climate change had been deliberately misleading in any of their analyses or intentionally exaggerated their findings. Rather, the aim was to draw attention to the complexity of statistics in this field, and the need to use the best possible methods.

APPENDIX A
PANEL MEMBERSHIP

Chair: Prof Ron Oxburgh FRS (Lord Oxburgh of Liverpool)

Prof Huw Davies, ETH Zürich
Prof Kerry Emanuel, Massachusetts Institute of Technology
Prof Lisa Graumlich, University of Arizona.
Prof David Hand FBA, Imperial College, London.
Prof Herbert Huppert FRS, University of Cambridge
Prof Michael Kelly FRS, University of Cambridge

APPENDIX B

Peer-reviewed publications for assessment.

1. Brohan, P., Kennedy, J., Harris, I., Tett, S.F.B. and Jones, P.D., 2006: Uncertainty estimates in regional and global observed temperature changes: a new dataset from 1850. *J. Geophys. Res.* **111**, D12106.

2. Briffa, K. R., F. H. Schweingruber, P. D. Jones, T. J. Osborn, S. G. Shiyatov, and E. A. Vaganov. 1998a. Reduced sensitivity of recent tree-growth to temperature at high northern latitudes. *Nature* **391**:678-682.

3. Briffa, K. R., F. H. Schweingruber, P. D. Jones, T. J. Osborn, I. C. Harris, S. G. Shiyatov, E. A. Vaganov, and H. Grudd, 1998b. Trees tell of past climates: but are they speaking less clearly today? *Philosophical Transactions of the Royal Society of London Series B – Biological Sciences* 353, 65-73.

4. Briffa, K. R. 2000. Annual climate variability in the Holocene: interpreting the message of ancient trees. *Quaternary Science Reviews* **19**, 87-105.

5. Briffa, K.R., Osborn, T.J., Schweingruber, F.H., Harris, I.C., Jones, P.D., Shiyatov, S.G. and Vaganov, E.A., 2001: Low-frequency temperature variations from a northern tree-ring density network. *J. Geophys. Res.* **106**, 2929-2941.

6. Briffa, K. R., V. V. Shishov, T. M. Melvin, E. A. Vaganov, H. Grudd, R. M. Hantemirov, M. Eronen, and M. M. Naurzbaev. 2008. Trends in recent temperature and radial tree growth spanning 2000 years across northwest Eurasia. *Philosophical Transactions of the Royal Society B-Biological Sciences* **363**, 2271-2284.

7. Jones, P.D. and Moberg, A., 2003: Hemispheric and large-scale surface air temperature variations: An extensive revision and an update to 2001. *J. Climate* **16**, 206-223.

8. Jones, P.D., Raper, S.C.B., Bradley, R.S., Diaz, H.F., Kelly, P.M. and Wigley, T.M.L., 1986a: Northern Hemisphere surface air temperature variations: 1851-1984. *Journal of Climate and Applied Meteorology* **25**, 161-179.

9. Jones, P.D., Raper, S.C.B. and Wigley, T.M.L., 1986b: Southern Hemisphere surface air temperature variations: 1851-1984. *Journal of Climate and Applied Meteorology* **25**, 1213-1230.

10. Jones, P.D., Groisman, P.Ya., Coughlan, M., Plummer, N., Wang, W-C. and Karl, T.R., 1990: Assessment of urbanization effects in time series of surface air temperature over land. Nature 347, 169-172.

11. Jones, P.D., Lister, D.H. and Li, Q., 2008: Urbanization effects in large-scale temperature records, with an emphasis on China. Journal of Geophysical Research, 113, D16122.

Supporting documentation

Briffa and Melvin (2009) which is online at http://www.cru.uea.ac.uk/cru/people/briffa/yamal2009/

TR017 – Bradley, R.S., Kelly, P.M., Jones, P.D., Goodess, C.M. and Diaz, H.F., 1985: A Climatic Data Bank for Northern Hemisphere Land Areas, 1851-1980, U.S. Dept. of Energy, Carbon Dioxide Research Division, *Technical Report TRO17*, 335 pp.

TR022 – Jones, P.D., Raper, S.C.B., Santer, B.D., Cherry, B.S.G., Goodess, C.M., Kelly, P.M., Wigley, T.M.L., Bradley, R.S. and Diaz, H.F., 1985: A Grid Point Surface Air Temperature Data Set for the Northern Hemisphere, U.S. Dept. of Energy, Carbon Dioxide Research Division, *Technical Report TRO22*, 251 pp.

TR027 – Jones, P.D., Raper, S.C.B., Cherry, B.S.G., Goodess, C.M. and Wigley, T.M.L., 1986: A Grid Point Surface Air Temperature Data Set for the Southern Hemisphere, 1851-1984, U.S. Dept. of Energy, Carbon Dioxide Research Division, *Technical Report TR027*, 73 pp.

nature

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Climatologists under pressure

Stolen e-mails have revealed no scientific conspiracy, but do highlight ways in which climate researchers could be better supported in the face of public scrutiny.

The e-mail archives stolen last month from the Climatic Research Unit at the University of East Anglia (UEA), UK, have been greeted by the climate-change-denialist fringe as a propaganda windfall (see page 551). To these denialists, the scientists' scathing remarks about certain controversial palaeoclimate reconstructions qualify as the proverbial 'smoking gun': proof that mainstream climate researchers have systematically conspired to suppress evidence contradicting their doctrine that humans are warming the globe.

This paranoid interpretation would be laughable were it not for the fact that obstructionist politicians in the US Senate will probably use it next year as an excuse to stiffen their opposition to the country's much needed climate bill. Nothing in the e-mails undermines the scientific case that global warming is real — or that human activities are almost certainly the cause. That case is supported by multiple, robust lines of evidence, including several that are completely independent of the climate reconstructions debated in the e-mails.

First, Earth's cryosphere is changing as one would expect in a warming climate. These changes include glacier retreat, thinning and areal reduction of Arctic sea ice, reductions in permafrost and accelerated loss of mass from the Greenland and Antarctic ice sheets. Second, the global sea level is rising. The rise is caused in part by water pouring in from melting glaciers and ice sheets, but also by thermal expansion as the oceans warm. Third, decades of biological data on blooming dates and the like suggest that spring is arriving earlier each year.

Denialists often maintain that these changes are just a symptom of natural climate variability. But when climate modellers test this assertion by running their simulations with greenhouse gases such as carbon dioxide held fixed, the results bear little resemblance to the observed warming. The strong implication is that increased greenhouse-gas emissions have played an important part in recent warming, meaning that curbing the world's voracious appetite for carbon is essential (see pages 568 and 570).

Mail trail

A fair reading of the e-mails reveals nothing to support the denialists' conspiracy theories. In one of the more controversial exchanges, UEA scientists sharply criticized the quality of two papers that question the uniqueness of recent global warming (S. McIntyre and R. McKitrick *Energy Environ.* **14**, 751–771; 2003 and W. Soon and S. Baliunas *Clim. Res.* **23**, 89–110; 2003) and vowed to keep at least the first paper out of the upcoming Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Whatever the e-mail authors may have said to one another in (supposed) privacy, however, what matters is how they acted. And the fact is that, in the end, neither they nor the IPCC suppressed anything: when the assessment report was published in 2007 it referenced and discussed both papers.

If there are benefits to the e-mail theft, one is to highlight yet again the harassment that denialists inflict on some climate-change researchers, often in the form of endless, time-consuming demands for information under the US and UK Freedom of Information Acts. Governments and institutions need to provide tangible assistance for researchers facing such a burden.

The e-mail theft also highlights how difficult it can be for climate researchers to follow the canons of scientific openness, which require them to make public the data on which they base their conclusions. This is best done via open online archives, such as the ones maintained by the IPCC (www.ipcc-data.org) and the US National Climatic Data Center (www.ncdc.noaa.gov/oa/ncdc.html).

Tricky business

But for much crucial information the reality is very different. Researchers are barred from publicly releasing meteorological data from many countries owing to contractual restrictions. Moreover, in countries such as Germany, France and the United Kingdom, the national meteorological services will provide data sets only when researchers specifically request them, and only after a significant delay. The lack of standard formats can also make it hard to compare and integrate data from different sources. Every aspect of this situation needs to change: if the current episode does not spur meteorological services to improve researchers' ease of access, governments should force them to do so.

The stolen e-mails have prompted queries about whether *Nature* will investigate some of the researchers' own papers. One e-mail talked of displaying the data using a 'trick' — slang for a clever (and legitimate) technique, but a word that denialists have used to accuse the researchers of fabricating their results. It is *Nature*'s policy to investigate such matters if there are substantive reasons for concern, but nothing we have seen so far in the e-mails qualifies.

> "The theft highlights the harassment that denialists inflict on some climate-change researchers."

The UEA responded too slowly to the eruption of coverage in the media, but deserves credit for now being publicly supportive of the integrity of its scientists while also holding an independent investigation of its researchers' compliance with Britain's freedom of information requirements (see http://go.nature.com/zRBXRP).

In the end, what the UEA e-mails really show is that scientists are human beings — and that unrelenting opposition to their work can goad them to the limits of tolerance, and tempt them to act in ways that undermine scientific values. Yet it is precisely in such circumstances that researchers should strive to act and communicate professionally, and make their data and methods available to others, lest they provide their worst critics with ammunition. After all, the pressures the UEA e-mailers experienced may be nothing compared with what will emerge as the United States debates a climate bill next year, and denialists use every means at their disposal to undermine trust in scientists and science.

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RA-10 Inquiry Report: Concerning the Allegations of Research Misconduct Against Dr. Michael E. Mann, Department of Meteorology, College of Earth and Mineral Sciences, The Pennsylvania State University

February 3, 2010

RA-10 Inquiry Committee for the Case of Dr. Michael E. Mann:

Henry C. Foley, Ph.D.
Vice President for Research and Dean of the Graduate School

Alan W. Scaroni, Ph.D.
Associate Dean for Graduate Education and Research,
College of Earth and Mineral Sciences

Ms. Candice A. Yekel, M.S., CIM,
Director, Office for Research Protections
Research Integrity Officer

Beginning on and about November 22, 2009, The Pennsylvania State University began to receive numerous communications (emails, phone calls and letters) accusing Dr. Michael E. Mann of having engaged in acts that included manipulating data, destroying records and colluding to hamper the progress of scientific discourse around the issue of anthropogenic global warming from approximately 1998. These accusations were based on perceptions of the content of the widely reported theft of emails from a server at the Climatic Research Unit of the University of East Anglia in Great Britain.

Given the sheer volume of the communications to Penn State, the similarity of their content and their sources, which included University alumni, federal and state politicians, and others, many of whom had had no relationship with Penn State, it was concluded that the matter required examination by the cognizant University official, namely Dr. Eva J. Pell, then Senior Vice President for Research and Dean of the Graduate School. The reason for having Dr. Pell examine the matter was that the accusations, when placed in an academic context, could be construed as allegations of *research misconduct*, which would constitute a violation of Penn State policy.

Under The Pennsylvania State University's policy, Research Administration Policy No. 10, (hereafter referred to as RA-10), *Research Misconduct* is defined as:

> (1) fabrication, falsification, plagiarism or other practices that seriously deviate from accepted practices within the academic community for proposing, conducting, or reporting research or other scholarly activities;
>
> (2) callous disregard for requirements that ensure the protection of researchers, human participants, or the public; or for ensuring the welfare of laboratory animals;

(3) failure to disclose significant financial and business interest as defined by Penn State Policy RA20, *Individual Conflict of Interest*;

(4) failure to comply with other applicable legal requirements governing research or other scholarly activities.

RA-10 further provides that "research misconduct does not include disputes regarding honest error or honest differences in interpretations or judgments of data, and is not intended to resolve bona fide scientific disagreement or debate."

On November 24, 2009, Dr. Pell decided that the matter should be examined by the process articulated in RA-10. Dr. Pell then took the first steps in implementing the RA-10 review by initiating a meeting with the Dean of the College of Earth and Mineral Sciences (Dr. William Easterling), the Associate Dean for Graduate Education and Research from the College of Earth and Mineral Sciences (Dr. Alan Scaroni), the Director of the Office for Research Protections, (Ms. Candice Yekel) and the Head of the Department of Meteorology (Dr. William Brune). At this meeting, all were informed of the situation and of the decision to respond to the matter with an inquiry under RA-10. Dr. Pell then discussed the responsibilities that each individual would be expected to have according to policy. At this time, Dean Easterling recused himself from the inquiry for personal reasons. As the next administrator in the line of management for the college, Dr. Alan Scaroni was asked to take on Dean Easterling's function in the ensuing inquiry.

Therefore, the committee assigned to conduct the inquiry into the matter consisted of Dr. Pell in her role as Senior Vice President for Research, Ms. Candice Yekel in her role as the Director of the Office for Research Protections and Dr. Scaroni in his role as the Associate Dean for Graduate Education and Research from the College of Earth and Mineral Sciences. Dr. William Brune, in his role as the Head of the Department of Meteorology, was to serve in a consulting capacity for the committee. Dr. Henry C. Foley, then Dean of the College of Information Sciences and Technology, was added to the inquiry committee in an ex-officio role for the duration of 2009, since he had been named to succeed Dr. Pell as the next Vice President for Research, beginning January 1, 2010.

At the time of initiation of the inquiry, and in the ensuing days during the inquiry, no formal allegations accusing Dr. Mann of research misconduct were submitted to any University official. As a result, the emails and other communications were reviewed by Dr. Pell and from these she synthesized the following four formal allegations. To be clear, these were not allegations that Dr. Pell put forth, or leveled against Dr. Mann, but rather were her best effort to reduce to allegation form the many different accusations that were received from parties outside of the University. The four synthesized allegations were as follows:

1. Did you engage in, or participate in, directly or indirectly, any actions with the intent to suppress or falsify data?

2. Did you engage in, or participate in, directly or indirectly, any actions with the intent to delete, conceal or otherwise destroy emails, information and/or data, related to AR4, as suggested by Phil Jones?

3. Did you engage in, or participate in, directly or indirectly, any misuse of privileged or confidential information available to you in your capacity as an academic scholar?

4. Did you engage in, or participate in, directly or indirectly, any actions that seriously deviated from accepted practices within the academic community for proposing, conducting, or reporting research or other scholarly activities?

On November 29, 2009, Dr. Pell and Dr. Foley met with Dr. Mann to let him know personally that he was accused of research misconduct and that an inquiry under RA-10 would take place. On November 30, 2010, a letter was delivered by Dr. Pell to Dr. Mann to notify him formally of these allegations and Dr. Pell's decision to conduct an inquiry under RA-10.

From November 30 to December 14, 2009, staff in the Office for Research Protections culled through approximately 1075 of the emails that were purloined from a server at the University of East Anglia. Emails were reviewed if they were sent by Dr. Mann, were sent to Dr. Mann, were copied to Dr. Mann, or discussed Dr. Mann (but were neither addressed nor copied to him). In summary, the following were found:

- 206 emails that contained a message/text from Dr. Mann somewhere in the chain;
- 92 emails that were received by Dr. Mann, but in which he did not write/participate in the discussion; and
- 79 that dealt with Dr. Mann, his work or publications; he neither authored nor was he copied on any of these.

From among these 377 emails, the inquiry committee focused on 47 emails that were deemed relevant. On December 17, 2009, the inquiry committee (Pell, Scaroni, Yekel), Dr. Brune and Dr. Foley met to review the emails, discuss the RA-10 inquiry process and go over what their respective activities would be. It was agreed that these individuals would meet again in early January and that they would use the time until that meeting to review the relevant information, including the above mentioned e-mails, journal articles, OP-ED columns, newspaper and magazine articles, the National Academy of Sciences report entitled "Surface Temperature Reconstructions for the Last 2,000 Years," ISBN: 0-309-66144-7 and various blogs on the internet.

On January 4, 2010, Dr. Foley, in his capacity as the new Vice President for Research and Dean of the Graduate School, became the convener of the inquiry committee as Dr. Pell had left the University to become the Under-Secretary of Science for the Smithsonian Institution. On January 8, 2010, Dr. Foley convened the inquiry committee to discuss their present thinking on the evidence presented in the emails and other publically available materials. At this meeting, it was decided that each committee member would send Dr. Foley specific questions that would be added to the four formal allegations and that would be used by the committee during the interview of Dr. Mann. These were compiled into one document. It was also decided that during

the upcoming interview of Dr. Mann, Dr. Foley would ask each of the initial questions with follow up questions coming from the other committee members, and he would moderate the interview.

On January 12, 2010, the inquiry committee (Foley, Yekel, Scaroni) and Dr. Brune met with Dr. Mann to interview him. Dr. Mann was asked to address the four allegations leveled against him and to provide answers to the fifteen additional questions that the committee had compiled. In an interview lasting nearly two hours, Dr. Mann addressed each of the questions and follow up questions. A recording was made of the meeting, and this recording was transcribed. The committee members asked occasional follow-up questions. Throughout the interview, Dr. Mann answered each question carefully:

- He explained the content and meaning of the emails about which we inquired;
- He explained that he had never falsified any data, nor had he had ever manipulated data to serve a given predetermined outcome;
- He explained that he never used inappropriate influence in reviewing papers by other scientists who disagreed with the conclusions of his science;
- He explained that he never deleted emails at the behest of any other scientist, specifically including Dr. Phil Jones, and that he never withheld data with the intention of obstructing science; and
- He explained that he never engaged in activities or behaviors that were inconsistent with accepted academic practices.

On January 15, 2010, and on behalf of the inquiry committee, Dr. Foley conveyed via email an additional request of Dr. Mann, who was asked to produce all emails related to the fourth IPCC report ("AR4"), the same emails that Dr. Phil Jones had suggested that he delete.

On January 18, 2010, Dr. Mann provided a zip-archive of these emails and an explanation of their content. In addition, Dr. Mann provided a ten page supplemental written response to the matters discussed during his interview.

On January 22, 2010, the inquiry committee and Dr. Brune met again to review the evidence, including but not limited to Dr. Mann's answers to the committee's questions, both in the interview and in his subsequent submissions. All were impressed by Dr. Mann's composure and his forthright responses to all of the queries that were asked of him. At this point, Dr. Foley reviewed the relevant points of his conversation with Dr. Gerald North, a professor at Texas A&M University and the first author of the NAS' 2006 report on Dr. Mann's research on paleoclimatology. Dr. Foley also relayed the sentiment and view of Dr. Donald Kennedy of Stanford University and the former editor of Science Magazine about the controversy currently swirling around Dr. Mann and some of his colleagues. Both were very supportive of Dr. Mann and of the credibility of his science. Once Dr. Brune had given his opinions and suggestions for next steps of the process, he was dismissed from further discussion as his role per policy RA-10 was that of providing consultation to the rest of the members; his role was not that of making a decision at the inquiry phase.

On January 26, 2010, Dr. Foley convened the inquiry committee along with University counsel, Mr. Wendell Courtney, Esq. in case issues of procedure arose.
After a careful review of all written material, and information obtained from the purloined emails, the interview of Dr. Mann, the supplemental materials provided by Dr. Mann and all the information from other sources, the committee found as follows with respect to each allegation:

Allegation 1: Did you engage in, or participate in, directly or indirectly, any actions with the intent to suppress or falsify data?

Finding 1. After careful consideration of all the evidence and relevant materials, the inquiry committee finding is that there exists no credible evidence that Dr. Mann had or has ever engaged in, or participated in, directly or indirectly, any actions with an intent to suppress or to falsify data. While a perception has been created in the weeks after the CRU emails were made public that Dr. Mann has engaged in the suppression or falsification of data, there is no credible evidence that he ever did so, and certainly not while at Penn State. In fact to the contrary, in instances that have been focused upon by some as indicating falsification of data, for example in the use of a "trick" to manipulate the data, this is explained as a discussion among Dr. Jones and others including Dr. Mann about how best to put together a graph for a World Meteorological Organization (WMO) report. They were not falsifying data; they were trying to construct an understandable graph for those who were not experts in the field. The so-called "trick"[1] was nothing more than a statistical method used to bring two or more different kinds of data sets together in a legitimate fashion by a technique that has been reviewed by a broad array of peers in the field.

Decision 1. As there is no substance to this allegation, there is no basis for further examination of this allegation in the context of an investigation in the second phase of RA-10.

Allegation 2: Did you engage in, or participate in, directly or indirectly, any actions with the intent to delete, conceal or otherwise destroy emails, information and/or data, related to AR4, as suggested by Phil Jones?

Finding 2. After careful consideration of all the evidence and relevant materials, the inquiry committee finding is that there exists no credible evidence that Dr. Mann had ever engaged in, or participated in, directly or indirectly, any actions with intent to delete, conceal or otherwise destroy emails, information and/or data related to AR4, as suggested by Dr. Phil Jones. Dr. Mann has stated that he did not delete emails in response to Dr. Jones' request. Further, Dr. Mann produced upon request a full archive of his emails in and around the time of the preparation of AR4. The archive contained e-mails related to AR4.

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[1] The word trick as used in this email has stirred some suspicion. However, *trick* is often used in context to describe a mathematical insight that solves the problem. For example, see in a classic text on quantum mechanics by David Parks: "The foregoing explanation of the velocity paradox involves no new assumptions; the basic *trick*, the representation of a modulated wave as the superposition of two (or more) unmodulated ones, has already been used to explain interference phenomena..." pg. 21, **Introduction to Quantum Theory**, David Parks, Third Edition, Dover 1992.

Decision 2. As there is no substance to this allegation, there is no basis for further examination of this allegation in the context of an investigation in the second phase of RA-10.

Allegation 3: Did you engage in, or participate in, directly or indirectly, any misuse of privileged or confidential information available to you in your capacity as an academic scholar?

Finding 3. After careful consideration of all the evidence and relevant materials, the inquiry committee finding is that there exists no credible evidence that Dr. Mann had ever engaged in, or participated in, directly or indirectly, any misuse of privileged or confidential information available to him in his capacity as an academic scholar. In media reports and blogs about Dr. Mann and other paleoclimatologists, those who are named in the CRU email files are purported to have been engaged in conspiratorial discussions indicative of a misuse of privileged or confidential information. Although it is not clear where the exact accusation lies in this with respect to Dr. Mann, it is inferred that the emails prove the case. Those who have formed this view-feel that, in their capacity as reviewers, Dr. Mann and his colleagues had early access to manuscripts from other authors with whom they disagreed, and that they could somehow act on those to reject them for publication. Actually, when one does due diligence on this matter, and asks about what papers were involved, one finds that enormous confusion has been caused by interpretations of the emails and their content. In some cases, the discussion and related debate centered on papers that were about to emerge which members of the purported conspiracy had written, but which were simply under embargo. In other cases, the discussion and related debate centered on papers that have emerged in otherwise notable scientific journals, which they deemed to have been published with a lower standard of scholarly and scientific scrutiny. The committee found no research misconduct in this. Science often involves different groups who have very different points of view, arguing for the intellectual dominance of their viewpoint, so that that viewpoint becomes the canonical one. We point to Kuhn[2] as an authority on how science is done, before it is accepted as "settled."

Decision 3. As there is no substance to this allegation, there is no basis for further examination of this allegation in the context of an investigation in the second phase of RA-10.

Allegation 4. Did you engage in, or participate in, directly or indirectly, any actions that seriously deviated from accepted practices within the academic community for proposing, conducting, or reporting research or other scholarly activities?

Finding 4. After careful consideration of all the evidence and relevant materials, the inquiry committee could not make a definitive finding whether there exists any evidence to substantiate that Dr. Mann did engage in, or participate in, directly or indirectly, any actions that deviated from accepted practices within the academic community for

[2] Thomas Kuhn, **The Structure of Scientific Revolutions**, The University of Chicago Press, Chicago, 1962.

proposing, conducting, or reporting research or other scholarly activities. It is the case that there has been a public outcry from some quarters that Dr. Mann and his colleagues did deviate from what some observers claim to be standard academic practice. All disciplines and scientific fields work within broad bounds of "accepted scientific" practice that apply to all researchers. However, within different disciplines of science there are additional elements of accepted practice that may be specific to those disciplines and therefore are different from those of other disciplines and fields. For example, accepted practices in a field of pure mathematics, such as number theory, may differ markedly from those in a field such as socio-biology. This is axiomatic. That said, the committee could not make a definitive finding on this allegation for reasons that follow.

Policy RA-10 speaks not just of research ***misconduct*** but also of research ***conduct*** and is explicit regarding the responsibility that we have as scientists to maintain the public trust. The preamble is as follows:

"Public trust in the integrity and ethical behavior of scholars is essential if research and other scholarly activities are to play their proper role in the University and in society. The maintenance of high ethical standards is a central and critical responsibility of faculty and administrators of academic institutions. Policy AD-47 sets forth statements of general standards of professional ethics within the academic community."

Furthermore, the preamble speaks to the high ethical expectations that Penn State has for its faculty and administrators. These expectations are embodied in another document, Policy AD-47 General Standards of Professional Ethics. The purpose of AD-47 is stated as follows:

"To set forth statements of general standards of professional ethics to serve as a reminder of the variety of obligations assumed by all members of the academic community."

The full document is publically available (see http://guru.psu.edu/policies/ad47.html). Here we will simply excerpt those parts of AD-47 that are most relevant to our finding and from which our decision on the allegation flowed.

I. Professors, guided by a deep conviction of the worth and dignity of the advancement of knowledge, recognize the special responsibilities placed upon them. Their primary responsibility to their respective subjects is to seek and to state the truth as they see it. To this end, they devote their energies to developing and improving their scholarly competence. They accept the obligation to exercise critical self-discipline and judgment in using, extending, and transmitting knowledge. They practice intellectual honesty. Although they may follow subsidiary interests, these interests must never seriously hamper or compromise their freedom of inquiry.

III. As researchers/scholars, professors recognize that their goal is to discover, develop, and communicate new understanding. This goal is rarely achieved without making use of knowledge gained from others. Researchers must always

exercise gracious and appropriate recognition of published work in the literature, conversations with colleagues, and the efforts of students who work under the researchers' guidance. They must be scrupulous in presentation of their own data; it must be verifiable as a result of the highest standards in data gathering techniques. They must be extremely careful in the use of data reported by others, especially if used in the formation of broad comparative or contradictory hypotheses, since they may not know of any compromising circumstances in such data gathering. They must be comprehensive in consideration of work with human subjects; they must have thoroughly researched all procedures, must have informed individuals involved of all aspects of their cooperation, and must report all responses accurately, both positive and negative results. As open-minded researchers, when evaluating the work of others, they must recognize the responsibility to allow publication of theories or experiments that may contradict their own findings, as only by free inquiry and dissemination of all facts will the fruits of the labor of the whole community be allowed to mature.

IV. As colleagues, professors have obligations that derive from common membership in the community of scholars. They respect and defend the free inquiry of their associates. In the exchange of criticism and ideas they show due respect for the opinions of others. They acknowledge their academic debts and strive to be objective in their professional judgment of colleagues. They accept their share of faculty responsibilities for the governance of their institution.

VI. As members of the community, professors have the rights and obligations of all citizens. They measure the urgency of these obligations in the light of their responsibilities to their respective subjects, to their students, to their profession, and to their institution. When they speak or act as private persons they avoid creating the impression that they speak or act for their respective colleges or the University. As citizens engaged in a profession that depends upon freedom for its health and integrity, professors have a particular obligation to promote conditions of free inquiry and to further public understanding of academic freedom.

It is clear to those who have followed the media and blogs over the last two months that there are two distinct and deeply polarized points of view that have emerged on this matter. One side views the emails as evidence of a clear cut violation of the public trust and seeks severe penalties for Dr. Mann and his colleagues. The other side sees these as nothing more than the private discussions of scientists engaged in a hotly debated topic of enormous social impact.

We are aware that some may seek to use the debate over Dr. Mann's research conduct and that of his colleagues as a proxy for the larger and more substantive debate over the science of anthropogenic global warming and its societal (political and economic) ramifications. We have kept the two debates separate by only considering Dr. Mann's conduct.

The allegation inquires about whether Dr. Mann seriously deviated from accepted practices within the academic community for proposing, conducting, or reporting research or other scholarly activities. In 2006, similar questions were asked about Dr. Mann and these questions motivated the National Academy of Sciences to undertake an in depth investigation of his research. The committee that wrote the report on surface temperature reconstructions found that Dr. Mann's science did fall well within the bounds of accepted practice. What has changed since that time is that private emails have come to our attention and that of the public at large, and these give us a glimpse into the behind the scenes workings of Dr. Mann and many of his colleagues in the conduct of their science.

Decision 4. Given that information emerged in the form of the emails purloined from CRU in November 2009, which have raised questions in the public's mind about Dr. Mann's conduct of his research activity, given that this may be undermining confidence in his findings as a scientist, and given that it may be undermining public trust in science in general and climate science specifically, the inquiry committee believes an investigatory committee of faculty peers from diverse fields should be constituted under RA-10 to further consider this allegation.

In sum, the overriding sentiment of this committee, which is composed of University administrators, is that allegation #4 revolves around the question of accepted faculty conduct surrounding scientific discourse and thus merits a review by a committee of faculty scientists. Only with such a review will the academic community and other interested parties likely feel that Penn State has discharged it responsibility on this matter.

An investigatory committee of faculty members with impeccable credentials will consider this matter and present its findings and recommendations to Dr. Henry C. Foley within 120 days of being charged. The committee will consist of the following five faculty members:

1. Dr. Mary Jane Irwin, Evan Pugh Professor, Department of Computer Science and Electrical Engineering;
2. Dr. Alan Walker, Evan Pugh Professor, Department of Anthropology and Department of Biology;
3. Dr. A. Welford Castleman, Evan Pugh Professor, Department of Chemistry and Department of Physic;
4. Dr. Nina G. Jablonski, Head, Department of Anthropology; and
5. Dr. Sarah M. Assmann, Waller Professor, Department of Biology.

Ms. Candice Yekel, as Director of the Office for Research Protections and as the University's Research Integrity Officer, will provide administrative support and assistance to the committee.

The investigatory committee's charge will be to consider what are the bounds of accepted practice in this instance and whether or not Dr. Mann did indeed engage in, or participate in, directly or indirectly, any actions that seriously deviated from accepted practices within the

academic community for proposing, conducting, or reporting research or other scholarly activities.

In accordance with policy RA-10, Dr. Mann will receive a printed copy of this inquiry report, and he will be welcome to provide written comment on this report for the record if he wishes.

NOTE: Dr. Michael E. Mann has consented to the public release of this report.

Henry C. Foley 02/03/2010

Henry C. Foley, Ph.D.
Vice President for Research and Dean of the Graduate School

Alan W. Scaroni 02/03/2010

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Ms. Candice A. Yekel, M.S., CIM,
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Research Integrity Officer

House of Commons

Science and Technology Committee

The disclosure of climate data from the Climatic Research Unit at the University of East Anglia

Eighth Report of Session 2009–10

Report, together with formal minutes

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The Science and Technology Committee

The Science and Technology Committee is appointed by the House of Commons to examine the expenditure, administration and policy of the Government Office for Science. Under arrangements agreed by the House on 25 June 2009 the Science and Technology Committee was established on 1 October 2009 with the same membership and Chairman as the former Innovation, Universities, Science and Skills Committee and its proceedings were deemed to have been in respect of the Science and Technology Committee.

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Committee staff

The current staff of the Committee are: Glenn McKee (Clerk); Richard Ward (Second Clerk); Dr Christopher Tyler (Committee Specialist); Xameerah Malik (Committee Specialist); Andy Boyd (Senior Committee Assistant); Camilla Brace (Committee Assistant); Dilys Tonge (Committee Assistant); Melanie Lee (Committee Assistant); Jim Hudson (Committee Support Assistant); and Becky Jones (Media Officer).

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Summary

The disclosure of climate data from the Climatic Research Unit (CRU) at the University of East Anglia (UEA) in November 2009 had the potential to damage the reputation of the climate science and the scientists involved.

We believe that the focus on CRU and Professor Phil Jones, Director of CRU, in particular, has largely been misplaced. Whilst we are concerned that the disclosed e-mails suggest a blunt refusal to share scientific data and methodologies with others, we can sympathise with Professor Jones, who must have found it frustrating to handle requests for data that he knew—or perceived—were motivated by a desire simply to undermine his work.

In the context of the sharing of data and methodologies, we consider that Professor Jones's actions were in line with common practice in the climate science community. It is not standard practice in climate science to publish the raw data and the computer code in academic papers. However, climate science is a matter of great importance and the quality of the science should be irreproachable. We therefore consider that climate scientists should take steps to make available all the data that support their work (including raw data) and full methodological workings (including the computer codes). Had both been available, many of the problems at UEA could have been avoided.

We are content that the phrases such as "trick" or "hiding the decline" were colloquial terms used in private e-mails and the balance of evidence is that they were not part of a systematic attempt to mislead. Likewise the evidence that we have seen does not suggest that Professor Jones was trying to subvert the peer review process. Academics should not be criticised for making informal comments on academic papers.

In the context of Freedom of Information (FOIA), much of the responsibility should lie with UEA. The disclosed e-mails appear to show a culture of non-disclosure at CRU and instances where information may have been deleted, to avoid disclosure. We found *prima facie* evidence to suggest that the UEA found ways to support the culture at CRU of resisting disclosure of information to climate change sceptics. The failure of UEA to grasp fully the potential damage to CRU and UEA by the non-disclosure of FOIA requests was regrettable. UEA needs to review its policy towards FOIA and re-assess how it can support academics whose expertise in this area is limited.

The Deputy Information Commissioner has given a clear indication that a breach of the Freedom of Information Act 2000 may have occurred but that a prosecution was time-barred; however no investigation has been carried out. In our view it is unsatisfactory to leave the matter unresolved. We conclude that the matter needs to be resolved conclusively—either by the Independent Climate Change Email Review or by the Information Commissioner.

We accept the independence of the Climate Change E-mail Review and recommend that the Review be open and transparent, taking oral evidence and conducting interviews in public wherever possible.

On 22 March UEA announced the Scientific Appraisal Panel to be chaired by Lord

Oxburgh. This Panel should determine whether the work of CRU has been soundly built and it would be premature for us to pre-judge its work.

1 Introduction

1. On Friday 20 November 2009 it was reported across the world that hackers had targeted a "leading climate research unit"[1] and that e-mails from the University of East Anglia's (UEA) Climatic Research Unit (CRU), one of the world's foremost centres of climate science, had been published in the internet.[2] The story of the substantial file of private e-mails, documents and data that had been leaked helped ignite the global warming debate in the run up to the Copenhagen climate change conference in December 2009. As reported by the press, exchanges on the internet alleged that data had been manipulated or deleted, in order to support evidence on global warming.

The Climatic Research Unit at UEA

2. UEA was founded in 1963 and in 1972 UEA established CRU.[3] CRU's website describes the Unit as being "widely recognised as one of the world's leading institutions concerned with the study of natural and anthropogenic [human caused] climate change".[4] CRU has a staff of around thirty research scientists and students.[5] But as we heard in oral evidence, it is in fact "a very small Unit [with only] three full-time members of academic staff".[6]

3. CRU has developed a number of the datasets widely used in climate research, including the global temperature record used to monitor the state of the climate system, as well as statistical software packages and climate models. In its written submission to the inquiry UEA outlined CRU's "pioneering role" in the science of understanding the world's changing climate. CRU's contributions included the compilation of a global land temperature record and the development of increasingly sophisticated methods by which to represent the average temperature of the globe and changes in that average over time.[7] Professor Edward Acton, the Vice-Chancellor of UEA, indicated that he was "immensely proud of what they have done; [as] without them humanity would be vastly less able to understand climate change."[8]

The disclosure of climate data

4. In mid November 2009 it appeared that a server used by CRU had been accessed with 160 MB of data containing more than 1,000 e-mails and 3,000 other documents being

1 "Hackers target leading climate research unit", *BBC News website*, 20 November 2009 news.bbc.co.uk/1/hi/sci/tech/8370282.stm

2 For example: "Hacked E-Mail Is New Fodder for Climate Dispute", *New York Times website*, 21 November 2009 www.nytimes.com/2009/11/21/science/earth/21climate.html?_r=4 and "Hackers leak emails, stoking climate debate", *Sydney Morning Herald website*, 23 November 2009, www.smh.com.au/technology/technology-news/hackers-leak-emails-stoking-climate-debate-20091123-iu6u.html

3 Ev 17, paras 1.2 and 1.5

4 "About the Climatic Research Unit", CRU website, www.cru.uea.ac.uk/cru/about/

5 *As above*

6 Q 92

7 Ev 17, paras 1.5-1.6

8 Q 152

copied.[9] A UEA spokeswoman confirmed that the information was not available on a server that could be easily accessed and could not have been inadvertently released.[10] It is not known exactly when the breach occurred; the RealClimate website, "a commentary site on climate science by working climate scientists for the interested public and journalists",[11] indicated that UEA had been notified of the possible security breach on 17 November.[12] The following was posted anonymously on the climate-sceptic blog, *The Air Vent*:

> November 17, 2009 at 9:57 pm
>
> We feel that climate science is, in the current situation, too important to be kept under wraps.
>
> We hereby release a random selection of correspondence, code, and documents. Hopefully it will give some insight into the science and the people behind it.[13]

From here the debate was "blown wide open".[14] *The Guardian* ran the story on 20 November with the headline: "Climate sceptics claim leaked e-mails are evidence of collusion among scientists".[15]

5. UEA issued a statement on 20 November: "This information has been obtained and published without our permission and we took immediate action to remove the server in question from operation. We are undertaking a thorough internal investigation and we have involved the police in this inquiry."[16] The e-mails contained technical and routine aspects of climate research, including data analysis and details of scientific conferences. The controversy has focused on a small number of e-mails, particularly those sent to, or written by, climatologist Professor Phil Jones, the Director of CRU.

The aftermath

6. Condemnation of alleged malpractices found within the leaked CRU e-mails was quickly disseminated on the internet. Contributors to climate change debate websites and written submissions to us claimed that these e-mails showed a deliberate and systematic attempt by leading climate scientists to manipulate climate data, arbitrarily adjusting and "cherry-picking" data that supported their global warming claims and deleting adverse data that questioned their theories.[17] It was alleged that UEA may not have complied with the requirements of the Freedom of Information Act 2000, that inappropriate statistical methods and defective computer programmes may have been used to analyse data and that

9 RealClimate website archive, November 2009, www.realclimate.org/index.php/archives/2009/11/the-cru-hack

10 "Scotland Yard call in to probe climate data leak from UEA in Norwich", *Norwich Evening News*, 1 December 2009

11 RealClimate website 'about' page, www.realclimate.org

12 RealClimate website archive, November 2009, www.realclimate.org/index.php/archives/2009/11/the-cru-hack; the data may have been downloaded on to the RealClimate—see paragraph 12.

13 The Air Vent website, November 2009 archive, noconsensus.wordpress.com/2009/11/page/3/

14 *As above*

15 "Climate sceptics claim leaked emails are evidence of collusion among scientists", *The Guardian*, 20 November 2009

16 "Sceptics publish climate e-mails 'stolen from East Anglia University'", *The Times*, 21 November 2009

17 For examples see Ev 85 [Roger Helmer MEP], Ev 92 [Godfrey Bloom MEP], and Ev 144 [Stephen McIntyre]

CRU may have attempted to abuse the process of peer review to prevent the publication of research papers with conflicting opinions about climate change.[18]

7. In a statement released on 24 November, Professor Trevor Davies, UEA pro-Vice-Chancellor with responsibility for research, rejected calls for Professor Jones's resignation: "We see no reason for Professor Jones to resign and, indeed, we would not accept his resignation. He is a valued and important scientist."[19] He also contested several of the claims of malpractice: "It is well known within the scientific community and particularly those who are sceptical of climate change that over 95% of the raw station data has been accessible through the Global Historical Climatology Network for several years. We are quite clearly not hiding information which seems to be the speculation on some blogs and by some media commentators". He added:

> There is nothing in the stolen material which indicates that peer-reviewed publications by CRU, and others, on the nature of global warming and related climate change are not of the highest-quality of scientific investigation and interpretation. CRU's peer-reviewed publications are consistent with, and have contributed to, the overwhelming scientific consensus that the climate is being strongly influenced by human activity.[20]

8. On 1 December, Professor Jones announced that he would step aside from the Director's role during the course of the independent review.[21]

The independent inquiries set up by UEA

9. On 3 December UEA announced that an independent review—the Independent Climate Change Email Review—into the allegations made against CRU would be carried out by Sir Muir Russell.[22] Professor Acton explained in a letter to us why Sir Muir was chosen to head the review:

> Sir Muir is extremely experienced in public life, has an understanding of the conduct of universities and research, and is entirely independent of any association with this University and with the climate change debate.[23]

10. Alongside the Independent Climate Change E-Mails Review, UEA decided on a separate scientific assessment of CRU's key scientific publications; an external reappraisal of the science itself. The Royal Society agreed to assist UEA in identifying assessors with the requisite experience, standing and independence.[24] UEA announced on 22 March that Lord Oxburgh FRS would "chair an independent Scientific Assessment Panel to examine

18 For examples see Ev 90 [Phillip Bratby]; Ev 115 [David Holland], para 2; Ev 144 [Stephen McIntyre]; Ev 194 [Peabody Energy Company], para 24.

19 "Climate scientist at centre of leaked email row dismisses conspiracy claims", *The Guardian*, 24 November 2009

20 UEA, "CRU update 2", 24 November 2009, www.uea.ac.uk/mac/comm/media/press/2009/nov/CRUupdate

21 UEA, "CRU update 3", 1 December 2009, www.uea.ac.uk/mac/comm/media/press/2009/nov/CRUupdate

22 "Sir Muir Russell to head the Independent Review into the allegations against the Climatic Research Unit (CRU)", UEA Press Release, 3 December 2009, www.uea.ac.uk/mac/comm/media/press/2009/dec/CRUreview

23 Ev 16

24 Ev 18, para 2.3

important elements of the published science of the Climatic Research Unit (CRU) at the University of East Anglia".[25]

Our inquiry

11. We were concerned by the press reports and on 1 December 2009 the Chair of the Committee wrote to the Vice-Chancellor of UEA. The letter explained that we took a close interest in academic integrity and the systems in place to ensure the quality of evidence from research and evidence-based policy making. The letter requested a note on the recent events setting out:

a) what had taken place;

b) the steps that had been taken to investigate the allegations and to test the integrity of the data held and used by CRU;

c) how CRU justified its commitment to academic transparency; and

d) how the Vice-Chancellor proposed to restore confidence in CRU and its handling of data.

We also asked for an assurance that none of the data referred to in the e-mails that had been publicised had been destroyed.[26]

12. UEA replied on 10 December 2009. It explained that "a significant amount of material including emails and documents appears to have been accessed illegally from a back-up server in CRU and downloaded in whole, or possibly in part, on to the RealClimate website."[27] This incident was the subject of a police enquiry and the Norfolk Constabulary investigation was expected to take some time. UEA was keen to stress that this "episode is being treated very seriously" and announced that it had set up the independent inquiry, headed by Sir Muir Russell, to investigate the allegations against CRU. UEA said that "none of the adjusted station data referred to in the emails that have been published has been destroyed."[28]

13. In the light of the gravity of the allegations against CRU, the growing weight of damaging press coverage, on-going concerns about the deletion of data and the serious implications for UK science we decided to hold an inquiry into the disclosure of the data at CRU. On 22 January 2010 we therefore announced the inquiry inviting submissions on three key issues:

- What were the implications of the disclosures for the integrity of scientific research?
- Were the terms of reference and scope of the Independent Review announced on 3 December 2009 by UEA adequate?

25 "CRU Scientific Assessment Panel announced", UEA Press Release, 22 March 2010, www.uea.ac.uk/mac/comm/media/press/CRUstatements/SAPannounce

26 House of Commons Science and Technology Committee Press Notice 04, 7 December 2009, Session 2009–10

27 Ev 16

28 Ev 17

- How independent were the other two international data sets (see paragraph 23)?

14. If there had been more time available before the end of this Parliament we would have preferred to carry out a wider inquiry into the science of global warming itself. In response to enquiries we issued a statement on 1 February making it clear that the inquiry would focus on the terms of reference announced on 22 January and that this was not an inquiry into global warming.[29]

15. We set a deadline of 10 February for the submission of memoranda and we have received 58 submissions, not including supplementary memoranda. We held one oral evidence session on 1 March, when we took evidence from five panels:

a) Rt Hon Lord Lawson of Blaby, Chairman, and Dr Benny Peiser, Director, Global Warming Policy Foundation;

b) Richard Thomas CBE, former Information Commissioner;

c) Professor Edward Acton, Vice-Chancellor, UEA and Professor Phil Jones, Director of CRU;

d) Sir Muir Russell, Head of the Independent Climate Change E-Mails Review; and

e) Professor John Beddington, Government Chief Scientific Adviser, Professor Julia Slingo OBE, Chief Scientist, Met Office, and Professor Bob Watson, Chief Scientist, Department for Environment, Food and Rural Affairs.

16. We would like to thank everyone who contributed to the inquiry through written submissions or oral evidence. We also received unsolicited copies of a number of books challenging anthropogenic global warming and reviewing events at CRU and the disclosed e-mails.[30]

Our Report

17. In the time left before the end of this Parliament we will not be able to cover all the issues raised by the events at UEA, nor cover all the ground that would be covered by the Independent Climate Change Email Review and the Scientific Appraisal Panel. We have therefore concentrated on what we believe to be key issues. Of central concern is the accuracy and availability of CRU's data, datasets and computer programming, which we address in Chapter 2 of this Report; and related to the data and methodology is the question of access, or the withholding of access, under the Freedom of Information Act 2000 which we cover in Chapter 3. Finally, in Chapter 4 we comment on the independent reviews that UEA has announced.

29 House of Commons Science and Technology Committee Press Notice 11, 1 February 2010, Session 2009–10

30 The Committee received the following books:
Christopher Booker, *The Real Global Warming Disaster*, Continuum, 2009
A.W. Montford, *The Hockey Stick Illusion*, Stacey International, 2010
Steven Mosher and Tom Fuller, *Climategate*, St Matthew Publishing, 2010
Ian Plimer, *Heaven and Earth*, Quartet Books Limited, 2009

2 Datasets

Climate science

18. *Climate* is distinct from *weather*: it is the average of weather conditions over a number of years. Climatologists study climates in different parts of the world and for the Earth as a whole. CRU, according to its website: "has developed a number of the data sets widely used in climate research, including the global temperature record used to monitor the state of the climate system, as well as statistical software packages and climate models".[31]

19. The process of calculating the Earth's average global temperatures (past, present and future) is complicated and lengthy. Data from thousands of weather stations all around the world, on land and at sea, must be collected, checked for quality, adjusted for inconsistencies and error margins, and then mapped onto a series of grids on the Earth's surface. The methods, results and conclusions are then presented to the academic world, first by passing the peer review process prior to publication, and second, after presentation, the scrutiny of the wider academic community.

20. Climate science, like any other science, uses the scientific method to make its assessments of past and present climate and predictions about the future climate. The key characteristics of the scientific method can be described as: characterisations, hypotheses, predictions, and experiments.

- Characterisations: consideration of a problem, and examination of whether or not an explanation exists for it.
- Hypotheses: if no such explanation exists, a new explanation is stated.
- Predictions: what consequences follow from a new explanation?
- Experiments: is the outcome consistent with the predicted consequences?

Each of these is subject to peer review prior to the formal sharing of knowledge through publication. Through peer review scientists allow their views and methods to be critically appraised expertly and externally.

- Replication and verification

To have the results and conclusions survive criticism or scepticism and be part of the accepted canon of scientific knowledge, most experiments will have to be demonstrably replicable (by the same group) to pass peer review and will often need to be verified by other independent researchers taking similar approaches.

21. Therefore climatologists are, like other scientists, required to test their theories—such as global warming and the causes of warming—against observational data. They must also replicate and verify their experiments, by holding independent datasets and conducting independent analyses of these datasets, and by publishing their full methods and results for

31 www.cru.uea.ac.uk/cru/about

scrutiny. Ultimately, these ideas are put up to the threat of falsification by other scientists working in the field.

22. In this Chapter we discuss some aspects of this process.

Context

23. There are three main international climate datasets, which have been built up from direct temperature measurements on land and sea at weather stations all around the world:

a) the National Climatic Data Center (NCDC) of the National Oceanographic and Atmospheric Administration (NOAA) in Asheville, North Carolina, USA;

b) the Goddard Institute of Space Studies (GISS), part of the National Aeronautic and Space Administration (NASA) in New York, USA; and

c) CRUTEM3, at CRU, UEA.[32]

24. In addition, there are two others, one in Russia and one in Japan, that use similar methods.[33] There are also two that use satellite observations, by the University of Alabama at Huntsville and by Remote Sensing Systems, California.[34]

25. Professor Jones, commenting on the different climate research groups around the world in the UK, US, Russia and Japan,[35] told us that:

> we are all working independently so we may be using a lot of common data but the way of going from the raw data to a derived product of gridded temperatures and then the average for the hemisphere and the globe is totally independent between the different groups.[36]

26. What sets the CRU dataset apart is its comprehensiveness:

> The CRU dataset, which forms the land surface component of the HadCRUT global temperature record, was compiled with the aim of comprehensiveness. The majority of the data in it are derived from the same freely-available raw data sets used by NOAA and NASA. However, it also includes data derived from station data that were obtained directly from countries, institutions and scientists on the understanding that they would not be passed on.[37]

Complaints and accusations

27. The complaints and accusations made against CRU in relation to the scientific process come under two broad headings. The first is transparency: that CRU failed to abide by best

32 Ev 21, para 4.2

33 Q 78

34 Ev 104 [D.R. Keiller], para 2

35 Q 79

36 Q 80

37 Ev 64 [John Beddington and Julia Slingo]

scientific practice by refusing to share its raw data and detailed methods. The second is honesty: that CRU has deliberately misrepresented the data, in order to produce results that fit its preconceived views about the anthropogenic warming of the climate. We take each of these complaints and accusations in turn.

Transparency

Raw data

28. Warwick Hughes, a "freelance earth scientist from Australia",[38] had asked Professor Jones for CRU's raw data. He received the following reply:

> I should warn you that some data we have we are not supposed [to] pass on to others. We can pass on the gridded data—which we do. Even if WMO [World Meteorological Organization] agrees, I will still not pass on the data. We have 25 or so years invested in the work. Why should I make the data available to you, when your aim is to try and find something wrong with it.[39]

29. On the face of it, this looks like an unreasonable response to a reasonable request. As Lord Lawson put it: "Ask any decent scientist and they will say the keystone for integrity in scientific research is full and transparent disclosure of data and methods".[40] However, Professor Jones, while confessing that he has sent some "awful" e-mails,[41] defended his position.

30. First, in answer to the question of whether the raw data are accessible and verifiable, Professor Jones told us that:

> The simple answer is yes, most of the same basic data are available in the United States in something called the Global Historical Climatology Network. They have been downloadable there for a number of years so people have been able to take the data, do whatever method of assessment of the quality of the data and derive their own gridded product and compare that with other workers.[42]

31. In addition, of course, there are the sources of the data, the weather stations, to which any individual is free to go and collect the data in the same way that CRU did. This is feasible because the list of stations that CRU used was published in 2008.[43]

32. Even if CRU had wanted to, it would have been unable to publish all of these data because, as Professor Acton explained, some of the data are bound by commercial agreements with different national meteorological organisations:

38 www.warwickhughes.com

39 Ev 158, Appendix 1

40 Q 9

41 Q 103

42 Q 78

43 Q 98

> Unfortunately, several of these countries impose conditions and say you are not allowed to pass [on the data]. Seven countries have said "No, you cannot", half the countries have not yet answered, Canada and Poland are amongst those who have said, "No you cannot publish it" and also Sweden. Russia is very hesitant. We are under a commercial promise, as it were, not to; we are longing to publish it because what science needs is the most openness.[44]

(The issue with Sweden has since been resolved. The Swedish Meteorological and Hydrological Institute gave permission for CRU to publish its Swedish data on the UEA website on 8 March 2010.[45])

33. Second, as UEA explained in its submission, it is:

> sometimes necessary to adjust temperature data because changes in station location, instrument or observation time, or in the methods used to calculate monthly average temperatures can introduce false trends. These have to be removed or adjusted, or else the overall series of values will be incorrect. In the early 1980s, CRU painstakingly examined the long-term homogeneity of each station temperature series which it acquired. As a result, data were adjusted for about 11% of the sites, that is approximately 314 sites out of a then-total of some 3,276. This was in complete accordance with standard practice, and all adjustments were documented.[46]

34. Professor Jones added, when he gave oral evidence:

> It is all documented [...] what [adjustments we made to the data] in the 1980s and since then we have obviously added more station data as more has become available, as countries have digitised more data; we have added that in and we have reported on that in our peer review publications in 2003 and 2006.[47]

35. These kinds of adjustments to raw data take a lot of time. That is why, in the words of Professor Jones, "Most scientists do not want to deal with the raw station data, they would rather deal with a derived product".[48]

36. A third point was made by Professor Acton that CRU should not be under any obligation to provide raw data:

> May I also point out that it is not a national archive, it is not a library, it is a research unit. It has no special duty to conserve and its data is the copy of data provided by over 150 countries, whose national meteorological stations turn the data into the average for a month.[49]

44 Q 94

45 Ev 39, para B

46 Ev 18, para 3.4

47 Q 81

48 Q 107

49 Q 92

37. CRU's refusal to release the raw data gave some the impression that it was deliberately keeping its work private so that its studies could not "be replicated and critiqued".[50] The Peabody Energy Company said of CRU that "they appeared to be particularly concerned that putting their information in the public domain would expose their work to criticism".[51] Even an effort to conduct a simple quality check was said to be thwarted by CRU's unwillingness to share the data it had used.[52] In contrast, NASA has been able to make all its raw data available as well as its programmes.[53]

38. **We recognise that some of the e-mails suggest a blunt refusal to share data, even unrestricted data, with others. We acknowledge that Professor Jones must have found it frustrating to handle requests for data that he knew—or perceived—were motivated by a desire simply to seek to undermine his work. But Professor Jones's failure to handle helpfully requests for data in a field as important and controversial as climate science was bound to be viewed with suspicion. He was obviously frustrated by other workers in the field trying to "undermine" his work, but his actions were inevitably counterproductive. Professor Jones told us that the published e-mails represented only "one tenth of 1%" of his output, which amounts to one million e-mails, and that we were only seeing the end of a protracted series of e-mail exchanges. We consider that further suspicion could have been allayed by releasing all the e-mails. In addition, we consider that had the available raw data been available online from an early stage, these kinds of unfortunate e-mail exchanges would not have occurred. In our view, CRU should have been more open with its raw data and followed the more open approach of NASA to making data available.**

39. **We are not in a position to set out any further the extent, if any, to which CRU should have made the data available in the interests of transparency, and we hope that the Independent Climate Change Email Review will reach specific conclusions on this point. However, transparency and accountability are of are increasing importance to the public, so we recommend that the Government reviews the rules for the accessibility of data sets collected and analysed with UK public money.**

Methods

40. The Royal Society of Chemistry in its submission made it clear that:

> It is essential that the public and all non-specialists remain truly confident in the scientific method to provide a sound scientific evidence-base on which strong decisions can be made.[54]

There have been criticisms that Professor Jones and colleagues have not shared their methodologies. Andrew Montford, author of *The Hockey Stick Illusion*,[55] pointed out in his memorandum that:

50 Ev 194 [Peabody Energy Company], para 20

51 *As above*

52 Ev 152 [Steven Mosher], para 8

53 Q 150 [Professor Jones]

54 Ev 170, summary

> The scientific method demands that findings be subject to testing and verification by others. The refusal of CRU scientists to release information to those who they felt might question or threaten their findings have led many to conclude that the CRU's work is not trustworthy.[56]

41. Professor Jones contested these claims. According to him, "The methods are published in the scientific papers; they are relatively simple and there is nothing that is rocket science in them".[57] He also noted: "We have made all the adjustments we have made to the data available in these reports[58]; they are 25 years old now".[59] He added that the programme that produced the global temperature average had been available from the Met Office since December 2009.[60]

42. On this basis, he argued, it was unnecessary to provide the exact codes that he used to produce the CRUTEM3 chart. The Met Office had released its code and it produced exactly the same result.[61]

43. In answer to the charge that the computer codes that were stolen from CRU's computer network were defective,[62] Professor Jones pointed out that:

> Those codes are from a much earlier time, they are from the period about 2000 to 2004. [They] do not relate to the production of the global and hemispheric temperature series. They are nothing to do with that, they are to do with a different project [...] that was funded by the British Atmospheric Data Centre, which is run by NERC, and that was to produce more gridded temperature data and precipitation data and other variables. A lot of that has been released on a Dutch website and also the BADC website.[63]

44. CRU's alleged refusal to disclose its assumptions and methodologies gave credence to the view that exposure to "independent scrutiny would have undermined the AGW [anthropogenic global warming] hypothesis".[64] However, the failure to publish the computer code for CRUTEM3 left CRU vulnerable when concerns emerged that other codes it used had faults. John Graham-Cumming, a professional computer programmer, told us that:

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55 Andrew Montford, *The Hockey Stick Illusion: Climategate and the corruption of science*, Stacey International, 2010

56 Ev 159, para 4

57 Q 92

58 Raymond Bradley, Mick Kelly, Phil Jones and others, *A Climatic Data Bank for Northern Hemisphere Land Areas, 1851-1980*, US DoE, Technical Report TRO17, 1985, p 335; Phil Jones, Sarah Raper, Ben Santer, and others, *A Grid Point Surface Air Temperature Data Set for the Northern Hemisphere*, DoE Technical Report No. TR022, US Department of Energy, 1985, p 251; Phil Jones, Sarah Raper, Claire Goodess, and others, *A Grid Point Surface Air Temperature Data Set for the Southern Hemisphere, 1851-1984*, DoE Technical Report No. TR027, US Department of Energy, 1986, 73

59 Q 97

60 *As above*

61 Qq 139-42

62 Ev 32, Q 137; Ev 196 [John Graham-Cumming]

63 Qq 137-38

64 Ev 94 [Clive Menzies], para 1.5

> the organization writing the [other] code did not adhere to standards one might find in professional software engineering. The code had easily identified bugs, no visible test mechanism, was not apparently under version control and was poorly documented. It would not be surprising to find that other code written at the same organization was of similar quality. And given that I subsequently found a bug in the actual CRUTEM3 code only reinforces my opinion.[65]

45. The conspiracy claims were fuelled by CRU's refusal to share the most detailed aspects of its methodologies, for example, the computer codes for producing global temperature averages. **We note that the research passed the peer review process of some highly reputable journals. However, we note that CRU could have been more open at that time in providing the detailed methodological working on its website. We recommend that all publicly funded research groups consider whether they are being as open as they can be, and ought to be, with the details of their methodologies.**

Repeatability and verification

46. These complaints and concerns surrounding transparency cut to the heart of the scientific process. It has been argued that without access to the raw data and detailed methodology it is not possible to check the results of CRU's work. The Institute of Physics pointed out that:

> Published reconstructions may represent only a part of the raw data available and may be sensitive to the choices made and the statistical techniques used. Different choices, omissions or statistical processes may lead to different conclusions. This possibility was evidently the reason behind some of the (rejected) requests for further information.[66]

47. This has substance if one considers CRU's work in isolation. But science is more than individual researchers or research groups. One should put research in context and ask the question: what would one hope to find by double checking the processing of the raw data? If this were the only dataset in existence, and Professor Jones's team had been the only team in the world to analyse it, then it might make sense to double check independently the processing of the raw data and the methods. But there are other datasets and other analyses that have been carried out as Professor Jones explained:

> There are two groups in America that we [CRU] compare with and there are also two additional groups, one in Russia and one in Japan, that also produce similar records to ourselves and they all show pretty much the same sort of course of instrumental temperature change since the nineteenth century compared to today.[67]

> [...] we are all working independently so we may be using a lot of common data but the way of going from the raw data to a derived product of gridded temperatures and

65 Ev 196

66 Ev 167, para 4

67 Q 78

> then the average for the hemisphere and the globe is totally independent between the different groups.[68]

48. In its memorandum UEA explained the differences between the methodologies used by three basic datasets for land areas of the world, NOAA, NASA and CRU/UEA:

> All these datasets rely on primary observations recorded by NMSs [National Meteorological Services] across the globe.[69]
>
> GISS[70] and NCDC[71] each use at least 7,200 stations. CRUTEM3 uses fewer. In CRUTEM3, each monthly temperature value is expressed as a departure from the average for the base period 1961–90. This "anomaly method" of expressing temperature records demands an adequate amount of data for the base period; this limitation reduces the number of stations used by CRUTEM3 to 4,348 (from the dataset total of 5,121). The latest NCDC analysis [...] has now moved to the "anomaly method" though with different refinements from those of CRU.[72]
>
> NCDC and GISS use different approaches to the problem of "absolute temperature" from those of CRUTEM3. The homogeneity procedures undertaken by GISS and NCDC are completely different from those adopted for CRUTEM3. NCDC has an automated adjustment procedure [...], whilst GISS additionally makes allowances for urbanization effects at some stations.[73]

49. In our call for evidence we asked for submissions on the question of how independent the other international data sets are. We have established to the extent that a limited inquiry of this nature can, that the NCDC/NOAA and GISS/NASA data sets measuring temperature changes on land and at sea have arrived at similar conclusions using similar data to that used by CRU, but using independently devised methodologies. We have further identified that there are two other data sets (University of Alabama and Remote Sensing Systems), using satellite observations that use entirely different data than that used by CRU. These also confirm the findings of the CRU work. **We therefore conclude that there is independent verification, through the use of other methodologies and other sources of data, of the results and conclusions of the Climate Research Unit at the University of East Anglia.**

50. The fact that all the datasets show broadly the same sort of course of instrumental temperature change since the nineteenth century compared to today was why Professor John Beddington, the Government Chief Scientific Adviser, had the confidence to say that

68 Q 80

69 Ev 21, para 4.3

70 Dataset held by the Goddard Institute for Space Studies (GISS, USA) part of the National Aeronautic and Space Administration (NASA)

71 Global Historical Climatology Network (GHCN) dataset held by National Climatic Data Center (NCDC), the National Oceanographic and Atmospheric Administration (NOAA, USA)

72 Ev 21, para 4.4

73 Ev 21, para 4.5

human induced global warming was, in terms of the evidence to support that hypothesis, "unchallengeable":[74]

> I think in terms of datasets, of the way in which data is analysed, there will always be some degree of uncertainty but when you get a series of fundamentally different analyses on the basic data and they come up with similar conclusions, you get a [...] great deal of certainty coming out of it.[75]

51. **Even if the data that CRU used were not publicly available—which they mostly are—or the methods not published—which they have been—its published results would still be credible: the results from CRU agree with those drawn from other international data sets; in other words, the analyses have been repeated and the conclusions have been verified.**

52. That is probably part of why it has not been practice in the climate science community to publish all the data and computer codes with the academic papers. We got to the crux of the issue during an interesting exchange with Professor Jones:

> **Graham Stringer:** You are saying that every paper that you have produced, the computer programmes, the weather stations, all the information, the codes, have been available to scientists so that they could test out how good your work was. Is that the case on all the papers you have produced?
>
> ***Professor Jones:*** That is not the case.
>
> **Graham Stringer:** Why is it not?
>
> ***Professor Jones:*** Because it has not been standard practice to do that.
>
> **Graham Stringer:** That takes me back to the original point, that if it is not standard practice how can the science progress?
>
> ***Professor Jones:*** Maybe it should be standard practice but it is not standard practice across the subject.[76]

53. Another reason why data and the codes were not published may be that norms for publication evolved in a period when the journals were only published in hard copy. In such circumstances it is understandable why an editor would not want to publish raw climate data (extremely long lists of numbers) and code for the computer programmes that analyse the data (which run to hundreds of thousands of lines of code). However, in the age of the internet, these kinds of products can be made available more easily, and we are minded to agree with Professor Jones observation on this point that: "Maybe it should be standard practice".[77]

74 Q 191

75 Qq 191–92

76 Qq 100–02

77 Q 102

54. **It is not standard practice in climate science and many other fields to publish the raw data and the computer code in academic papers. We think that this is problematic because climate science is a matter of global importance and of public interest, and therefore the quality and transparency of the science should be irreproachable. We therefore consider that climate scientists should take steps to make available all the data used to generate their published work, including raw data; and it should also be made clear and referenced where data has been used but, because of commercial or national security reasons is not available. Scientists are also, under Freedom of Information laws and under the rules of normal scientific conduct, entitled to withhold data which is due to be published under the peer-review process.[78] In addition, scientists should take steps to make available in full their methodological workings, including the computer codes. Data and methodological workings should be provided via the internet. There should be enough information published to allow verification.**

Dishonesty

55. Of all the e-mails released, one dated 16 November 1999 has caused particular concern:

> I've just completed Mike's Nature trick of adding in the real temps to each series for the last 20 years (ie from 1981 onwards) amd [*sic*] from 1961 for Keith's to hide the decline.[79]

56. The word "trick" and the phrase "hide the decline" have been taken by some to demonstrate intent on the part of Professor Jones to "falsify data" and to "exaggerate warming".[80]

"Trick"

57. In his submission, Peter Taylor, author of *Chill*,[81] states that:

> The tree ring data did not match the model expectation (ie the 'hockey stick' pattern of a sudden rise at the end of the period). Rather than admit this, the team-workers discuss using Michael Mann's 'trick' of replacing the offending tree-ring data and using instrumental data in its place in a spliced graph.[82]

58. UEA interpreted the use of the word "trick" differently:

> as for the (now notorious) word 'trick', so deeply appealing to the media, this has been richly misinterpreted and quoted out of context. It was used in an informal email, discussing the difficulties of statistical presentation. It does not mean a 'ruse' or method of deception. In context it is obvious that it is used in the informal sense

78 See paragraph 78 and following; section 22 of the FOIA provides an exemption from disclosure where the requested information is intended for future (but imminent) publication.

79 E-mail from Phil Jones to Ray Bradley, 16 November 1999

80 Ev 93 [Godfrey Bloom MEP], para 4

81 Peter Taylor, *Chill, A Reassessment of Global Warming Theory: Does Climate Change Mean the World is Cooling, and If So What Should We Do About It?*, Clairview Books, 2009

82 Ev 188, para 22

of 'the best way of doing something'. In this case it was 'the trick or knack' of constructing a statistical illustration which would combine the most reliable proxy and instrumental evidence of temperature trends.[83]

59. These interpretations of the colloquial meaning of "trick" have been accepted by even the staunchest of critics:

> ***Lord Lawson of Blaby:*** The sinister thing is not the word 'trick'. In their [UEA's] own evidence they say that what they mean by 'trick' is the best way of doing something.
>
> **Chairman:** You accept that?
>
> ***Lord Lawson of Blaby:*** I accept that.[84]

60. **Critics of CRU have suggested that Professor Jones's use of the word "trick" is evidence that he was part of a conspiracy to hide evidence that did not fit his view that recent global warming is predominately caused by human activity. The balance of evidence patently fails to support this view. It appears to be a colloquialism for a "neat" method of handling data.**

"Hide the decline"

61. Lord Lawson did, however, describe CRU's treatment of the data as "reprehensible",[85] because, in his view, Professor Jones deliberately hid data that demonstrated a decline in temperatures.[86]

62. The data that he believed to be "hidden" are a set of tree ring data that disagree with other data sources regarding temperature trends. Lord Lawson said: "when the proxy series [...] departed from the measured temperature series, a normal person will say maybe that means the proxy series is not all that reliable".[87] In that context he made two specific claims:

- that the tree ring data were flawed because "for a long period before 1421 they relied on one single pine tree";[88] and
- that the divergence problem was not just for data after the 1960s, "it is not a good fit in the latter half of the nineteenth century either".[89]

63. It is outside the remit of the terms of reference of this inquiry to make a detailed assessment of the science, but it is worth noting that Professor Jones had a very different perspective. On the first point, he commented:

83 Ev 19, para 3.5.6

84 Qq 25–26

85 Q 26

86 Qq 26–28

87 Q 26

88 *As above*

89 Q 28

> That particular reconstruction went back to 1400, or just after 1400, and that is because there are insufficient trees to go back before that, there are more than just one. We have criteria to determine how far you can go back in terms of the number of trees you have at a certain number of sites.[90]

64. On the second point, he told us:

> One of the curves was based on tree ring data which showed a very good relationship between the tree rings and the temperature from the latter part of the nineteenth century through to 1960, and after that there was a divergence where the trees did not go up as much as the real temperatures had.[91]

65. Professor Jones has published on this issue on several occasions, including a 1998 *Nature* paper[92] and subsequent papers.[93] He contested the view that he was trying to hide the decline in the sense that he was trying to pretend that these data did not exist and thereby exaggerate global warming: "We do not accept it was hidden because it was discussed in a paper[94] the year before and we have discussed it in every paper we have written on tree rings and climate".[95] Rather, what was meant by "hide the decline" was remove the effects of data known to be problematic in the sense that the data were known to be misleading. UEA made it clear in its written submission that:

> CRU never sought to disguise this specific type of tree-ring "decline or divergence". On the contrary, CRU has published a number of pioneering articles that illustrate, suggest reasons for, and discuss the implications of this interesting phenomenon.[96]

66. **Critics of CRU have suggested that Professor Jones's use of the words "hide the decline" is evidence that he was part of a conspiracy to hide evidence that did not fit his view that recent global warming is predominantly caused by human activity. That he has published papers—including a paper in *Nature*—dealing with this aspect of the science clearly refutes this allegation. In our view, it was shorthand for the practice of discarding data known to be erroneous. We expect that this is a matter the Scientific Appraisal Panel will address.**

Perverting the peer review process

67. The main allegations on the suppression or distortion of others' findings concern the role of CRU in the operation of the peer review process. It has been alleged that scientists at CRU abused the peer review process to prevent those with dissenting views on climate change the opportunity in getting papers published. There are three key accusations. First,

90 Q 125

91 Q 122

92 Q 122; Keith Briffa and others, "Reduced sensitivity of recent tree-growth to temperature at high northern latitudes", *Nature*, vol 391 (1998), pp 678-82

93 For example: Edward Cook, Paul Krusic and Phil Jones, "Dendroclimatic signals in long tree-ring chronologies from the Himalayas of Nepal", *International Journal of Climatology*, Vol 23 (2003), pp 707-32

94 Keith Briffa and others, "Trees tell of past climates: but are they speaking less clearly today?", *Philosophical Transactions of the Royal Society of London Series B-Biological Sciences*, vol 353 (1998), pp 65-73

95 Q 124

96 Ev 19, para 3.5.5

David Holland, an author of several FOIA requests that were mentioned in the leaked e-mails, claimed that climate scientists at CRU corrupted the IPCC process:

> The emails show that a group of influential climate scientists colluded to subvert the peer-review process of the IPCC and science journals, and thereby delay or prevent the publication and assessment of research by scientists who disagreed with the group's conclusions about global warming. They manufactured pre-determined conclusions through the corruption of the IPCC process and deleted procedural and other information hoping to avoid its disclosure under freedom-of-information requests.[97]

68. In one e-mail, Professor Jones appeared to suggest that he and another scientist would deliberately try to "keep out" two papers from the IPCC's Fourth Assessment Report.[98]

> From: Phil Jones <p.jones@xxxxxxxxx.xxx>
> To: "Michael E. Mann" <mann@xxxxxxxxx.xxx>
> Subject: HIGHLY CONFIDENTIAL
> Date: Thu Jul 8 16:30:16 2004
>
> Mike,
>
> Only have it in the pdf form. FYI ONLY - don't pass on. Relevant paras are the last
>
> 2 in section 4 on p13. As I said it is worded carefully due to Adrian knowing Eugenia for years. He knows the're wrong, but he succumbed to her almost pleading with him to tone it down as it might affect her proposals in the future !
>
> I didn't say any of this, so be careful how you use it - if at all. Keep quiet also that you have the pdf. The attachment is a very good paper - I've been pushing Adrian over the last weeks to get it submitted to JGR or J. Climate. The main results are great for CRU and also for ERA-40. The basic message is clear - you have to put enough surface and sonde obs into a model to produce Reanalyses. The jumps when the data input change stand out so clearly. NCEP does many odd things also around sea ice and over snow and ice. The other paper by MM is just garbage - as you knew. De Freitas again. Pielke is also losing all credibility as well by replying to the mad Finn as well - frequently as I see it. I can't see either of these papers being in the next IPCC report. Kevin and I will keep Them out somehow - even if we have to redefine what the peer-review literature is !

69. The second is that climate scientists tried to suppress a paper on research fraud. As Dr Benny Peiser, Director of the Global Warming Policy Foundation, put it:

> The CRU e-mails under investigation suggest that climate scientists (not only at CRU but also elsewhere) have actively sought to prevent a paper on alleged research fraud from being published in violation of principles of academic integrity.[99]

70. The third allegation is made by Dr Sonja Boehmer-Christiansen, a former peer reviewer for the IPCC, editor of the journal, *Energy & Environment*, and Reader Emeritus

97 Ev 115, para 2

98 www.eastangliaemails.com

99 Ev 164, para 2

at Hull University, who stated in her memorandum that her journal became the focus of attacks from CRU scientists:

> As editor of a journal which remained open to scientists who challenged the orthodoxy, I became the target of a number of CRU manoeuvres. The hacked emails revealed attempts to manipulate peer review to E&E's disadvantage, and showed that libel threats were considered against its editorial team. Dr Jones even tried to put pressure on my university department. The emailers expressed anger over my publication of several papers that questioned the 'hockey stick' graph and the reliability of CRU temperature data. The desire to control the peer review process in their favour is expressed several times. [...] CRU clearly disliked my journal and believed that "good" climate scientists do not read it.[100]

71. When we asked Professor Jones about these accusations, he contested each of them.

- On the claim that he tried to keep two papers out of the IPCC report, he explained that the papers were already published and that "I was just commenting that I did not think those papers were very good".[101]
- On the claim by he tried to suppress papers that alleged research fraud, he told us:

  > Dr Benny Peiser [...] was editing a series of papers in *Energy & Environment*. He asked me to comment on a particular paper and I sent him some views back that I did not think the paper was very good. It was not a formal review, he was just asking me for my views.[102]

- On the claims made by Dr Boehmer-Christiansen, he noted: "I was sending an email to the head of department about a complaint that she had made about me to the UK Climate Impacts Programme, so I was just responding there".[103]

72. In summary, Professor Jones argued:

> I do not think there is anything in those emails that really supports any view that I or CRU have been trying to pervert the peer review process in any way. I have just been giving my views on specific papers.[104]

73. **The evidence that we have seen does not suggest that Professor Jones was trying to subvert the peer review process. Academics should not be criticised for making informal comments on academic papers. The Independent Climate Change Email Review should look in detail at all of these claims.**

100 Ev 125, paras 4.1–4.3

101 Q 154

102 Q 157

103 *As above*

104 Q 159

3 Freedom of information issues

74. We are not a tribunal reviewing whether breaches of the Freedom of Information Act 2000 (FOIA) have taken place but see as our role in this inquiry as considering whether:

(a) the arrangements for examining whether CRU breached FOIA are adequate;

(b) whether the six-month time limit on the initiation of a prosecution where a public authority acts so as to prevent intentionally the disclosure of requested information needs to be revised; and

(c) whether UEA ensured that CRU was able to meet the requirements of the legislation when it received FOIA requests.

Freedom of Information legislation

75. The FOIA creating new rights of access to information came into operation on 1 January 2005. CRU, as part of UEA, is classed as a "public authority" for the purposes of the FOIA. In his submission Richard Thomas, who was Information Commissioner from 2002 until June 2009, explained the application of the FOIA to scientific data held by UK universities:

> the public must be satisfied that publicly-funded universities, as with any other public authority in receipt of public funding, are properly accountable, adopt systems of good governance and can inspire public trust and confidence in their work and operations [...] The fact that the FOIA requests relate to complex scientific data does not detract from this proposition or excuse non-compliance.[105]

76. When he gave oral evidence, we asked Mr Thomas if the legislation drew a distinction between, on the one hand, scientific data and modelling and, on the other hand, administrative records. He replied:

> the broad answer [...] is no [...] First of all, the legislation applies to information held by the public authority, and information is not elaborated in that sense. [...] It is not ownership. The legislation uses the word "held", and in the Environmental Information Regulations [EIR] that phrase "held" is slightly elaborated. If I can quote the regulation for you there, "It is held by a public authority if the information: (a) is in the authority's possession and has been produced or received by the authority, or (b) is held by another person on behalf of the authority." So that is an elaboration of the concept of "held". It is not ownership.[106]

77. Mr Thomas considered that the issues in this case which were most relevant to the information law appeared to be:

(a) the relevance and impact of the information laws on scientific and academic research conducted within universities;

105 Ev 8, para 3.2

106 Qq 59-60

(b) the adequacy of section 77 of FOIA to deal with suggestions that CRU researchers deleted information, not in the course of normal work, but to frustrate FOIA/EIR[107] requests;

(c) the handling of a large number of FOIA/EIR requests by UEA relating especially to climate change research which (within CRU) it "held"; and

(d) whether this case illustrates that there is scope to extend the "proactive" disclosure provisions of FOIA as they relate to universities.[108]

78. Parliament has created a presumption in favour of disclosure but there are exclusions.[109] Mr Thomas explained:

> There are over 20 exemptions to the fundamental duty to disclose requested information in FOIA.[...] Eight of the main exemptions are absolute and 16 are qualified. Qualified means that there is a "public interest override," which means that, even where the exemption applies, the public interest considerations must be considered. In formal terms, there must still be disclosure—even though the qualified exemption applies—unless the public interest in the exemption outweighs the public interest in disclosure.

Mr Thomas added that:

> The exemptions are similar to those found in other Freedom of Information laws in force in the world. I am not aware which exemptions were considered by the University as potentially applicable to some or all of the requests to CRU. I can speculate that some or all of the following [...] might have been considered:
>
> (a) Section 22—where the requested information is intended for future (but imminent) publication;
>
> (b) Section 40—where disclosure of personal data would breach any of the data protection principles;
>
> (c) Section 41—where the information had been obtained from elsewhere in such circumstances that its disclosure would constitute an actionable breach of confidence under common law;
>
> (d) Section 43 (qualified)—where disclosure would, or would be likely to, prejudice the commercial interests of any person, including the public authority;
>
> (e) Section 44—where disclosure is prohibited by another enactment or inconsistent with an EU obligation (which may include some intellectual property restrictions); and

107 EIR: Environmental Information Regulations 2004. Deriving from European Directive 2003/4/EC these give rights of public access to environmental information held by public authorities.

108 Ev 8, para 2.2

109 Ev 9, para 3.6

(f) Section 14 (not an exemption, strictly speaking)—where the request is vexatious.[110]

79. We were grateful to Mr Thomas for explaining the operation of the FOIA and EIR. He did, however, point out that he did not have detailed knowledge of events at UEA since leaving the Information Commissioner's Office:

> I have no idea at all what has happened inside my former office. I cannot say because this is a serious matter. It depends a great deal on the circumstances of the particular case, the evidence. I have had no direct contact with the office as to how this case is being handled.[111]

Alleged breaches of the Freedom of Information Act 2000

The e-mails

80. Some of the hacked e-mails appear to reveal scientists encouraging their colleagues to resist disclosure and to delete e-mails, apparently to prevent them from being revealed to people making FOIA requests. Below are examples, in chronological order, of e-mails sent by Professor Jones which address FOIA and requests for information.

E-mail: 1107454306 [Extract]
At 09:41 AM 2/2/2005, Phil Jones wrote:
Mike,[...]Just sent loads of station data to Scott. Make sure he documents everything better this time! And don't leave stuff lying around on ftp sites - you never know who is trawling them. The two MMs have been after the CRU station data for years. If they ever hear there is a Freedom of Information Act now in the UK, I think I'll delete the file rather than send to anyone. Does your similar act in the US force you to respond to enquiries within 20 days? - our does ! The UK works on precedents, so the first request will test it. We also have a data protection act, which I will hide behind. Tom Wigley has sent me a worried email when he heard about it - thought people could ask him for his model code. He has retired officially from UEA so he can hide behind that. IPR should be relevant here, but I can see me getting into an argument with someone at UEA who'll say we must adhere to it !. [...]

E-mail: 1219239172 [Extract]
From: Phil Jones <p.jones@xxxxxxxxx.xxx>
To: Gavin Schmidt <gschmidt@xxxxxxxxx.xxx>
Subject: Re: Revised version the Wengen paper
Date: Wed Aug 20 09:32:52 2008

[...] Keith/Tim still getting FOI requests as well as MOHC and Reading. All our FOI officers have been in discussions and are now using the same exceptions not to respond - advice they got from the Information Commissioner. As an aside and just between us, it seems that Brian Hoskins has withdrawn himself from the WG1 Lead nominations. It seems he doesn't want to have to deal with

110 Ev 9, para 3.7

111 Q 58

this hassle.

The FOI line we're all using is this. IPCC is exempt from any countries FOI – the Sceptics have been told this. Even though we (MOHC, CRU/UEA) possibly hold relevant info the IPCC is not part our remit (mission statement, aims etc) therefore we don't have an obligation to pass it on.
Cheers
Phil

E-mail: 1228330629
From: Phil Jones <p.jones@xxxxxxxxx.xxx>
To: santer1@xxxxxxxxx.xxx, Tom Wigley <wigley@xxxxxxxxx.xxx>
Subject: Re: Schles suggestion
Date: Wed Dec 3 13:57:09 2008
Cc: mann <mann@xxxxxxxxx.xxx>, Gavin Schmidt <gschmidt@xxxxxxxxx.xxx>, Karl Taylor <taylor13@xxxxxxxxx.xxx>, peter gleckler gleckler1@xxxxxxxxx.xxx

Ben,
When the FOI requests began here, the FOI person said we had to abide by the requests. It took a couple of half hour sessions - one at a screen, to convince them otherwise showing them what CA was all about. Once they became aware of the types of people we were dealing with, everyone at UEA (in the registry and in the Environmental Sciences school - the head of school and a few others) became very supportive. I've got to know the FOI person quite well and the Chief Librarian - who deals with appeals. The VC is also aware of what is going on - at least for one of the requests, but probably doesn't know the number we're dealing with. We are in double figures.

One issue is that these requests aren't that widely known within the School. So I don't know who else at UEA may be getting them. CRU is moving up the ladder of requests at UEA though - we're way behind computing though. We're away of requests going to others in the UK - MOHC, Reading, DEFRA and Imperial College. So spelling out all the detail to the LLNL management should be the first thing you do. I hope that Dave is being supportive at PCMDI. The inadvertent email I sent last month has led to a Data Protection Act request sent by a certain Canadian, saying that the email maligned his scientific credibility with his peers!

If he pays 10 pounds (which he hasn't yet) I am supposed to go through my emails and he can get anything I've written about him. About 2 months ago I deleted loads of emails, so have very little - if anything at all. This legislation is different from the FOI - it is supposed to be used to find put why you might have a poor credit rating ! In response to FOI and EIR requests, we've put up some data - mainly paleo data. Each request generally leads to more - to explain what we've put up. Every time, so far, that hasn't led to anything being added - instead just statements saying read what is in the papers and what is on the web site! Tim Osborn sent one such response (via the FOI person) earlier this week. We've never sent programs, any codes and manuals.

In the UK, the Research Assessment Exercise results will be out in 2 weeks time.
These are expensive to produce and take too much time, so from next year we'll be moving onto a metric based system. The metrics will be # and amounts of grants, papers and citations etc. I did flippantly suggest that the # of FOI requests you get should be another.

When you look at CA, they only look papers from a handful of people. They will start on another coming out in The Holocene early next year. Gavin and Mike are on this with loads of others. I've told both exactly what will appear on CA once they get access to it!
Cheers

Phil
E-mail: 1237496573 [Extract] From: Phil Jones <p.jones@xxxxxxxxx.xxx> To: santer1@xxxxxxxxx.xxx Subject: Re: See the link below Date: Thu Mar 19 17:02:53 2009 [...] CRU has had numerous FOI requests since the beginning of 2007. The Met Office, Reading, NCDC and GISS have had as well – many related to IPCC involvement. I know the world changes and the way we do things changes, but these requests and the sorts of simple mistakes, should not have an influence on the way things have been adequately dealt with for over a century. Cheers Phil

81. In his submission Andrew Montford stated that:

> Research materials should be made available to outsiders as a requirement of the scientific method. That scientists have failed to do so is reprehensible, but the fact that they have apparently also resorted to breaches of the Freedom of Information Act in order to do so requires urgent attention from policymakers.[112]

82. As we explained in the previous chapter, David Holland was the author of several FOIA requests that were mentioned in the leaked e-mails. In his submission he pointed out that on 9 May [2008] in e-mail 1210367056, Professor Jones sent "my formal information request to 'team' members Mann, Hughes and Ammann" writing:

> You can delete this attachment if you want. Keep this quiet also, but this is the person who is putting in FOI requests for all emails Keith and Tim have written and received re Ch 6 of AR4.[113] We think we've found a way around this.[114]

83. Mr Holland also drew attention to e-mail 1212063122 dated 29 May 2008 in which Professor Jones asked Professor Mann:

> Can you delete any emails you may have had with Keith re AR4? Keith will do likewise. Can you also email [Eu]Gene [Wahl] and get him to do the same? I don't have his new email address. We will be getting Caspar [Ammann] to do likewise.[115]

Correspondence with the Deputy Information Commissioner

84. On 22 January 2010, when the Deputy Information Commissioner, Graham Smith, issued a statement which suggested that at l east some of the requested information should

112 Ev 159, para 6

113 Intergovernmental Panel on Climate Change: Fourth Assessment Report

114 Ev 117, para 23

115 Ev 118, para 32

have been disclosed in the absence of applicable exemptions, it gave support to the criticisms of CRU's handling of FOIA requests. Mr Smith said:

> The FOI Act makes it an offence for public authorities to act so as to prevent intentionally the disclosure of requested information. Mr Holland's FOI requests were submitted in 2007/8, but it has only recently come to light that they were not dealt with in accordance with the Act. The legislation requires action within six months of the offence taking place, so by the time the action came to light the opportunity to consider a prosecution was long gone.[116]

85. Mr Thomas commented that this was "clearly a reference to section 77 of the Act and/or the near-identical Regulation 19 of EIR".[117] Section 77 of the FOIA provides:

> 1. Where:
>
> (a) a request for information has been made to a public authority,
>
> (b) under section 1 of this Act or section 7 of the Data Protection Act 1998, the applicant would have been entitled (subject to payment of any fee) to communication of any information in accordance with that section,
>
> any person to whom this subsection applies is guilty of an offence if he alters, defaces, blocks, erases, destroys or conceals any record held by the public authority, with the intention of preventing the disclosure by that authority of all, or any part, of the information to the communication of which the applicant would have been entitled.
>
> 2. Subsection (1) applies to the public authority and to any person who is employed by, is an officer of, or is subject to the direction of, the public authority.
>
> 3. A person guilty of an offence under this section is liable on summary conviction to a fine not exceeding level 5 on the standard scale.[118]

86. Mr Thomas added that the Deputy Commissioner also appeared "to have in mind" section 127(1) of the Magistrates Court Act 1980, which provides that

> a magistrates' court shall not try an information or hear a complaint unless the information was laid, or the complaint made, within 6 months from the time when the offence was committed, or the matter of complaint arose.[119]

Mr Thomas confirmed in oral evidence that

> because of the interaction with the Magistrates Court Act, any prosecution must be brought within six months of the offence being committed.[120]

87. In its memorandum to our inquiry, UEA defended its actions:

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116 Ev 9, para 4.1

117 Ev 10

118 Ev 10, para 4.1

119 Ev 10, para 4.2

120 Q 56

> CRU has been accused of refusing to release data requested under the FOIA. There are many obstacles outside CRU's control surrounding the release of data provided by NMSs [National Meteorological Services]. Many FOIA requests made to CRU related to primary data provided by the NMSs. Some of these data are subject to formal non-publication agreements between the NMS and CRU. Other primary data had been provided to CRU on an individual-to-individual basis, with accompanying verbal agreements that they may be used within the gridded dataset, but should not be passed on to others. CRU responded to the FOIA requests for primary data by pointing out that approximately 90% of the stations in the CRU dataset are available from other sources, particularly GHCN.[121]

88. On 29 January there was an exchange between UEA and Mr Smith, the Deputy Commissioner. Brian Summers, the Registrar and Secretary of UEA responded forcibly to Mr Smith's 22 January press statement, which asserted that UEA had not dealt with FOIA requests "as they should have been under the legislation".[122] He did not consider it was "acceptable that such a statement which has led to an extremely damaging commentary on the University [was] first communicated to the University by a journalist".[123] His letter goes on to defend UEA's actions in detail and to ask that, if the Information Commissioner's Office (ICO) cannot retract the 22 January statement, it issue a clarification regarding the alleged breaches of the FOIA. A response from the ICO was issued the same day. It did not retract the original statement but offered clarification:

> 1. [No] decision notice has yet been issued and no alleged breaches have yet been put to the University for comment. That matter has yet to be addressed, but it will be over coming months.
>
> 2. The fact that the elements of a section 77 offence may have been found here, but cannot be acted on because of the elapsed time, is a very serious matter. The ICO is not resiling from its position on this.
>
> 3. The ICO's position is as stated in point 2 above. The statement may be read to indicate that.[124] Under section 77, an offence may be committed by an individual, not necessarily the public authority itself.
>
> 4. Errors like this are frequently made in press reports and the ICO cannot be expected to correct them, particularly when the ICO has not itself referred to penalties or sanctions in its own statement.[125]

121 Ev 20, para 3.7.2

122 "Scientists in stolen e-mail scandal hid climate data", *The Times*, 28 January 2010

123 Registrar and Secretary to Deputy Information Commissioner - 29 January 2010, UEA website, Correspondence between University of East Anglia and the Information Commissioner's Office, www.uea.ac.uk/mac/comm/media/press/CRUstatements/ICOcorrespondence

124 UEA had asked the Deputy Commissioner to confirm that "your statement cannot be taken to mean that there has been a demonstrable breach of Section 77, which is a breach of the FOI which can result in prosecution"; Registrar and Secretary to Deputy Information Commissioner, 29 January 2010, UEA website, Correspondence between University of East Anglia and the Information Commissioner's Office, www.uea.ac.uk/mac/comm/media/press/CRUstatements/ICOcorrespondence

125 Deputy Information Commissioner to Registrar and Secretary - 29 January 2010, UEA website, Correspondence between University of East Anglia and the Information Commissioner's Office, www.uea.ac.uk/mac/comm/media/press/CRUstatements/ICOcorrespondence

89. UEA responded on 1 February thanking the ICO for the clarification but setting out its concerns relating to the press coverage of the ICO's original statement:

> Your clarification that the press cannot infer from your statement to the Sunday Times that it has been established that the University (or indeed any individual associated with the University) has breached the terms of the Freedom of Information Act is welcome. [UEA's] reputation which has been subjected to these damaging and incorrect assertions claiming to be based on your statement and we must take some steps to put this right. We will be writing to the media which carried reports based on your statement, pointing out the inaccuracies and asking them to rectify the position.[126]

90. In his oral evidence Professor Acton questioned the ICO statement of 22 January:

> our principle is that *prima facie* evidence is evidence which on the face of it and without investigation suggests that there is a case to answer. To my mind if there is *prima facie* evidence; why did I set up the Muir Russell independent review? Prima facie evidence is not the same as, you have been found to breach. [...] If it is sub judice, if, as we had in the letter ten days ago from the ICO, the investigation has not even begun, I am puzzled how we could have been found to breach if there has been no investigation.[127]

91. The ICO's most recent letter, dated 3 March, in UEA's view, "makes plain that there is no assumption by the ICO, prior to investigation, that UEA has breached the Act; and that no investigation has yet been completed."[128] The ICO's letter confirmed that the "ICO is not pursuing any investigation under section 77 of the Act. That matter is closed as far as the ICO is concerned, given the statutory time limits for action". It added that:

> The ICO acknowledges your concern about the statement made and the subsequent media and blog reports. Given that the Deputy Commissioner has already been publicly associated with the matter, any Decision Notice will be reviewed and signed off by another authorised signatory.[129]

We regret that the ICO made a statement to the press that went beyond that which it could substantiate and that it took over a month for the ICO properly to put the record straight. We recommend that the ICO develop procedures to ensure that its public comments are checked and that mechanisms exist to swiftly correct any mis-statements or misinterpretations of such statements.

92. The disclosed e-mails appear to show a culture of non-disclosure at CRU and instances where information (disclosable or otherwise) may have been deleted, to avoid disclosure. The Deputy Information Commissioner's letter of 29 January gives a clear indication that a

126 Registrar and Secretary to Deputy Information Commissioner - 1 February 2010, UEA website, Correspondence between University of East Anglia and the Information Commissioner's Office, www.uea.ac.uk/mac/comm/media/press/CRUstatements/ICOcorrespondence

127 Q130

128 Ev 39, para A

129 Ev 39, annex

breach of the FOIA may have occurred but that a prosecution was time-barred.[130] As, however, UEA pointed out, no investigation has been carried out.

93. It seems to us that both sides have a point. **There is *prima facie* evidence that CRU has breached the Freedom of Information Act 2000. It would, however, be premature, without a thorough investigation affording each party the opportunity to make representations, to conclude that UEA was in breach of the Act. In our view, it is unsatisfactory to leave the matter unresolved simply because of the operation of the six-month time limit on the initiation of prosecutions. Much of the reputation of CRU hangs on the issue. We conclude that the matter needs to be resolved conclusively—either by the Independent Climate Change Email Review or by the Information Commissioner.**

94. On the question of the six-month time limit on the initiation of prosecutions, Mr Thomas pressed for a revision of the law. He pointed out that apart from in the most blatant cases "it will usually be impossible for the ICO to detect an offence within 6 months of its occurrence" and thus to be able to initiate a prosecution.[131] He drew attention to a recent debate in the House of Lords on a proposal to amend the time limit. In reply, in the debate the Parliamentary Under-Secretary of State at the Ministry of Justice said that:

> The Freedom of Information Act 2000 came into force only in 2005, and [...] we have no evidence at present that the current six-month time limit presents a systemic problem for the Information Commissioner or any other prosecutor in taking action under Section 77. [...] We will listen to the views of the Information Commissioner and other interested parties on this point, and if there is evidence that the current legislation is causing systemic difficulties, we will look for ways to address the matter, if necessary by means of an alternative legislative vehicle in the future. However, I cannot go further than that today on behalf of the Government.[132]

No change was made to the legislation.

95. We consider that events at CRU throw light on the operation of the Freedom of Information Act 2000 and, in particular, whether there is a need to amend the time limit on prosecutions from six months from the time the alleged offence was committed. **If the Minister was correct to assert in July 2009 that the Government had no evidence that the current six-month time limit presents a systemic problem, then it is now clear that such evidence exists. Irrespective of whether or not CRU breached the Freedom of Information Act 2000, we recommend that the Government review the operation of section 77 of the 2000 Act and the six month limit on the initiation of prosecutions provided by section 127(1) of the Magistrates Court Act 1980.**

130 UEA website, Correspondence between University of East Anglia and the Information Commissioner's Office, www.uea.ac.uk/mac/comm/media/press/CRUstatements/ICOcorrespondence

131 Ev 10, para 4.3

132 HL Deb, 21 July 2009, col 1571

Volume of requests

96. In the face of allegations of poor handling of FOIA requests, one of the explanations offered by UEA was that in:

> July 2009 UEA received an unprecedented, and frankly administratively overwhelming, deluge of FOIA requests related to CRU. These amounted to 61 requests out of a 2009 total of 107 related to CRU, compared to annual totals of 2 in 2008 and 4 in 2007 (University totals for those years were 204, 72 and 44 respectively).[133]

97. At the oral evidence session Lord Lawson commented on the increase in the volume of FOIA requests:

> what had happened was there had been a very, very small number of FOI Act requests to begin with and it was in response to those that there was all the evasion, the lack of disclosure and all the other things which we have seen in the emails: discussions about possibly destroying evidence and so on. All that came well before the 2009 flood of stuff. The 2009 flood, if you look at the sequence of events, was a response to the refusal to give disclosure of various things before. That was what came first.[134]

98. There are two issues here: the adequacy of CRU's handling of the FOIA requests and whether the increase in the number of requests in July 2009 was a deluge. On the latter, Mr Thomas said that, whilst agreeing that UEA had faced a significant rise in FOIA requests in July 2009, he did not consider that a total of 61 was a "huge number".[135]

99. On handling, CRU claimed that it could not cope with the significant rise in FOIA requests because it only had three full-time academic staff.[136] We therefore wrote to UEA on 2 March 2010 to ask what extra resources were provided to assist CRU cope with these requests. UEA responded that:

> additional support was provided to the University's Information Policy Compliance Manager (IPCM) who handles FOI requests. This included rescheduling workloads to allow him to concentrate on the CRU FOI requests and diverting secretarial support to provide additional resource. Given the high volume of requests received, the Director of Information Services (DoIS) also took an active role in the first stage of a number of requests, thus providing additional support to the IPCM. (Should any cases where the DoIS was directly involved in the first stage be appealed then we have arranged for the PVC Academic to adjudicate to ensure impartiality). ISD also fast-tracked the merging of the Security Policy and Compliance team to ensure that a fully trained back-up to the IPCM was available.[137]

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133 Ev 20, para 3.7.4

134 Q 9

135 Q 68

136 Q 92 [Professor Acton], Ev 20, para 3.7.4; Ev 37, Q 1

137 Ev 37, para 1

100. The Science Faculty also provided additional administrative support, including that of the Director of Faculty Administration, the most senior member of the Faculty's administrative staff. UEA pointed out that many of the requests were of a very technical nature and:

> required scientific knowledge and understanding of the subject area in order to provide the details. Despite the additional administrative resources provided, the requirement to respond to the 61 requests received in July 2009 impacted considerably upon the work of CRU.[138]

101. We also asked UEA to outline what legal advice and guidance on handling had been offered to CRU in handling these FOIA requests. UEA confirmed that the:

> IPCM provided advice to CRU on the requirements of the Act both generally, and in relation to any applicable sections, exemptions or exceptions pertaining to the specific request. In this latter role, the IPCM set out the requirements of any possible exemption or exception, inclusive of the public interest test, and elicited from CRU staff whether the public interest test had been met. Additional advanced training was provided to the 'FOI Contact' for the Faculty of Science, the Director of Faculty Administration. In this role, the FOI contact acted as a support to CRU in the location and retrieval of information and provided assistance to the IPCM in exploring the application of the Act to the specific requests.[139]

102. On the evidence we took we have concerns about the handling of FOIA requests by CRU. First, the disclosed e-mails betray an attitude to freedom of information that was antipathetic to the spirit of disclosure in the legislation. Mr Thomas pointed out that:

> the simplest approach, particularly where requests tend to generate either a defensive attitude or place a great burden on the public authority, is proactive disclosure in the first place.[...] Public authorities ought to decide what really has to be kept away from the public. If it is particularly sensitive or there is a good reason for withholding it, fair enough, but where there is no good reason for withholding information, then why not proactively disclose it and avoid the hassle of large numbers of requests?[140]

103. Whether or not CRU liked it, those making FOIA requests were entitled to have their requests dealt with in accordance with the legislation and, if the information sought did not fall within one of the exclusions provided by the FOIA, it should have been disclosed. **We have already recommended in paragraph 54 above that in future information, including data and methodology, should be published proactively on the internet wherever possible. However, a culture of withholding information—from those perceived by CRU to be hostile to global warming—appears to have pervaded CRU's approach to FOIA requests from the outset. We consider this to be unacceptable.**

104. In the face of such an unhelpful approach we are not surprised that FOIA requests multiplied. When the surge in FOIA requests hit CRU in July 2009 UEA provided extra

138 Ev 37, para 1

139 Ev 37, para 2

140 Q 70

resources but because of their technical nature the same small group of staff at CRU had a pivotal role in handling the requests. We are not clear that the culture changed. **We cannot reach a firm conclusion on the basis of the evidence we took but we must put on record our concern about the manner in which UEA allowed CRU to handle FOIA requests. Further, we found *prima facie* evidence to suggest that the UEA found ways to support the culture at CRU of resisting disclosure of information to climate change sceptics. The failure of UEA to grasp fully the potential damage to CRU and UEA by the non-disclosure of FOIA requests was regrettable. UEA needs to review its policy towards FOIA and re-assess how it can support academics whose expertise in this area is limited.**

4 Independent inquiries

105. There are two reviews underway: the Independent Climate Change Email Review led by Sir Muir Russell; and a scientific assessment panel reviewing CRU's key scientific publications. The Vice-Chancellor explained to us in oral evidence on 1 March 2010 that the reviews would focus on different matters:

> Muir Russell's independent review is not looking at the science, it is looking at allegations about malpractice. As for the science itself, I have not actually seen any evidence of any flaw in the science but I am hoping, later this week, to announce the chair of a panel to reassess the science and make sure there is nothing wrong.[141]

In the event the announcement was not made until 22 March.

The Independent Climate Change Email Review

106. The Independent Climate Change Email Review is being conducted by a team, led by Sir Muir Russell. According to the Review's website the team has more than 100 years' collective expertise of scientific research methodology and a wide range of scientific backgrounds. None have any links to the Climatic Research Unit, or the United Nations' Intergovernmental Panel on Climate Change (IPCC).[142]

Terms of reference

107. The Review's terms of reference are as follows:

> The Independent Review will investigate the key allegations that arose from a series of hacked e-mails from the University of East Anglia's Climatic Research Unit (CRU). The review will:
>
> 1.1. Examine the hacked e-mail exchanges, other relevant e-mail exchanges and any other information held at CRU to determine whether there is any evidence of the manipulation or suppression of data which is at odds with acceptable scientific practice and may therefore call into question any of the research outcomes.
>
> 1.2. Review CRU's policies and practices for acquiring, assembling, subjecting to peer review and disseminating data and research findings, and their compliance or otherwise with best scientific practice.
>
> 1.3. Review CRU's compliance or otherwise with the University's policies and practices regarding requests under the Freedom of Information Act ('the FOIA') and the Environmental Information Regulations ('the EIR') for the release of data.

141 Q 129

142 www.cce-review.org/About.php

> 1.4. Review and make recommendations as to the appropriate management, governance and security structures for CRU and the security, integrity and release of the data it holds.[143]

108. Sir Muir has discretion to amend or add to the terms of reference if he feels necessary, devise his own methods of working, and call on appropriate expertise, in order to investigate the allegations fully. UEA has asked for the Review to be completed by Spring 2010 and this will be made public along with UEA's response.[144]

109. Lord Lawson, in both his written submission and his oral evidence, considered that the terms of reference "may be a bit too CRU-centric"[145] and "needed to be extended to include more fully the issue of the dissenting scientists".[146] These points were echoed in written submissions to us. Andrew Montford suggested that:

> The independence of the review is not assured. Sir Muir Russell was appointed to head the review by the vice-chancellor of the University of East Anglia, [...] Edward Acton. However, the emails disclosed implicate [his] predecessor in an apparent breach of the Freedom of Information Act and there is therefore a prime-facie case that the review is not sufficiently independent. [...] The review must take evidence from sceptics. At time of writing it appears that no prominent sceptic has been contacted by Sir Muir with a view to providing evidence. Without complainants being able to make their case to the review, it is unlikely that the findings will be sound or accepted by the sceptic community.[147]

Mike Haseler, creator of the Number 10 Petition regarding the CRU, was also critical of the Review saying that it "seems to serve no real purpose except the PR of the University to appear to be doing something."[148]

110. Others offered amendments to the terms of reference. Professor Ross McKitrick, a professor of environmental economics, recommended that the terms of reference "should consider whether CRU scientists whose responsibilities include providing climate data to the IPCC should not serve as IPCC Lead Authors (or Coordinating Lead Authors) on any Report or Chapter that assesses evidence for or against its quality for climatic research purposes."[149]

111. The Royal Society of Chemistry considered the terms of reference "adequate"[150] and Professor John Beddington suggested that they "give sufficient scope for the issue to be investigated in full".[151] Professor Peter Cox, a former lead author on the last IPCC Working

143 Ev 39

144 "Sir Muir Russell to head the Independent Review into the allegations against the Climatic Research Unit (CRU)" UEA Press Release, 3 December 2009, www.uea.ac.uk/mac/comm/media/press/2009/dec/CRUreview

145 Q 5, Ev 1, annex containing letter dated 26 January 2010 from the Foundation to Sir Muir Russell (*not printed*)

146 Q 3

147 Ev 161, paras 22 and 24

148 Ev 139, para 27

149 Ev 140, para 3.2

150 Ev 172, para 12

151 Ev 45, para 7

Group, suggested that the "Inquiry should hear evidence on the reviewing of scientific papers and the exclusion of papers from the IPCC report. It will be critical to determine whether these decisions were carried out on the basis of scientific merit alone".[152]

112. In response to criticisms Sir Muir pointed out that the review "is not actually about the big science of global warming and making forecasts for the next hundred years".[153] He said that "it will not be window dressing", and UEA had "not interfered at all".[154]

113. **We accept the assurances that Sir Muir Russell has given about the independence of the Independent Climate Change Email Review and we expect him to be scrupulous in preserving its impartiality. We see no reason why the Review's conclusions and UEA's response have to be published together. Indeed, it could give the impression that UEA was being given an advantage when it comes to responding. We consider that the Review's conclusions and recommendations should not be conveyed to UEA in advance of publication.**

114. **With regards to the terms of reference of the Review, we consider that as well as measuring CRU against current acceptable scientific practice, the Review should also make recommendations on best practice to be followed by CRU in the future. We invite Sir Muir Russell to respond formally to our Report to the extent that he sets out whether, on the basis of its contents, he finds the Terms of Reference of his inquiry need to be changed.**

The Review team

115. The Review Team membership, as announced, consisted of:

Sir Muir Russell
Professor Geoffrey Boulton
Dr Philip Campbell [*subsequently resigned*]
Professor Peter Clarke
Mr David Eyton
Professor Jim Norton.[155]

116. Sir Muir and the Review team held a press briefing at the Science Media Centre in London on 11 February 2010 to announce its membership, publish its workplan and issue a call for submissions from interested parties. Almost immediately it was beset by claims of partiality. On the same day as the launch Sir Muir Russell accepted the resignation of Dr Philip Campbell, Editor of Chief of *Nature*, after a recording of an interview given by Dr Campbell to China Radio International in December 2009 was alleged to raise doubts over his impartiality. Dr Campbell said:

> I made the remarks in good faith on the basis of media reports of the leaks. As I have made clear subsequently, I support the need for a full review of the facts behind the

152 Ev 132, para 2

153 Q 163

154 Q 166

155 Ev 40

> leaked e-mails. There must be nothing that calls into question the ability of the independent Review to complete this task, and therefore I have decided to withdraw from the team.[156]

117. Sir Muir said "I have spoken to Philip Campbell, and I understand why he has withdrawn. I regret the loss of his expertise, but I respect his decision."[157] Further allegations arose on 12 February that Professor Geoffrey Boulton's background and views affected his ability to be a member of the Review.[158] These have been rejected by Sir Muir Russell and by Professor Boulton. Professor Boulton said:

> At the Review press conference (on February 11), I pointed out that I had worked full-time in the School of Environmental Sciences at UEA from its inception in 1968 to 1980, and that I had a part-time appointment between 1980 and 1986, whilst working primarily in the University of Amsterdam. Since then, I have had no professional contact with the University of East Anglia or the Climatic Research Unit. I was equally clear that although my research is not in the field of modern or recent climate change, I am familiar with its scientific basis and uncertainties surrounding it. I declared my current view of the balance of evidence: that the earth is warming and that human activity is implicated. These remain the views of the vast majority of scientists who research on climate change in its different aspects. They are based on extensive work worldwide, not that of a single institution. As a sceptical scientist, I am prepared to change those views if the evidence merits it. They certainly do not prevent me from being heavily biased against poor scientific practice, wherever it arises.[159]

Sir Muir Russell said:

> This Review must determine if there is evidence of poor scientific practice, as well as investigate allegations around the manipulation and suppression of data. As others have pointed out, it would be impossible to find somebody with the qualifications and experience we need who has not formed an opinion on climate change. I am completely confident that each member of the Review team has the integrity, the expertise, and the experience to complete our work impartially.[160]

118. In his oral evidence Sir Muir outlined his approach in choosing the team:

156 "Dr Philip Campbell withdraws from the Review", *Independent Climate Change Email Review News release*, 12 February 2010, www.cce-review.org/News.php

157 *As above*

158 There has been pressure on Professor Boulton to step down. *The Scotsman* reported: "Dr Benny Peizer, [*sic*] director of the Global Warming Policy Foundation, a think tank which claims the debate on climate change has become distorted, called for Prof Boulton to step down, too. He said: 'Prof Boulton obviously is a very distinguished geologist. The problem is, he is a very outspoken campaigner on this issue and he's given talks calling for galvanising public opinion. He also worked at the very institution that he is now going to be investigating. That, we think, is a conflict of interest.'" ("Senior Scots scientist in climate probe row", *The Scotsman*, 13 February 2010) Sir Muir has rejected the call. ("Allegations of bias against Review member rejected", *Independent Climate Change Email Review News release*, 15 February 2010)

159 "Allegations of bias against Review member rejected", *Independent Climate Change Email Review News release*, 15 February 2010,www.cce-review.org/News.php

160 *As above*

> You can see as you look at the composition of the team that I needed to be looking at climate science in general but not somebody who was associated with this particular stream of work but would understand what was going on. There were going to be huge data handling issues, there was a lot of work on computing and data security and so on and that the work was going to have a resonance out there in the real world and around the world. Really on that basis I came up with this set of names that you can see. In relation to Dr Campbell, the others that I had got together thought that it would be extremely important to have somebody who knew about peer review and that was really the qualification that brought him in.[161]

119. **It is unfortunate that the Independent Review got off to a bad start with the necessary resignation of Dr Campbell. The question of the operation of peer review is going to be a critical issue in the inquiry and the Review Team needs to take steps to ensure the insight and experience he would have brought are replaced.**

Transparency

120. Contributors to our inquiry have suggested the importance that the Independent Review is open and transparent. Lord Lawson, in his oral evidence, said that he was:

> concerned about the openness and transparency, [...] there should be public hearings, like you are having here—I think that is very, very important—and I regret the fact that it appears that they do not intend to do this.[162]

Andrew Montford commented:

> The review must be held in public. Sir Muir Russell has stated that he wants to retain the confidence of global warming sceptics. However, in his letter to Mr Willis of 10 December 2009, [...] the vice-chancellor of UEA, states that Sir Muir will present his findings to [him], who will in turn present a report to the council of the university. We are asked to believe that Sir Muir will properly investigate [the Vice-Chancellor's] role in the alleged FoI breaches, and that [he] will pass on the findings that Sir Muir makes on this subject to the university council.[163]

121. When answering our question on transparency Sir Muir indicated that the Review team "plans to put on its website the evidence that we receive".[164] When pressed on the question of holding public evidence sessions Sir Muir responded that:

> all my predispositions and those of the fellow team members are to do it that way [via written evidence] rather than to do it in a hearing of perhaps this kind or in a series of one-to-one interviews or whatever. Where we have interviews with people in CRU or elsewhere, those will be written up and they will be part of the record but at the moment I am not really sure that getting to the stage of putting people in a

161 Q 160

162 Q 3

163 Ev 161, para 23

164 Q 172

> hearing context is going to be a particularly effective way of adding value to the objective evidence that we want to get our hands on.[165]

122. We agree that the Review must be open and transparent. **We conclude that, when the Independent Review holds oral hearings or interviews, they should be carried out in public wherever possible and that it should publish all the written evidence it receives on its website as soon as possible.**

Scientific Appraisal Panel

123. In its evidence to us the Independent Climate Change Email Review stated that its remit does not invite it to re-appraise the scientific work of CRU. That re-appraisal is being separately commissioned by UEA, with the assistance of the Royal Society.[166] In a statement released on 11 February UEA said that:

> The Royal Society will assist the University in identifying assessors with the requisite expertise, standing and independence. "Published papers from CRU have gone through the rigorous and intensive peer review process which is the keystone for maintaining the integrity of scientific research," said Professor Trevor Davies, the University's Pro-Vice-Chancellor for Research, Enterprise and Engagement. "That process and the findings of our researchers have been the subject of significant debate in recent months. Colleagues in CRU have strenuously defended their conduct and the published work and we believe it is in the interests of all concerned that there should be an additional assessment considering the science itself."
>
> The independent reassessment will complement Sir Muir Russell's Review of the key allegations about the handling of data arising from the publication of a series of e-mails hacked from CRU. Sir Muir's Review is expected to announce its finding in Spring 2010.
>
> The reassessment of CRU's key publications will be completed at the earliest date the assessors can manage. The findings will be made public.[167]

124. Details of the panel were announced on 22 March. It will be headed by Lord Oxburgh. His appointment was made on the recommendation of the Royal Society, which was also consulted on the choice of the six scientists on the panel: Professor Huw Davies, Professor of Physics at the Institute for Atmospheric and Climate Science at ETH Zürich; Professor Kerry Emanuel, Professor of Meteorology at Massachusetts Institute of Technology; Professor Lisa Graumlich, Director of the School of Natural Resources and the Environment at The University of Arizona; Professor David Hand, Professor of Statistics in the Department of Mathematics at Imperial College; Professor Herbert Huppert, Professor of Theoretical Geophysics at the University of Cambridge; and Professor Michael Kelly, Prince Philip Professor of Technology at the University of Cambridge. The panel will have

165 Q 176

166 Ev 40, para 4

167 UEA, 11 February 2010, www.uea.ac.uk/mac/comm/media/press/CRUstatements/New+scientific+assessment+of+climatic+research+publications+announced

access to any publications or materials it requests, and all information considered will be listed in the Report. UEA, in consultation with the Royal Society, has suggested that the panel looks in particular at key publications, from the body of CRU's research referred to in the UEA submission to our inquiry. According to the announcement on 22 March, the panel will meet in Norwich in April and will have the opportunity to see original data and speak to those who did the work and it comprises of scientists who use techniques similar to those used in CRU but who largely apply them to other areas of research, as well as those with experience in climate or related research.[168]

125. Announcing the Panel, Professor Trevor Davies, UEA's Pro-Vice-Chancellor for Research, said that:

> Our concern has been to bring together a distinguished group of independent scientists who understand the difference between assertion and evidence, and are familiar with using the latter to judge the validity of conclusions arising from science research. The panel members have the right mix of skills to understand the complex nature of climate research and the discipline-based expertise to scrutinise CRU's research. How they do this will be entirely down to the panel.
>
> The choice of scientists is sure to be the subject of discussion, and experience would suggest that it is impossible to find a group of eminent scientists to look at this issue who are acceptable to every interest group which has expressed a view in the last few months. Similarly it is unlikely that a group of people who have the necessary experience to assess the science, but have formed no view of their own on global warming, could be found.[169]

Public view of the climate science

126. There is no doubt that the e-mail disclosure from CRU in November 2009, and especially the extensive media coverage that has followed it ever since, has affected the general public view of climate science, both in the UK and further afield. Professor Bob Watson, Defra's Chief Scientific Adviser, told us that "the media has certainly portrayed the UEA issue as a crisis, so I think to the public it has been portrayed as a crisis".[170] Professor Peter Cox, a climate scientist and a lead-author on the last IPCC[171] Working Group, in his written submission to us, said as much: "I am concerned that public confidence in the science of climate change has been undermined by the email leak".[172] In its submission the Royal Society of Chemistry said that the:

> true nature of science dictates that research is transparent and robust enough to survive scrutiny. A lack of willingness to disseminate scientific information may infer that the scientific results or methods used are not robust enough to face scrutiny, even if this conjecture is not well-founded. This has far-reaching consequences for

168 "CRU Scientific Assessment Panel announced", UEA Press Release, 22 March 2010, www.uea.ac.uk/mac/comm/media/press/CRUstatements/SAPannounce

169 *As above*

170 Q 198

171 Intergovernmental Panel on Climate Change

172 Ev 132, para 1

> the reputation of science as a whole, with the ability to undermine the public's confidence in science.[173]

127. The majority of submissions submitted to our inquiry has been from those who stated that the disclosed e-mails confirmed their worries that the climate change orthodoxy has serious flaws and the actions of CRU seriously impugned the integrity of climate change research.[174] A representative example was the memorandum from Dr Phillip Bratby, "a semi-retired energy consultant", who said that having examined the disclosures:

> It is concluded that over at least a period of 20 years, climate science has been seriously compromised by the actions of a small group of scientists who have attempted to control the debate about climate change. The effects of this are potentially profound. For example a generation of work may have been corrupted and may be unreliable. A generation of students may have been corrupted and their work may be unreliable.[175]

128. Others offered a different perspective. Dr Timothy Osborn, a full-time member of staff at CRU, defended CRU:

> It is impossible to draw firm conclusions from the hacked documents and emails. They do not represent the complete record, and they are not a random selection from the complete record. They are clearly selected with a purpose in mind and it is easy for people to fall into the traps set by those who did the selection.[176]

129. Beyond CRU, Professor Hans von Storch and Dr Myles Allen, professional statistical climatologists, agreed that the publication of the hacked e-mails had initiated an intense debate about the credibility of climate science and that "unfortunately, this debate sometimes goes so far as to question a key result of climate science",[177] and the

> language used in some of these e-mails has created concern, among both scientists and the public, about the openness and integrity of the scientific process. But at the same time it is critical to point out that no grounds have arisen to doubt the validity of the thermometer-based temperature record since 1850, nor any results based upon it.[178]

130. We put the concerns about the threat to the reputation of science to the fifth panel who gave oral evidence: Professor John Beddington, Government Chief Scientific Adviser, Professor Julia Slingo, Chief Scientist, Met Office, and Professor Bob Watson, Chief Scientist, Department for Environment, Food and Rural Affairs. Professor Beddington did

173 Ev 171, para 4

174 For examples, see Ev 68 [Richard S Courtney]; Ev 77 [Walter Radtke]; Ev 78 [Geoffrey Sherrington]; and Ev 93 [Clive Menzies]

175 Ev 92, para 21

176 Ev 130, para 3

177 Ev 172, para 1

178 *As above*

not consider that "UK science has been damaged".[179] The Met Office, in its written submission stated that

> the UK enjoys a reputation for strong and robust science on the international stage. In the field of climate research the Met Office is widely acknowledged as world leading.[180]

Professor Slingo confirmed in oral evidence that she has "absolute confidence in the science that we produce at the Met Office",[181] and Professor Watson, looking at the wider situation, attested that "there is absolutely no adverse effect on any of the conclusions of the IPCC."[182]

131. **In our view, reputation has to be built on the solid foundation of excellent, peer-reviewed science. The review of the science to be carried out by the Scientific Appraisal Panel, which UEA announced on 22 March, should determine whether the work of CRU has been soundly built and it would be premature for us to pre-judge that review.**

132. **Reputation does not, however, rest solely on the quality of work as it should. It also depends on perception. It is self-evident that the disclosure of CRU e-mails has damaged the reputation of UK climate science and, as views on global warming have become polarised, any deviation from the highest scientific standards will be pounced on. As we explained in chapter 2, the practices and methods of climate science are a key issue. If the practices of CRU are found to be in line with the rest of climate science, the question would arise whether climate science methods of operation need to change. In this event we would recommend that the scientific community should consider changing those practices to ensure greater transparency.**

Need for a single review

133. The final issue is whether the best interests of science are served by having two reviews or inquiries. We found this difficult to evaluate as details of the Scientific Appraisal Panel were released in a late stage in our inquiry. When we asked Sir Muir whether it would be better to have a single inquiry, he responded:

> It would have been possible, obviously, to have constructed an inquiry that looked at both aspects of that, and that was not what I was asked to do. Whether I would have been the right person to be asked to do it I do not know but certainly it obviously became clear to the Vice Chancellor that there was this different issue about the confidence that one should have not in all the methodological and handling issues but in the higher level set of conclusions about what was actually happening.[183]

134. The process of two reviews or inquiries is underway. In our view there is the potential for overlap between the two inquiries—for example, the question of the operation of peer

179 Q 194

180 Ev 46, para 1

181 Q 197

182 Q 198

183 Q 181

review needs to examine both methodology and quality of the science subject to review. **The two reviews or inquiries need to map their activities to ensure that there are no unmanaged overlaps or gaps. If there are, the whole process could be undermined.**

5 Conclusions

135. Consideration of the complaints and accusations made against CRU has led us to three broad conclusions.

136. Conclusion 1 **The focus on Professor Jones and CRU has been largely misplaced. On the accusations relating to Professor Jones's refusal to share raw data and computer codes, we consider that his actions were in line with common practice in the climate science community. We have suggested that the community consider becoming more transparent by publishing raw data and detailed methodologies. On accusations relating to Freedom of Information, we consider that much of the responsibility should lie with UEA, not CRU.**

137. Conclusion 2 **In addition, insofar as we have been able to consider accusations of dishonesty—for example, Professor Jones's alleged attempt to "hide the decline"—we consider that there is no case to answer. Within our limited inquiry and the evidence we took, the scientific reputation of Professor Jones and CRU remains intact. We have found no reason in this unfortunate episode to challenge the scientific consensus as expressed by Professor Beddington, that "global warming is happening [and] that it is induced by human activity".[184] It was not our purpose to examine, nor did we seek evidence on, the science produced by CRU. It will be for the Scientific Appraisal Panel to look in detail into all the evidence to determine whether or not the consensus view remains valid.**

138. Conclusion 3 **A great responsibility rests on the shoulders of climate science: to provide the planet's decision makers with the knowledge they need to secure our future. The challenge that this poses is extensive and some of these decisions risk our standard of living. When the prices to pay are so large, the knowledge on which these kinds of decisions are taken had better be right. The science must be irreproachable.**

184 Q 191

Conclusions and recommendations

Datasets

1. We recognise that some of the e-mails suggest a blunt refusal to share data, even unrestricted data, with others. We acknowledge that Professor Jones must have found it frustrating to handle requests for data that he knew—or perceived—were motivated by a desire simply to seek to undermine his work. But Professor Jones's failure to handle helpfully requests for data in a field as important and controversial as climate science was bound to be viewed with suspicion. He was obviously frustrated by other workers in the field trying to "undermine" his work, but his actions were inevitably counterproductive. Professor Jones told us that the published e-mails represented only "one tenth of 1%" of his output, which amounts to one million e-mails, and that we were only seeing the end of a protracted series of e-mail exchanges. We consider that further suspicion could have been allayed by releasing all the e-mails. In addition, we consider that had the available raw data been available online from an early stage, these kinds of unfortunate e-mail exchanges would not have occurred. In our view, CRU should have been more open with its raw data and followed the more open approach of NASA to making data available. (Paragraph 38)

2. We are not in a position to set out any further the extent, if any, to which CRU should have made the data available in the interests of transparency, and we hope that the Independent Climate Change Email Review will reach specific conclusions on this point. However, transparency and accountability are of are increasing importance to the public, so we recommend that the Government reviews the rules for the accessibility of data sets collected and analysed with UK public money. (Paragraph 39)

3. We note that the research passed the peer review process of some highly reputable journals. However, we note that CRU could have been more open at that time in providing the detailed methodological working on its website. We recommend that all publicly funded research groups consider whether they are being as open as they can be, and ought to be, with the details of their methodologies. (Paragraph 45)

4. We therefore conclude that there is independent verification, through the use of other methodologies and other sources of data, of the results and conclusions of the Climate Research Unit at the University of East Anglia. (Paragraph 49)

5. Even if the data that CRU used were not publicly available—which they mostly are—or the methods not published—which they have been—its published results would still be credible: the results from CRU agree with those drawn from other international data sets; in other words, the analyses have been repeated and the conclusions have been verified. (Paragraph 51)

6. It is not standard practice in climate science and many other fields to publish the raw data and the computer code in academic papers. We think that this is problematic because climate science is a matter of global importance and of public interest, and therefore the quality and transparency of the science should be irreproachable. We

therefore consider that climate scientists should take steps to make available all the data used to generate their published work, including raw data; and it should also be made clear and referenced where data has been used but, because of commercial or national security reasons is not available. Scientists are also, under Freedom of Information laws and under the rules of normal scientific conduct, entitled to withhold data which is due to be published under the peer-review process. In addition, scientists should take steps to make available in full their methodological workings, including the computer codes. Data and methodological workings should be provided via the internet. There should be enough information published to allow verification. (Paragraph 54)

7. Critics of CRU have suggested that Professor Jones's use of the word "trick" is evidence that he was part of a conspiracy to hide evidence that did not fit his view that recent global warming is predominately caused by human activity. The balance of evidence patently fails to support this view. It appears to be a colloquialism for a "neat" method of handling data. (Paragraph 60)

8. Critics of CRU have suggested that Professor Jones's use of the words "hide the decline" is evidence that he was part of a conspiracy to hide evidence that did not fit his view that recent global warming is predominantly caused by human activity. That he has published papers—including a paper in *Nature*—dealing with this aspect of the science clearly refutes this allegation. In our view, it was shorthand for the practice of discarding data known to be erroneous. We expect that this is a matter the Scientific Appraisal Panel will address. (Paragraph 66)

9. The evidence that we have seen does not suggest that Professor Jones was trying to subvert the peer review process. Academics should not be criticised for making informal comments on academic papers. The Independent Climate Change Email Review should look in detail at all of these claims. (Paragraph 73)

Freedom of Information issues

10. We regret that the ICO made a statement to the press that went beyond that which it could substantiate and that it took over a month for the ICO properly to put the record straight. We recommend that the ICO develop procedures to ensure that its public comments are checked and that mechanisms exist to swiftly correct any mis-statements or misinterpretations of such statements. (Paragraph 91)

11. There is *prima facie* evidence that CRU has breached the Freedom of Information Act 2000. It would, however, be premature, without a thorough investigation affording each party the opportunity to make representations, to conclude that UEA was in breach of the Act. In our view, it is unsatisfactory to leave the matter unresolved simply because of the operation of the six-month time limit on the initiation of prosecutions. Much of the reputation of CRU hangs on the issue. We conclude that the matter needs to be resolved conclusively—either by the Independent Climate Change Email Review or by the Information Commissioner. (Paragraph 93)

12. If the Minister was correct to assert in July 2009 that the Government had no evidence that the current six-month time limit presents a systemic problem, then it is now clear that such evidence exists. Irrespective of whether or not CRU breached the Freedom of Information Act 2000, we recommend that the Government review the operation of section 77 of the 2000 Act and the six month limit on the initiation of prosecutions provided by section 127(1) of the Magistrates Court Act 1980. (Paragraph 95)

13. We have already recommended in paragraph 54 above that in future information, including data and methodology, should be published proactively on the internet wherever possible. However, a culture of withholding information—from those perceived by CRU to be hostile to global warming—appears to have pervaded CRU's approach to FOIA requests from the outset. We consider this to be unacceptable. (Paragraph 103)

14. We cannot reach a firm conclusion on the basis of the evidence we took but we must put on record our concern about the manner in which UEA allowed CRU to handle FOIA requests. Further, we found *prima facie* evidence to suggest that the UEA found ways to support the culture at CRU of resisting disclosure of information to climate change sceptics. The failure of UEA to grasp fully the potential damage to CRU and UEA by the non-disclosure of FOIA requests was regrettable. UEA needs to review its policy towards FOIA and re-assess how it can support academics whose expertise in this area is limited. (Paragraph 104)

The Independent Climate Change Email Review

15. We accept the assurances that Sir Muir Russell has given about the independence of the Independent Climate Change Email Review and we expect him to be scrupulous in preserving its impartiality. We see no reason why the Review's conclusions and UEA's response have to be published together. Indeed, it could give the impression that UEA was being given an advantage when it comes to responding. We consider that the Review's conclusions and recommendations should not be conveyed to UEA in advance of publication. (Paragraph 113)

16. With regards to the terms of reference of the Review, we consider that as well as measuring CRU against current acceptable scientific practice, the Review should also make recommendations on best practice to be followed by CRU in the future. We invite Sir Muir Russell to respond formally to our Report to the extent that he sets out whether, on the basis of its contents, he finds the Terms of Reference of his inquiry need to be changed. (Paragraph 114)

17. It is unfortunate that the Independent Review got off to a bad start with the necessary resignation of Dr Campbell. The question of the operation of peer review is going to be a critical issue in the inquiry and the Review Team needs to take steps to ensure the insight and experience he would have brought are replaced. (Paragraph 119)

18. We conclude that, when the Independent Review holds oral hearings or interviews, they should be carried out in public wherever possible and that it should publish all the written evidence it receives on its website as soon as possible. (Paragraph 122)

The Scientific Appraisal Panel

19. In our view, reputation has to be built on the solid foundation of excellent, peer-reviewed science. The review of the science to be carried out by the Scientific Appraisal Panel, which UEA announced on 22 March, should determine whether the work of CRU has been soundly built and it would be premature for us to pre-judge that review. (Paragraph 131)

20. Reputation does not, however, rest solely on the quality of work as it should. It also depends on perception. It is self-evident that the disclosure of the CRU e-mails has damaged the reputation of UK climate science and, as views on global warming have become polarised, any deviation from the highest scientific standards will be pounced on. As we explained in chapter 2, the practices and methods of climate science are a key issue. If the practices of CRU are found to be in line with the rest of climate science, the question would arise whether climate science methods of operation need to change. In this event we would recommend that the scientific community should consider changing those practices to ensure greater transparency. (Paragraph 132)

The two inquiries

21. The two reviews or inquiries need to map their activities to ensure that there are no unmanaged overlaps or gaps. If there are, the whole process could be undermined. (Paragraph 134)

Conclusions

22. The focus on Professor Jones and CRU has been largely misplaced. On the accusations relating to Professor Jones's refusal to share raw data and computer codes, we consider that his actions were in line with common practice in the climate science community. We have suggested that the community consider becoming more transparent by publishing raw data and detailed methodologies. On accusations relating to Freedom of Information, we consider that much of the responsibility should lie with UEA, not CRU. (Paragraph 136)

23. In addition, insofar as we have been able to consider accusations of dishonesty—for example, Professor Jones's alleged attempt to "hide the decline"—we consider that there is no case to answer. Within our limited inquiry and the evidence we took, the scientific reputation of Professor Jones and CRU remains intact. We have found no reason in this unfortunate episode to challenge the scientific consensus as expressed by Professor Beddington, that "global warming is happening [and] that it is induced by human activity". It was not our purpose to examine, nor did we seek evidence on, the science produced by CRU. It will be for the Scientific Appraisal Panel to look in detail into all the evidence to determine whether or not the consensus view remains valid. (Paragraph 137)

24. A great responsibility rests on the shoulders of climate science: to provide the planet's decision makers with the knowledge they need to secure our future. The challenge that this poses is extensive and some of these decisions risk our standard of

living. When the prices to pay are so large, the knowledge on which these kinds of decisions are taken had better be right. The science must be irreproachable. (Paragraph 138)

Formal Minutes

Wednesday 24 March 2010

Members present:

Mr Phil Willis, in the Chair

Mr Tim Boswell	Dr Brian Iddon
Dr Evan Harris	Graham Stringer

The Committee considered this matter.

Draft Report (The disclosure of climate data from the Climatic Research Unit at the University of East Anglia), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 46 read and agreed to.

Paragraph 47 read.

Question put, That the paragraph stand part of the Report.

The Committee divided.

Ayes, 3	Noes, 1
Mr Tim Boswell	Graham Stringer
Dr Evan Harris	
Dr Brian Iddon	

Paragraphs 48 to 50 read and agreed to.

Paragraph 51 read.

Question put, That the paragraph stand part of the Report.

The Committee divided.

Ayes, 3	Noes, 1
Mr Tim Boswell	Graham Stringer
Dr Evan Harris	
Dr Brian Iddon	

Paragraphs 52 to 65 read and agreed to.

Paragraph 66 read.

Amendment proposed, to leave out from the beginning to "We" in line 6 and insert "We have not taken enough evidence on this matter to come to a final conclusion".—(*Graham Stringer.*)

Question put, That the Amendment be made.

The Committee divided.

Ayes, 1	Noes, 3
Graham Stringer	Mr Tim Boswell
	Dr Evan Harris
	Dr Brian Iddon

Paragraph 66 agreed to.

Paragraphs 67 to 131 read and agreed to.

Paragraph 132 read.

Amendment proposed, to leave out from "science" in line 6 to the end and add "it would be necessary for the whole of climate science to increase its transparency and improve its scientific methodology".—(*Graham Stringer.*)

Question put, That the Amendment be made.

The Committee divided.

Ayes, 1	Noes, 3
Graham Stringer	Mr Tim Boswell
	Dr Evan Harris
	Dr Brian Iddon

Paragraph 132 agreed to.

Paragraph 133 read and agreed to.

Paragraph 134 read.

Amendment proposed, at the end of line 5 to insert "Given the increasingly hostile attitudes of both sides on this issue, it is vital that these two inquiries have at least one member each who is a reputable scientist, and is sceptical of anthropogenic climate change".—(*Graham Stringer.*)

Question put, That the Amendment be made.

The Committee divided.

Ayes, 1	Noes, 3
Graham Stringer	Mr Tim Boswell
	Dr Evan Harris
	Dr Brian Iddon

Paragraphs 135 and 136 read and agreed to.

Paragraph 137 read.

Amendment proposed, after "answer" in line 3 add "**Within our limited inquiry and the evidence we took, the scientific reputation of Professor Jones and CRU remains intact.**"—(*Dr Evan Harris.*)

Question put, That the Amendment be made.

The Committee divided.

Ayes, 3	Noes, 1
Mr Tim Boswell	Graham Stringer
Dr Evan Harris	
Dr Brian Iddon	

Question put, That the paragraph, as amended, stand part of the Report.

The Committee divided.

Ayes, 3	Noes, 1
Mr Tim Boswell	Graham Stringer
Dr Evan Harris	
Dr Brian Iddon	

Paragraph 138 read and agreed to.

Summary brought up and read.

Question put, That the summary be added to the Report.

The Committee divided.

Ayes, 3	Noes, 1
Mr Tim Boswell	Graham Stringer
Dr Evan Harris	
Dr Brian Iddon	

Motion made, and Question put, That the Report be the Eighth Report of the Committee to the House.

The Committee divided.

Ayes, 3	Noes, 1
Mr Tim Boswell	Graham Stringer
Dr Evan Harris	
Dr Brian Iddon	

Resolved, That the Report be the Eighth Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

Written evidence was ordered to be reported to the House for printing with the Report, together with written evidence reported and ordered to be published on 24 February and 1 March 2010.

Written evidence was ordered to be reported to the House for placing in the Library and Parliamentary Archives.

[The Committee adjourned

Witnesses

Wednesday 1 March 2010

The Rt Hon Lord Lawson of Blaby, Chairman, and **Dr Benny Peiser,** Director, Global Warming Policy Foundation — Ev 2

Richard Thomas CBE, former Information Commissioner — Ev 11

Professor Edward Acton, Vice-Chancellor, University of East Anglia and **Professor Phil Jones,** Director of the Climatic Research Unit — Ev 27

Sir Muir Russell, Head of the Independent Climate Change E-Mails Review — Ev 41

Professor John Beddington, Government Chief Scientific Adviser, **Professor Julia Slingo OBE,** Chief Scientist, Met Office, and **Professor Bob Watson,** Chief Scientist, Defra — Ev 58

List of written evidence

1	Andrew Montford	Ev 159
2	Anne Stallybrass	Ev 169
3	Aporia	Ev 98
4	Climate Change E-Mails Review Team	Ev 39
5	Clive Menzies	Ev 93
6	David Andrew Cockroft	Ev 168
7	David Holland	Ev 115
8	David Shaw	Ev 99
9	Douglas J. Keenan	Ev 181
10	Dr. Benny Peiser	Ev 164
11	Dr. D. R. Keiller	Ev 103
12	Dr. Michael Simons	Ev 97
13	Dr. Sonja Boehmer-Christiansen	Ev 124, Ev 127
14	Dr. Timothy J. Osborn	Ev 129
15	Edward Dilley	Ev 76
16	Eric Rasmusen	Ev 89
17	G R Ryan	Ev 78
18	Geoffrey Sherrington	Ev 78
19	Global Warming Policy Foundation	Ev 1
20	Godfrey Bloom MEP	Ev 92
21	Ian Goddard	Ev 82
22	Institute of Physics	Ev 167
23	J Ronan	Ev 197

24	John F Kelly	Ev 191
25	John Graham-Cumming	Ev 195
26	John Wadsworth	Ev 81
27	Lalu Hanuman	Ev 81
28	Martin Brumby	Ev 82
29	Met Office	Ev 46, Ev 64
30	Mike Haseler	Ev 133
31	Nicholas Barnes and David Jones	Ev 197
32	Peabody Energy Company	Ev 191
33	Peter Sinclair	Ev 82
34	Peter Taylor	Ev 186
35	Phillip Bratby	Ev 90
36	Professor Darrel Ince	Ev 152
37	Professor Hans von Storch and Dr. Myles R. Allen	Ev 172
38	Professor John Beddington, Government Chief Scientific Adviser	Ev 45, Ev 64
39	Professor Peter Cox	Ev 132
40	Professor Ross McKitrick	Ev 140
41	Public Interest Research Centre	Ev 176
42	Research Councils UK	Ev 175
43	Richard S Courtney	Ev 68
44	Richard Thomas CBE	Ev 7
45	Richard Tyrwhitt-Drake	Ev 162
46	Roger Helmer MEP	Ev 85
47	Ronald K Bolton	Ev 119, Ev 123
48	Royal Society of Chemistry	Ev 170
49	Royal Statistical Society	Ev 185
50	Stephen McIntyre	Ev 82, Ev 144
51	Stephen Prower	Ev 86
52	Steven Mosher	Ev 151
53	Stuart Huggett	Ev 77
54	Susan Ewens	Ev 83
55	University of East Anglia	Ev 16, Ev 17, Ev 25, Ev 34, Ev 37, Ev 38
56	Walter Radtke	Ev 77
57	Warwick Hughes	Ev 153

List of unprinted evidence

The following written evidence has been reported to the House, but has not been printed and copies have been placed in the House of Commons Library, where they may be inspected by Members. Other copies are in the Parliamentary Archives (www.parliament.uk/archives), and are available to the public for inspection. Requests for inspection should be addressed to The Parliamentary Archives, Houses of Parliament, London SW1A 0PW (tel. 020 7219 3074; e-mail archives@parliament.uk). Opening hours are from 9.30 am to 5.00 pm on Mondays to Fridays.

CRU 27 The Global Warming Policy Foundation annexes

CRU 58/58a Dr Nigel Dudley memoranda

List of Reports from the Committee during the current Parliament

The reference number of the Government's response to each Report is printed in brackets after the HC printing number.

Session 2009–10

First Report	The work of the Committee in 2008–09	HC 103
Second Report	Evidence Check 1: Early Literacy Interventions	HC 44 (HC 385)
Third Report	The Government's review of the principles applying to the treatment of independent scientific advice provided to government	HC 158-I (HC 384)
Fourth Report	Evidence Check 2: Homeopathy	HC 45
Fifth Report	The Regulation of Geoengineering	HC 221
Sixth Report	The impact of spending cuts on science and scientific research	HC 335-I
Seventh Report	Bioengineering	HC 220
Eighth Report	The disclosure of climate data from the Climatic Research Unit at the University of East Anglia	HC 387-I

Session 2008–09

First Report	Re-skilling for recovery: After Leitch, implementing skills and training policies	HC 48–I (HC 365)
Second Report	The Work of the Committee 2007–08	HC 49
Third Report	DIUS's Departmental Report 2008	HC 51–I (HC 383)
Fourth Report	Engineering: turning ideas into reality	HC 50–I (HC 759)
Fifth Report	Pre-appointment hearing with the Chair-elect of the Economic and Social Research Council, Dr Alan Gillespie CBE	HC 505
Sixth Report	Pre-appointment hearing with the Chair-elect of the Biotechnology and Biological Sciences Research Council, Professor Sir Tom Blundell	HC 506
Seventh Report	Spend, spend, spend? – The mismanagement of the Learning and Skills Council's capital programme in further education colleges	HC 530 (HC 989)
Eighth Report	Putting Science and Engineering at the Heart of Government Policy	HC 168–I (HC 1036)
Ninth Report	Pre-appointment hearing with the Chair-elect of the Science and Technology Facilities Council, Professor Michael Sterling	HC 887
Tenth Report	Sites of Special Scientific Interest	HC 717 (HC 990)
Eleventh Report	Students and Universities	HC 170–I (HC 991)

Session 2007–08

First Report	UK Centre for Medical Research and Innovation	HC 185 (HC 459)
Second Report	The work and operation of the Copyright Tribunal	HC 245 (HC 637)
Third Report	Withdrawal of funding for equivalent or lower level qualifications (ELQs)	HC 187–I (HC 638)
Fourth Report	Science Budget Allocations	HC 215 (HC 639)
Fifth Report	Renewable electricity-generation technologies	HC 216–I (HC 1063)
Sixth Report	Biosecurity in UK research laboratories	HC 360–I (HC 1111)

Seventh Report	Pre-legislative Scrutiny of the Draft Apprenticeships Bill	HC 1062–I (HC (2008–09)262)
First Special Report	The Funding of Science and Discovery Centres: Government Response to the Eleventh Report from the Science and Technology Committee, Session 2006–07	HC 214

Session 2007–08 (Continued)

Second Special Report	The Last Report: Government Response to the Thirteenth Report from the Science and Technology Committee, Session 2006–07	HC 244
Fourth Special Report	Investigating the Oceans: Government Response to the Science and Technology Committee's Tenth Report of Session 2006–07	HC 506 [incorporating HC 469–i]

HENRY A. WAXMAN, CALIFORNIA
CHAIRMAN

JOE BARTON, TEXAS
RANKING MEMBER

ONE HUNDRED ELEVENTH CONGRESS

Congress of the United States
House of Representatives

COMMITTEE ON ENERGY AND COMMERCE
2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–6115

Majority (202) 225–2927
Minority (202) 225–3641

May 18, 2010

The Honorable Lisa P. Jackson
Administrator
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Administrator Jackson:

Thank you for appearing before the Subcommittee on Energy and Environment on April 28, 2010, at the hearing entitled "Clean Energy Policies That Reduce Our Dependence on Oil."

Pursuant to the Committee's Rules, attached are written questions for the record directed to you from certain Members of the Committee. In preparing your answers, please address your response to the Member who submitted the questions.

Please provide your responses by June 3, 2010, to Earley Green, Chief Clerk, via e-mail to Earley.Green@mail.house.gov. Please contact Earley Green or Jennifer Berenholz at (202) 225-2927 if you have any questions.

Sincerely,

Henry A. Waxman
Chairman

Attachment

The Honorable Doris O. Matsui

According to an economic analysis of various smart growth strategies that have been implemented nationwide, increasing transportation choices actually saves taxpayers money. The average middle-class family spends about 25 percent of its household budget on transportation alone.

1. **Question: What are effective policies that would address the amount Americans drive their vehicles?**

   Answer: Policies that support the development of cost-effective alternatives to driving – such as public transit, smart growth, and carpools – can help reduce greenhouse gases and oil consumption, as well as protect Americans from increases in gas prices. The recent House and Senate climate bills outline approaches to support these travel efficiency strategies, including assessment of the greenhouse gas impact of transportation infrastructure investments; a call for integrated transportation and land-use plans and standardized models; and establishment of transportation greenhouse gas reduction targets at the state and Metro Planning Organization (MPO) level.

2. **Question: According the Environmental Defense Fund, middle-class families living in communities with transportation choices spend only about 9 percent of their household budgets on transportation. How does development centered on transportation choice drive the kinds of cost and emissions savings that we seek? And how can the EPA support such development projects?**

   Answer: A recent report, *Moving Cooler*, which EPA, DOT and others helped to fund, provides new evidence that travel efficiency strategies such as public transit, smart growth, carpools, and intermodal freight can reduce GHG emissions. According to the report's analysis of a "Low Cost Bundle" of strategies, these strategies would reduce emissions by 15 percent to 18 percent below projected 2050 levels. The report notes that achieving these reductions will require considerable changes in transportation infrastructure, land use patterns, travel behavior, and public policy. According to the *Moving Cooler* report, for 5 of the 6 bundles of strategies evaluated, including the "Low Cost Bundle," annual savings of direct vehicle costs exceed estimated implementation costs by between $72 and $112 billion, but the report also caveats this result, noting that it has not included some important cost and benefit categories in its assessment.

   In addition, the Department of Transportation's recent Report to Congress, *Transportation's Role in Reducing U.S. Greenhouse Gas Emissions*, which looks at strategies for reducing emissions individually, reached similar conclusions with respect to land use and transportation. The report found that that increasing transportation choices for users can reduce greenhouse gas emissions and costs.

We believe that smart growth and mass transit can play an important role in helping to reduce greenhouse gas emissions from the transportation sector. The air quality planning process under the Clean Air Act has provided an important framework for the integration of transportation, land-use, and air quality planning. This process has been able to quantify and communicate to local officials and the public the important role transit and smart growth development can play in helping to reduce emissions. A number of Smart Growth showcase projects in cities like Sacramento, Charlotte, Atlanta, and Denver were initiated, in part, to address transportation and air quality issues that were raised under the CAA process. EPA also supports smart growth and transit by developing models and technical guidance documents to assess and measure emission benefits, conducting case studies, and providing technical assistance to local areas.

3. **Question: How will the EPA encourage smart growth and green transportation – such as Complete Streets policies to promote bicycling, walking and transit in order to reduce oil consumption in the transportation sector?**

   Answer: EPA will continue to support the development of resources aimed at overcoming barriers to building more walkable and bike-friendly street networks in transit-oriented neighborhoods and traditional town centers. For example, along with FHWA, we supported the development of a guidebook on walkable street design published by the Institute of Transportation Engineers. This *ITE Recommended Practice* shows how to build major urban thoroughfares that are walkable and consistent with national design standards. Additionally, EPA worked directly with Caltrans to develop *Smart Mobility – A Call to Action for the New Decade,* a document that charts core principles, model policies and performance measures. EPA has also developed various other resource documents that help communities implement a range of green transportation strategies. Finally, we will continue to work through the HUD DOT EPA Sustainable Communities Partnership to promote complete streets policies and walkable neighborhoods

4. **Question: According to the Center for Clean Air Policy, transportation efficiency can actually reduce emissions at a net gain to taxpayers. In Sacramento, for instance, the Blueprint project – which promotes comprehensive long-term growth through compact, mixed-use development and more transit choices – will yield 7.2 million metric tons of reductions through 2050 at a net cost of $198 per ton. Is there any other sector where each ton of carbon saved also results in such significant consumer savings?**

   Answer: EPA has not conducted any studies comparing the cost-effectiveness of travel efficiency strategies with other GHG emission reduction strategies. We recognize that there can be substantial cost savings from smart growth type

development, as reported by NAS in a study titled, *Costs of Sprawl – 2000*[1]. According to this NAS study:

- Water and Sewer Infrastructure Savings: The study estimates that between 2000 and 2025, water and sewer infrastructure costs will be $190 billion, assuming conventional development patterns. Under the study's Smart Growth projection, these costs would be only $177 billion, for a savings of $13 billion.
- Road Infrastructure: The study estimates that between 2000 and 2025, road infrastructure costs will be $927 billion, assuming conventional development patterns. Under the study's Smart Growth projection, these costs would be $817 billion, for a savings of $110 billion.
- Other Cost Savings: The study also estimates that Smart Growth development could save local governments $4.2 billion in school, police, fire and other local government costs, and that daily travel costs would be reduced by $8.9 billion due to shorter commutes, increased use of transit, and greater walkability.

5. **Question: In Sacramento, transit planning plays a central role in the long-term vision for our regional development. What role do you see for enhanced transit infrastructure as a component of long-term greenhouse gas reduction planning from the transportation sector?**

Answer: We recognize Sacramento as a leader in the area of incorporating smart growth into regional transportation planning. By linking land use and transportation planning in the vision for growth in the six Sacramento counties, the region can promote more compact development and transportation choices. This type of smart growth can encourage shorter vehicle trips, walking, biking, and public transit to access goods and services – which, in turn, can help reduce air pollution, GHG emissions, and energy consumption, and improve the quality of life for residents.

We believe that smart growth and mass transit can play an important role in helping Sacramento and other areas save fuel and reduce greenhouse gas emissions from the transportation sector. The recent *Moving Cooler* report, described above, provides new evidence of the technical potential for travel efficiency strategies like public transit, Smart Growth, congestion pricing, and carpools to significantly reduce emissions.

In 2007, EPA published a study titled, *Measuring the Air Quality and Transportation Impacts of Infill Development*,[2] which included three case studies that evaluated transit-oriented development and other smart growth development strategies. For

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[1] National Academy of Sciences, Transportation Research Board. *Costs of Sprawl – 2000.* Transit National Academy Press, Report 74. Washington, D.C.: 2002.

[2] U.S. EPA. Measuring the Air Quality and Transportation Impacts of Infill Development. EPA 231-R-07-001. November 2007

example, this study showed that increased use of smart growth strategies in Denver could reduce congestion by six percent and emissions by four percent. In Charlotte, the study found that a new light rail project would reduce emissions on its own, but with significant transit-oriented development around its stations, ridership would increase by 6,000 trips per day and the emissions reduction benefits would be ten times larger.

The Honorable Joe Barton

1. **Would you agree that it is critical for Congress and the public to have full and complete information about EPA's assessment of the science associated with its endangerment finding?**

   Providing full and complete information and ensuring transparency are essential to all of the Agency's work. EPA followed a rigorous, methodical, and transparent process to develop the Endangerment and Cause or Contribute Findings, and the accompanying Technical Support Document (TSD). EPA did not develop new science as part of this action but instead synthesized information from the existing peer-reviewed assessment literature. The Agency relied primarily on the major assessment reports which collectively reflect the current state of knowledge on climate change science, vulnerabilities and potential impacts. The public was kept informed and engaged from the beginning of our process. EPA held two public comment periods, and received more than 380,000 public comments on the proposed Findings. EPA responded to significant comments in the final Findings and the extensive, 11-volume Response to Comments document (RTC).[3] The scope and depth of the public record on the Endangerment Finding demonstrates both the volume of information that was considered in developing the Findings and the seriousness with which we approached the task of synthesizing the science.

   a. **EPA did not evaluate and determine that the United Nations scientific panel that EPA was relying on – the Intergovernmental Panel on Climate Change or "IPCC" - followed its own quality guidelines when publishing the IPCC reports EPA relied upon. Why would you allow EPA to duck this important due diligence?**

   EPA did, in fact, evaluate the review processes of the IPCC and other cited assessments (such as those of the US Global Change Research Program and the National Research Council). EPA's conclusions from this evaluation are described in the final Findings and in the RTC. In particular, Volume 1 of the RTC, General Approach to the Science and Other Technical Issues, includes extensive discussion of EPA's use of assessment literature including the IPCC

[3] The Findings and eleven-volume Response to Comments document may be accessed at http://www.epa.gov/climatechange/endangerment.html

reports. **Can you show this Committee that EPA evaluated that the IPCC actually implemented and followed its published policies regarding review and comments on its published reports?**

EPA reviewed and evaluated the written procedures of IPCC and the other assessment entities regarding their author selection, report preparation, expert review, public review, information quality, and approval processes to ensure the information adhered to a basic standard of quality, including objectivity, utility, and integrity. In addition to the IPCC assessment reports having gone through a rigorous review process within EPA, these documents were officially vetted by the U.S. Government through an open and transparent inter-agency review process led by the White House's Office of Science and Technology Policy. Given the involvement of EPA staff and other U.S. officials during the development of the IPCC reports, and the rigorous vetting of IPCC products across the U.S. Government and by other governments, EPA had no reason to believe that IPCC would not follow its stated procedures in developing its reports.

2. **What previous major regulations has EPA issued that have relied so heavily on non-EPA assessment reports as was the case for the endangerment finding?**

Climate change has been and continues to be studied by numerous Federal agencies which are part of a comprehensive and coordinated Federal research enterprise. EPA, as part of that federal research enterprise, would have no reason to disregard the collective body of knowledge built over the years by U.S. Government scientists. Also, as stated above, the scientific assessments of the IPCC, USGRCP, and the NRC undergo a rigorous and exacting standard of peer review by the expert community, as well as rigorous levels of U.S. government review and acceptance. Thus, it is EPA's view that the major assessment reports represent the best reference materials for determining the general state of knowledge on the scientific and technical issues before the Agency in making an endangerment decision. EPA presented its synthesis of the state of the science before the public for comment and evaluated and considered all comments received. EPA properly and carefully exercised its own judgment in all matters related to the Endangerment Finding, following a robust and transparent process.

3. **You have said that the Climategate and the widely publicized errors that have been identified in the Fourth Assessment Report of the IPCC have not changed any of the conclusions on which you based EPA's endangerment finding. What analyses has EPA done that caused you to reach this conclusion?**

Prior to finalizing the Endangerment Finding, EPA carefully reviewed many of the e-mails from the Climate Research Unit (CRU) at University of East Anglia, and recognized that many of the issues raised therein had also been raised through the public comments. Thus, we found that we had reviewed the underlying scientific issues that were presented to us at the time (see, for example, Volume 2 of the RTC document). Based on that initial review, we concluded that the fundamental

conclusions of the assessment literature remained sound as to the state of the science on greenhouse gases and climate change.

Following issuance of the Endangerment Finding, the Agency has received petitions for reconsideration of the Endangerment Findings. We are carefully and fully reviewing those petitions now. EPA has reviewed all of the e-mails in light of the petitioners' assertions with respect to the CRU e-mails and the few examples of errors in the IPCC Fourth Assessment Report. On the basis of our preliminary analysis of the scientific issues raised, and our thorough review of the contents of the e-mails, we have not yet found evidence that causes us to question our current understanding of the state of climate science and the causal linkage between anthropogenic GHG emissions and warming of the climate system.

a. When did you conduct this analysis?

See our response to Question 3 above.

b. Would you supply it to the Committee?

We will be happy to share with you our response to those petitions when completed.

4. What role did the White House have in your decision to issue the endangerment and cause or contribute findings for greenhouse gases under Section 202(a) of the Clean Air Act announced December 7, 2009 ("endangerment finding")?

The process of developing the Findings began in 2007 under the previous Administration as a result of the Supreme Court's decision in *Massachusetts v EPA*. The Administrator's determinations relied solely on a careful consideration of the full weight of the synthesis of scientific evidence and a thorough review of hundreds of thousands of public comments.

a. Please identify any communications or interactions between the White House and your agency relating to issuance of the proposed endangerment finding in April of 2009, and/or relating to the final endangerment finding in December 2009.

Communication between the White House and EPA relating to issuing a proposed or final endangerment finding took place in connection with the OMB-led interagency review process under Executive Order 12866.

b. Were you, or any members of your staff, instructed about when to announce the finding by anyone working in the Executive Office of the President of the United States? If so, by whom?

No. See our response to Question 4a.

5. **According to the timeline you laid out in your February 22, 2010 letter to Senator Rockefeller, "fewer than 400" stationary source emitters will face regulation under the Clean Air Act for their greenhouse gas (GHG) emissions in the first half of 2011. Pursuant to that same timeline:**

   a. **Approximately how many stationary sources would be regulated in the second half of 2011?**

For the second half of 2011, the sources subject to the permitting requirements of the CAA will be determined by the thresholds established in Step 2 of EPA's Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule. EPA estimates that about 550 sources will be newly considered major because of their GHG emissions and will need to obtain title V permits for the first time due to their GHG emissions. We also estimate that during Step 2, there will be approximately 900 additional Prevention of Significant Deterioration (PSD) permitting actions each year related to new and modified GHG emission sources.

   b. **Approximately how many stationary sources would be regulated by the end of 2013?**

EPA commits to undertake another rulemaking by July 1, 2012, that would not be effective until July 1, 2013. This rulemaking will consider a Step 3 for phasing in GHG permitting. Step 3 would establish if any new sources of GHG emissions will be regulated. In any case, it will not require permitting for sources with GHG emissions below 50,000 tpy earlier than April 2016.

   c. **Approximately how many stationary sources would be regulated starting in 2016 and beyond, when you've explained that the smallest sources will be phased in?**

The tailoring rule provides a phase-in plan that will not require small sources to undergo permitting for GHG any earlier than 2016. That does not mean that EPA has decided that small sources *will* need to undergo permitting for GHG starting in 2016. In any event, we fully expect that Congress will address the question by statute before 2016.

   d. **How do these numbers compare to the current level of regulation under the Clean Air Act?**

Approximately 700 new sources and modifications are currently subject to the major New Source Review Program review each year. Approximately 15,000 existing sources currently have Title V operating permits.

e. Can you provide a comprehensive and specific list of examples of the smallest sources that EPA will regulate after 2016?

The study EPA has committed to complete by April 2015 will inform a separate rulemaking. Until that study and rulemaking are complete, EPA is unable to provide a comprehensive list of examples of sources that would be included in that rulemaking.

f. In 2016 and beyond, what is the smallest threshold (in tons per year) for regulated entities that EPA intends to subject to Clean Air Act permitting for GHG emissions?

See the response to question 5c above.

6. On April 2, 2010, EPA published a decision in the Federal Register concluding the stationary sources will become subject to GHG regulation on Jan. 2, 2011. That date is only 8 months away.

a. As I understand it, you still have not finalized EPA's "Tailoring Rule" indicating which stationary sources will be subject to new permitting requirements. When do you plan to issue the final rule?

EPA finalized the Tailoring Rule on May 13, 2010, and it was published in the Federal Register on June 3, 2010.

b. As I understand it, you still have not released any guidance on what EPA will consider to be Best Available Control Technology (BACT) for those stationary sources that will be subject to new permitting requirements. When do you plan to issue that guidance?

The Clean Air Act Advisory Committee (CAAAC) has established a Climate Change Work Group which has initially focused its attention on the procedure for evaluating BACT for GHG emissions. In February 2010, the work group completed the first phase of its effort and sent EPA a list of recommendations that highlighted areas of the BACT determination process that are in need of technical and policy guidance. A copy of their report is available from the public docket for this rulemaking and at http://www.epa.gov/air/caaac/climate/2010_02_InterimPhaseIReport.pdf.

In response, we are working to develop technical information, guidance, and training to assist states in permitting large stationary sources of GHGs, including identifying GHG control measures for different industries. EPA is currently

working with states on technical information and data needs related to BACT determinations for GHGs. Also, EPA is actively developing BACT policy guidance for GHGs that will culminate in training courses for state, local, and tribal permitting authorities. The results of all of these efforts will roll out over the remainder of 2010 but prior to any source being subject to GHG permitting requirements.

c. **If we are only 8 months away, how can all of the industries and sources that are going to be subject to the new permitting rules know what they have to accomplish in that span of time? You are not giving much lead time to businesses that are going to fall under the rule are you?**

The final tailoring rule provides a phased-in approach to regulation of GHGs under the CAA. Under Step 1 of the rule, which starts on January 2, 2011, only those sources already subject to PSD or Title V due to their non-GHG emissions will be subject to GHG-related requirements. As such, both the sources that will become subject as well as the permitting authorities that will be in charge of issuing the permits during this first step will have considerable experience with the requirements of the permitting programs. In addition, we have made commitments to provide sources and permitting authorities with technical guidance in order to help ease the transition into these new GHG-related requirements. This technical guidance will be available before the new requirements take effect.

d. **The auto industry gets 18 months lead time for the new standards you are imposing on them – why not give the same amount of time to stationary greenhouse gas emitters, who have never been regulated for such emissions before?**

The timeframe in which stationary sources of GHG emissions will be required to comply with the GHG permitting requirements is dictated by the Clean Air Act. EPA has established its interpretation of when these requirements are triggered as a result of GHG emissions being "subject to regulation" under the CAA in the final PSD Interpretive Memo. 75 Fed. Reg. 17004 (Apr. 2, 2010). In the final action on reconsideration of the Interpretive Memo, EPA explained its interpretation that the phrase "subject to regulation" in the CAA means that the BACT requirement applies when controls on a pollutant first apply to a regulated activity. In this case, the first time controls on GHG emissions will become applicable, thus triggering the permitting requirements under the CAA, is the date when automakers may begin to introduce model year 2012 vehicles into commerce, which is January 2, 2011.

7. **In your testimony, you say that if the endangerment finding was nullified, that would "forfeit one quarter of the combined fuel savings and one third of its**

greenhouse gas emission cuts" of the joint National Highway Traffic Safety Administration (NHTSA)/EPA national fuel efficiency standards (a/k/a "Light-Duty Vehicle" or the "tailpipe rule").

a. Please provide the basis for this calculation and explain how it was performed.

The joint final rule for the 2012-2016 light-duty vehicle greenhouse gas and CAFE standards was published in the Federal Register on May 7, 2010. In Table I.C.1-3 on page 25344, NHTSA estimates that the new CAFE standards will reduce CO2 by 636 million metric tons. In Table I.C.2-2 on page 25347, EPA estimates that the new EPA standards will reduce greenhouse gas emissions by 962 million metric tons.

8. **In a May 5, 2010 BNA press report, your Assistant Administrator for Air, Regina McCarthy, was quoted as saying the benefits of the tailpipe rule would be a 40% GHG reduction in greenhouse gases. In particular, she is quoted as saying that "about 40 percent of the greenhouse gas reductions will go away."**

a. Which figure is correct? Is it the 40% figure Assistant Administrator McCarthy is quoted as saying or the lower figure of "a third," or 33%, in your written testimony?

We were not able to find the BNA article cited. However, according to the final rule's regulatory impact analysis, elimination of the EPA standards would reduce the projected greenhouse gas emissions reductions from the joint EPA/NHTSA National Program by 326 million metric tons, which is a 33.8 percent reduction.

9. **With regard to the "historic agreement" between the EPA, Department of Transportation, State of California, the auto industry and other stakeholders announced by the President in May 2009 and relating to new national fuel efficiency standards:**

a. Wasn't this agreement premised on EPA finalizing an endangerment finding for greenhouse gases under Section 202(a) of the Clean Air Act? In particular, wasn't the crux of that agreement that EPA and NHTSA would be jointly issuing new fuel efficiency standards that would regulate greenhouse gas emissions from motor vehicles, which EPA only would have authority to do if you made a positive endangerment finding?

First, we should clarify that the "historic agreement" was between California and the auto companies. On May 19, 2009 President Obama announced a new national policy aimed at both increasing fuel economy and reducing greenhouse gas pollution for all new cars and trucks sold in the United States. On May 22,

2009, a "Notice of Upcoming Joint Rulemaking to Establish Vehicle GHG emissions and CAFE Standards" was published in the federal register. As noted in this Notice, if regulations were ultimately adopted these standards would represent a harmonized and consistent national policy pursuant to the separate statutory frameworks under which EPA and DOT operate. This Notice also stated that the GHG standards expected to be issued under section 202(a) of the Clean Air Act would become final only if EPA made a final positive endangerment finding. EPA's intent to follow normal rulemaking procedures is set forth in the Notice. The various stakeholders, including the automakers and California, expressed their support for the national policy and reserved their rights to participate in the full notice and comment rulemaking.

b. If the agreement was premised on the endangerment finding, wasn't it premature to enter into the agreement given there was no final endangerment finding?

President Obama's announcement on May 19, 2009 which united federal and state governments, the auto industry, labor unions and the environmental community was aimed at achieving a national policy to harmonize greenhouse gas and fuel economy standards. The automakers and California submitted letters to reflect their commitments as part of this process. EPA and NHTSA did not agree to take any action; instead the federal regulators issued the "Notice of Upcoming Joint Rulemaking to Establish Vehicle GHG emissions and CAFE Standards" published on May 22, 2009. The announcement of the new national policy was not premature and was aimed at commencing a regulatory process aimed at reducing greenhouse gases for new cars and trucks. As the May 22, 2009 Notice sets out, the regulatory process includes consideration of whether emissions of greenhouse gases from new motor vehicles and motor vehicle engines cause or contribute to air pollution that may reasonably be anticipated to endanger public health and welfare.

c. If the agreement wasn't premised on the endangerment finding, why have you said in your letter to Senator Rockefeller that a resolution disapproving the endangerment finding would "undo" the "historic agreement."

The new national policy announced by President Obama on May 19, 2009 culminated in a final rule to address greenhouse gases and fuel economy from new motor vehicles. As part of the necessary regulatory process, before the issuance of the final rule EPA separately conducted a public process to make a final finding regarding endangerment. A resolution aimed at disapproving the endangerment finding would both curtail the final rule addressing greenhouse gases from new motor vehicles and undo the unity reached among the affected stakeholders and announced by President Obama on May 19, 2009.

d. As a practical matter, once President Obama announced the agreement with the auto industry and California in May 2009, wasn't he in effect committing you to making a positive endangerment finding?

The Administrator of the Environmental Protection Agency is responsible for making any endangerment findings under section 202(a) of the Clean Air Act. The Administrator made the positive endangerment finding regarding greenhouse gases and new motor vehicles and new motor vehicle engines in a full public process that culminated in the finding published on December 15, 2009, 74 Fed. Reg. 66496.

e. If you say he was not committing you to make the finding, how realistic was it that you had any other option?
f. In making a final decision on endangerment, were you concerned that if you did not make a positive endangerment finding that it would undo the "historic agreement"? Didn't it color your views on endangerment?

The Administrator's options and evaluation was based upon the terms of the Clean Air Act and included a complete review of all pertinent legal, scientific and technical data before the Agency.

10. Under the historic agreement between the EPA, Department of Transportation, the State of California, the auto industry and other stakeholders announced by President Obama in May 2009, how long did California agree to hold off on enforcing its own standards? Isn't California's agreement not to enforce its own standards only a short term commitment for the 2012-2016 model years?

California, through its regulatory process, will allow manufacturers to demonstrate compliance with its 2012-2016 standards by meeting the EPA GHG standards during that time period. EPA plans to work with California and other stakeholders to pursue a continued National Program after 2016.

a. After 5 years, isn't California going to be able to threaten again to enforce its own motor vehicle emissions standards?

California has revised its program such that for MYs 2012-2016, a manufacturer may elect to demonstrate compliance with CARB's standards by demonstrating compliance with the EPA's greenhouse gas standards. EPA plans to work with California and other stakeholders to pursue a continued National Program after 2016.

b. Hasn't the Administration, by granting the waiver, in effect set up a situation in which California can set the fuel economy standards for the entire nation?

California has set greenhouse gas emission standards for itself and EPA has issued it a Clean Air Act waiver. Fourteen other states and DC adopted CA standards. California has revised its program such that manufacturers may demonstrate compliance with its 2012-2016 MY standards by meeting the EPA greenhouse gas standards. Thus, the greenhouse gas standards issued by EPA are the greenhouse gas standards for the nation. The President's announcement on May 21, 2010, is intended, in part, to continue where the current National Program leaves off – which is to work with all affected stakeholders to extend the National Program beyond 2016 in order to set standards for the nation.

c. Does the Administration believe that it is desirable for California to effectively be setting the fuel economy standards for the nation?

We do not believe that California is effectively setting the fuel economy standards for the nation.

11. Does the Administration continue to agree with the position taken by the United States in the Green Mountain Chrysler-Plymouth-Dodge-Jeep et al. v. Crombie case in the Second Circuit, reflected in a brief dated April 16, 2008, that the California motor vehicle GHG regulations are preempted by federal law? If not, has the Solicitor General approved any change of position?

On January 26, 2009, President Obama issued a Memorandum to the Secretary of Transportation and the Administrator of the National Highway Traffic Safety Administration (NHTSA). Included in the Memorandum was the request that in adopting final rules regarding fuel economy for 2011 and later motor vehicles, consideration be given to whether any provisions regarding preemption are "consistent with EISA, the Supreme Court's decision in Massachusetts v. EPA and other relevant provisions of law and the policies underlying them."

In NHTSA's Final Rule for 2011 model year vehicles signed on March 23, 2009, NHTSA decided to not include any preemption provisions in the regulatory text and said that it would be re-examining the issue in the context of the rulemaking for 2012 and later model years.

In the Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards, published on May 7, 2010, it was noted that "With respect to the President's request that NHTSA consider the issue of preemption, NHTSA is deferring further consideration of the preemption issue. The agency believes that it is unnecessary to address the issue further at this time because of the consistent and coordinated Federal standards that apply nationally under the National Program. As discussed in this Final Rule, the California Air Resources Board (CARB) has committed to (and in fact has completed its rulemaking) allow manufacturers to demonstrate compliance with the National

Program in order to meet CARB's applicable requirements during the 2012-2016 model years."

12. What is the future for coal-fired power plants in this country?

I believe that if Congress acts quickly to pass comprehensive energy and climate legislation with a cap on carbon pollution, that will provide the largest incentive for CCS because it will create stable, long-term market-based incentives to channel private investment into low-carbon technologies. Coal will then continue to play a role in US electricity generation for years to come.

a. Is the Administration trying to phase out and shut down the coal industry?

No, the Administration supports a portfolio of low-carbon energy technologies, including CCS, to reduce greenhouse gas emissions and provide energy security..

b. How does this comport with energy security when coal is our most abundant resource?

Please see the response to Question 12, above.

13. You testified that you have been asked to co-chair a task force on carbon capture and sequestration (CCS) to get 5 to 10 projects up and running in the next few years so that we can make CCS technologies commercially available.

a. Can you explain in greater detail the nature of the task force, what the task force is currently doing, and what it expects to accomplish over the next few years?

To develop a comprehensive and coordinated Federal strategy to speed the commercial development and deployment of clean coal technologies, the President established an Interagency Task Force on Carbon Capture and Storage on February 3, 2010. The Task Force, co-chaired by the Department of Energy and EPA, is charged with developing a proposed plan to overcome the barriers to the widespread, cost-effective deployment of CCS within 10 years, with a goal of bringing 5 to 10 commercial demonstration projects online by 2016.

The Task Force is exploring incentives for commercial CCS adoption and addressing financial, economic, technological, legal, institutional, social, or other barriers to deployment. It is also considering how best to coordinate existing administrative authorities and programs, including those involving international collaboration, as well as identifying areas where additional administrative authority may be necessary. The Task Force's plan is due to the President in August 2010.

14. If CCS technologies cannot be commercially developed or deployed, is it the Administration's position that new coal-fired power plants should not be built in the U.S.?

The Administration is committed to cost-effective greenhouse gas emissions reductions. Ultimately, comprehensive energy and climate legislation that puts a cap on carbon pollution will provide the largest incentive for CCS because it will create stable, long-term market-based incentives to channel private investment in low-carbon technologies.

15. Do you expect any new coal-fired power plants to be permitted during your tenure as EPA Administrator?

I hope we will see the permitting and construction of new facilities that generate electricity using American coal in ways that are environmentally responsible.

The Honorable John Shimkus

1. **Could you provide any data EPA has collected from retail fuel marketers as to what percentage of their customers would need to be able to utilize E15 to make it economical to invest in additional infrastructure to sell E15 to only a portion of the U.S. automotive fleet?**

   EPA has not collected any data regarding what percentage of gasoline customers would need to demand E15 in order for retailers to want to invest in it. The decision to bring E15 to market will likely depend on market conditions (price of ethanol vs. gasoline), existing retail configurations, and the cost to upgrade equipment. Testing is still underway to determine what changes might be needed to replace/retrofit gasoline storage and dispensing equipment (designed to handle up to 10% ethanol) to ensure its compatibility with E15.

2. **EPA has stated that in order to approve E11 or E12 as an interim step towards E15, it would have to take such action outside of the waiver process. Could you provide the specific legal or regulatory impediments you believe prevent you from making such a determination?**

   Clean Air Act § 211(f)(1) prohibits the introduction into commerce of a fuel or fuel additive unless it is "substantially similar" to the fuels used in certification of new motor vehicles. In 1981, EPA issued a rule interpreting what fuels are substantially similar for gasoline fuels. The rule was revised in 1991, with a very slight revision in 2008. E11 or E12 is not currently considered "substantially similar" to our certification fuels, and deciding whether to include E11 or E12 in the definition of "substantially similar" would, in any event, raise the same type of concerns and require the same type of data that is required for the current E15 waiver application

under § 211(f)(4). Alternatively, a separate waiver application process could be conducted for E11 or E12, but again, it would require the same type of data and analysis that is required for the E15 waiver application.

3. **As I stated at the hearing, we are importing less ethanol, exporting more (to places like Korea and even the Middle East), while ethanol inventories are growing and prices are falling. It seems that we are fast approaching or have already hit the blend wall for ethanol in the United States. Ethanol companies in my state are also telling me their customers are saying an enhanced blend decision that does not apply to all cars will not be adopted in the marketplace. Do you believe that a partial E15 waiver approval for only a portion of the US automotive fleet would allow the goals of RFS2 to be achieved?**

   The decision on the E15 waiver request must be based on the criteria under the CAA Section 211(f)(4), requiring me to "determine that the applicant has established that such a fuel or fuel additive . . . and the emission products . . . will not cause or contribute to a failure of any emission control device or system . . . to achieve compliance by the vehicle or engine with the emission standards . . . ."

   We expect the goals of the RFS2 program to be met with a wide range of renewable fuels, ethanol being one of the more prominent ones. In the final rule, we estimated that ethanol use could be anywhere from 17.5 to 33.2 billion gallons by 2022. If granted a partial waiver for E15, this could allow for ethanol use to expand in the marketplace, along with FFV and E85 expansion. The actual impact of E15 will depend on how the market actually responds in the event of a partial waiver. As discussed above in #1, this will depend on market conditions, existing retail configurations, and the cost to upgrade equipment.

4. **As part of its waiver petition, Growth Energy provided a significant amount of data and studies on the effects of enhanced ethanol blends. This was supplemented by additional studies showing positive results through the comment process. Yet, EPA has stated that in order to approve E11 or E12 on an interim basis for all cars, "we are not aware of the availability of significant data to support such a revision." Could you provide details on what data is insufficient, or what additional data is required?**

   As is mentioned in the question above on E11 and E12, the regulatory procedures required for the approval of E11 or E12 are essentially the same as those available for approval of E15. We are not aware of specific data of the type that would be needed for E11 or E12. Data on E15 would likely be applicable to E11 and E12 since the critical data still needed involves durability issues primarily due to increases in oxygen content in the fuel. If the vehicle does not adequately adjust for the increased oxygen, the fuel may burn hotter and raise durability concerns. We continue to evaluate the critical question of component durability using E15 when used over many thousands of miles and the ongoing study by the Department of Energy will provide critical data on this issue.

The Honorable Parker Griffith

1. **Do you believe that recycling coal combustion residuals (CCR) is a beneficial use of this byproduct?**

   a. **Many states are already concerned that a hazardous designation would prevent most CCR from being recycled because end use is not always determined at the time of creation. What steps will you take to be sure that recycling rates do not decrease should these designations move forward?**

EPA recognizes the concerns that our state partners, through ASTSMWO, have brought to our attention about the potential effect that regulating CCRs as a hazardous waste may have. However, EPA believes that existing landfills can meet the various requirements, including the installation of ground water monitoring. In addition, under the Resource Conservation and Recovery Act (RCRA), facilities that begin to receive newly listed wastes are eligible for "interim status" which means that by fulfilling certain permit notification requirements, they can continue to operate until they are fully permitted under RCRA subtitle C regulations. Thus, most landfills should be able to operate under subtitle C regulations. Finally, because regulation under subtitle C would make disposal more costly, and because the beneficial use of CCRs would retain the statutory Bevill exemption, it is likely that the beneficial use of CCRs will increase, thus reducing the disposal of CCRs. For more information, please see EPA's proposed rule on coal combustion residuals, which was published in the Federal Register on June 21, 2010.

2. **It was recently announced that the TVA will be establishing a centralized training facility for its nuclear power division in the heart of my district. In what ways do you think your agency and this Administration can contribute to ensuring that additional jobs are created, clean nuclear energy is encouraged and regulations are not overly burdensome, especially on the end use customers?**

The best way to ensure nuclear power is a part of the future of this nation's energy supply is for Congress to pass comprehensive energy and climate legislation that creates a system of incentives to make clean energy profitable. Currently, producing carbon pollution carries no cost, and therefore traditional plants that use fossil fuels will continue to be more cost-effective than plants that use nuclear fuel.

Even without new legislation, the Administration is taking steps to encourage nuclear energy. One example is earlier this year the President announced that the Department of Energy has offered conditional commitments for a total of over eight billion dollars in loan guarantees for the deployment of two new nuclear reactors. More information can be found at: www.lgprogram.energy.gov.

3. There has been quite a bit of discussion recently regarding coal mining permits that the EPA seems to be delaying. In my state we are waiting on 51 permits which would create thousands of good paying Alabama jobs. What steps are you taking to streamline these long permitting times on small coal businesses?

EPA's responsibility under the Clean Water Act focuses on ensuring that proposed projects comply with requirements of the law in order to protect water quality, the environment, and public health. EPA fulfills this responsibility through its review of permit applications provided by the U.S. Army Corps of Engineers through public notice in accordance with Section 404 of the Clean Water Act, and through its review of State proposed National Pollutant Discharge Elimination System (NPDES) permits under Section 402 of the Act. EPA works hard with our Federal and State partners and permit applicants to conduct permit reviews in a manner that is consistent with the law and provides the public with timely, predictable, and consistent decision making.

EPA's environmental concerns regarding surface coal mining are focused on reducing the harmful environmental consequences of projects in steep-slope areas of central Appalachia. Special procedures have been prepared by the agencies for the review of coal mining projects in the steep slopes of Central Appalachia. EPA is reviewing projects outside Central Appalachia, including Alabama, under standard permit review procedures and timeframes established in the Corps of Engineers regulations.

Where EPA identifies environmental concerns with proposed projects, EPA looks forward to working with the Corps and permit applicants to resolve those concerns in order to facilitate timely permitting of proposed projects. EPA invites permit applicants, including small businesses, to meet with EPA and the Corps before and during the formal permitting process in order to encourage productive dialogue, ensure that the agencies have the necessary information to conduct their reviews, promote prompt decision-making that is consistent with the Clean Water Act, and that promotes the economic, energy, and jobs related benefits associated with coal mining in Alabama and elsewhere.

a. Specifically, can you give me an example of a decision you have made to streamline this process?

As noted above, EPA has placed a greater focus recently on conducting pre-application meetings in order to discuss project details and identify potential environmental concerns for timely resolution. These meetings, which have taken place in Alabama and elsewhere in Appalachia, have helped facilitate effective communication among EPA, the Corps, State agencies, and permit applicants. EPA looks forward to continuing to hold these meetings in Alabama to help explain the permitting process and streamline dialogue between applicants and agencies. In addition, EPA has been meeting with relevant state and federal agencies to ensure that our procedures are well coordinated. Where possible, we are eliminating redundancy, efficiently sharing critical information, and conducting concurrent reviews to reduce the time for decisions.

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