THE BROOKINGS INSTITUTION

PEW CENTER ON GLOBAL CLIMATE CHANGE

U.S. CLIMATE POLICY POLICY:

TOWARD A SENSIBLE CENTER

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C O N T E N T S

AGENDA ITEM

P R O C E E D I N G S

MR. TALBOTT: Good morning, everybody. Could you all take your seats, please? Let me give the folks in the back of the room just another moment. I'll use the pause while we're waiting for people to take their seats to make the standard announcement, and that is, until Brookings is able to install the ejection seats that they're now advertising in the movie theaters, I would ask you all please to turn off your cell phones, or put them on vibrate I guess is Option B.

I'm Strobe Talbott, the President of Brookings, and I want to welcome you all here this morning for what I'm sure you all agree is not just a very important event on an important subject but a very timely event as well. I cannot think of a better example than climate change of a global issue and, indeed, a global challenge that is also a challenge to American national policy. And that, of course, is our topic today.

Brookings is very proud to be cosponsoring this event with our friends from the Pew Center on Global Climate Change, and in a moment Eileen Claussen will come to the podium and preview the program for the day. She is the President of the Pew Center. She's a former colleague of mine and a very good friend, and I'm glad that she's now a collaborator with the Brookings Institution on this project.

Eileen is also a true expect on the subject that we are going to be discussing today. She has devoted much of her career to these issues. That is not a claim that I can make. Much of my career has been focused on other threats to international security and, indeed, threats to the survival of the planet and the species. I've been working on such issues as nuclear weaponry, the arms race, the Cold War. But as a citizen, I have come to appreciate, as I suspect all of you in this room have, that global warming is in the same league in terms of both something to worry about and also something to do something about and also in terms of its importance, its complexity, and the danger that it poses to all of us.

There is, of course, a difference between manmade weaponry that can unleash forces of nature that would trigger catastrophic destruction, perhaps global destruction, in a matter of hours and man-induced disruption of the forces of nature that can wreak horrendous destruction over a period of decades and centuries by degrading the Earth's ability to sustain life in general and human life in particular.

The United States, of course, is a major contributor to the problem of climate change, and it behooves us, both for that reason and also because of our leadership position in the world, to be a major contributor to the solution. Achieving that goal is going to require a much more sophisticated, constructive, forward-looking, and civil discussion than has been the case so far. To date, the debate on this issue has been characterized by far more heat than light. This issue has been both polarized and polarizing.

One example that often comes to my mind is what's happened to the word Kyoto. Not too long ago, that word conjured up images of imperial grandeur and raked pebble gardens. Now it is, of course, a battle slogan. It is either a buzz word for what's wrong with attempts at international governance, or it's seen as representing a threat to our national sovereignty, or it's a catch phrase for much of what is wrong with U.S. policy and predominant views about America's role in the world.

What's needed in order to get this right, or at least to begin moving in the right direction, is objectivity, a respect for empirical evidence--which is to say, the facts as best we can determine them--and also a respect for diversity of views.

We have those values very much in mind here at Brookings as we're going about the task of trying to significantly increase this institution's capacity to make a contribution on the issue of the environment and to put the environment on our long-term

agenda here at Brookings as befits an issue that is so important to the national agenda.

Several colleagues of mine whom you will be seeing during the course of the day have been in the lead in this respect: Niger Purvis, who worked on these issues both in the Clinton and Bush administrations; David Sandalow, who worked on them in the State Department, in the White House, and in the NGO world; Warwick McKibben, who is a leading expert on the economics of climate change; and Jim Steinberg, Vice President of Brookings and also the director of our Foreign Policy Studies Program, who has played in the past a central role in climate change diplomacy as Deputy National Security Adviser to the President.

I want to join all of them in thanking the Alcoa Foundation and the Virginia Wellington Cabot Foundation for supporting Brookings' work in this area during the past year, and I want to single out two of our trustees in particular: Steve Wolf, and particularly Louis Cabot, who is here today to participate in these proceedings.

In organizing this conference, Nigel and Eileen have reached out to a broad-based and very distinguished group of participants. They include Members of Congress, Senators, CEOs, senior administration officials, representatives of the scientific and NGO communities, and the President of the World Bank. They will all offer different perspectives on the challenge that is posed by out topic, which is how to define a sensible center for U.S. climate policy, and thereby perhaps help to depolarize the issue and lay the ground for bold yet practical and widely supported remedies to this problem.

So, Eileen, if I could now invite you to the podium to describe the structure of the conference in greater depth and offer your thoughts on where U.S. climate policy is heading. Thank you.

MS. CLAUSSEN: Well, thank you very much, and on behalf of the Pew Center on Global Climate Change, I'm also pleased to welcome you to this important conference. It's not often that I get to open a talk with a quotation from William Butler Yeats, so please indulge me.

In his classic poem, "The Second Coming," he wrote: "Things fall apart, the center cannot hold. Mere anarchy is loosed upon the world."

We're here today and tomorrow to talk about climate change, and on this issue we must not only build the center, we must make certain that the center can hold. The "sensible center" of the title of this conference will be the place from which solutions to the problem of climate change will emerge, and I'm delighted that we were able to assemble such a distinguished group of people to help begin paint a picture of what that sensible center will look like and what solutions it might yield.

So allow me to make a few brief remarks, and I'm going to encourage all our other presenters to be brief as well so that mere anarchy is not loosed upon our very full conference agenda.

The casual observer might conclude that the only significant development on climate change in the United States in recent years was the release last month of "The Day After Tomorrow." For those of you who haven't seen it, the movie is somewhat entertaining, but as you might imagine, it lends little insight into the real causes and consequences of climate change or its potential cures.

Still, the movie's release managed to draw an enormous amount of media attention to these very issues. Why? Not because of all the Hollywood hype, I think. The real reason is that the movie, however preposterous, speaks to an issue that increasingly is on the minds of ordinary Americans. Indeed, a new poll by the University of Maryland that we'll have available here tomorrow shows that three in four Americans believe global warming is a real problem that requires action, and a surprising number support strong

action now, even if there are significant costs.

There is, in fact, a burgeoning debate across the United States and, believe it or not, right here in Washington over how best to address the very real issues in climate change. We're still a long way from agreeing on answers to that question, but there is a growing recognition that answers are urgently needed. And I think the sensible center is beginning to emerge.

The next day and a half will establish the broad contours of this sensible center. We'll hear from an impressive array of leaders--smart experienced individuals who are looking at this issue from a broad range of perspectives. We will hear that, despite the many scientific uncertainties, there is solid consensus within the U.S. scientific community that climate change is real and that we must address it.

We will hear of the growing recognition that tackling climate change will help address another urgent concern, namely, the security of our nation's energy supply. We will hear the emerging view within the economic establishment that addressing climate change is economically justified and, with the right policies, is well within our economic means.

We will hear that we need to make significant investments in new technologies if we are to seriously address climate change. We'll hear from business leaders about the steps they are taking on their own to reduce greenhouse gas emissions and to prepare our country and our economy for a low-carbon future.

We will hear from states that are launching climate change programs because they know that reducing emissions is not only good for the climate, but also will help secure their economic and their energy futures. We'll hear from congressional leaders from both sides of the aisle who believe it is time for an ambitious and comprehensive approach at the federal level. And we will hear about the challenges of trying to construct a sensible center internationally.

Together, I believe these varying perspectives will help us to illuminate some common ground. Each, I believe, helps point the way toward a sensible center. We're not there yet. It will take time. But I for one am convinced that we will get there. And when we do, when this sensible center is firmly established, what is it likely to produce? What are the actions, the solutions it should generate?

Well, I don't want to preempt--well, maybe I do--any of our speakers or any of the vigorous discussion that I'm sure will be prompted by their remarks. But while I have the podium--and I haven't forgotten my promise to be brief--allow me to identify five principles that I believe should guide our way forward from the sensible center.

The first is that we need a two-pronged approach to climate change. We need to think both in terms of adaptation and mitigation. On the adaptation side, we need to recognize that the Earth is already warming and that it will continue to warm even if we undertake ambitious measures to limit that warming. We need only to look at what we're learning from the Arctic region, the canary in the coal mine of climate change, to recognize this.

We need to think seriously in this country and throughout the world about how to prepare for the impacts of climate change rather than simply reacting to changes as they occur. This means making climate-conscious decisions now about everything, from water management and transportation to health care. Whether we like it or not, it is time to make adaptation a priority.

But in acknowledging the importance of adaptation, we cannot neglect mitigation. Indeed, to the extent that we fail to pursue strategies to limit the scope and severity of climate change, we will likely find it hard and more expensive to adapt.

Climate change may well be underway, but there is a great deal we can and must do to minimize its impacts.

That brings me to the second principle, and that is the power of technology as a cornerstone of an effective climate strategy. Meeting the challenge of climate change demands nothing short of a new Industrial Revolution. We need the means to replace our entrenched high-carbon energy system, and that is going to require investment in new technology on a scale never before seen. This is not about investing in one or two promising technologies; rather, we need to start work right now to encourage the development of a wide-ranging technology portfolio that can deliver real reductions in greenhouse gas emissions while still powering our economy. This portfolio may well include energy technologies, hydrogen and carbon sequestration, renewable fuels, coal-bed methane, biofuels, and more.

While there is some support now for breakthrough technology, it is woefully inadequate. Most of the investment remains attached to carbon-intensive energy technologies and, clearly, this has to change. If we're serious about finding climate-friendly energy technology solutions--and we had better be serious--we need to significantly ramp up both public and private investment.

This brings me to the third principle: the power and necessity of strong public policies. Just as we need a broad range of technology solutions, an effective climate strategy will require us to mobilize an array of policy solutions as well. We need policies to both push and pull new technologies into the marketplace. We need stronger tax incentives, efficiency standards, and renewable energy mandates. We need smart market-based approaches that give the private sector the flexibility and the incentives to ferret out the most cost-effective solutions. We need a clear signal that our greenhouse gas emissions cannot continue to grow. We need to set and enforce goals for bringing our emissions down.

When do we need to have these policies in place? The answer is: As soon as possible, which brings me to the fourth principle. Woody Allen famously said that 80 percent of success is showing up. We need climate solutions to show up now. In waiting to act, we risk imposing unconscionable burdens and impossible tasks on future generations.

The fifth and final problem is that we need more than a domestic policy on climate change. We also need a global framework for action that moves beyond the Kyoto Protocol. Climate change is a global problem that demands global action. The challenge before us is to engage all nations that are major sources of greenhouse gas emissions in this work, including the United States and the major developing countries. And to do that, we need a long-term international effort that mobilizes the resources and technology needed to spur global progress.

The key to the success of any international effort in the future will be an acknowledgment that climate change is not only an environmental issue but one of economics and development. This framework must also be guided by a clear sense of fairness. No country should feel that it is being asked to bear an unfair burden in this global effort. And, finally, it must incorporate a great deal of flexibility. There must be room for every country's commitments to reflect its unique circumstances and abilities.

So there you have it--five principles that I see emerging from the sensible center. We need a two-pronged approach, including adaptation and mitigation. We need an array of technologies and an array of policies as well. We need to start right now, and we need a flexible global framework that delivers results.

I know that these principles and the issues they raise will receive ample attention from our presenters over the next day and a half, so I'm going to conclude my

remarks and let the show go on. I appreciate your participation in this conference, and along with all of you, I look forward to hearing from our distinguished guests. And I'm going to turn the podium over now to David Sandalow, who is an environmental scholar and co-director of the Environment and Energy Program at the Brookings Institute.

[Applause.]

MR. SANDALOW: Thank you, Eileen, for those very thoughtful remarks and for your long record of leadership on this issue.

Our next three speakers are Don Kennedy, Jim Woolsey, and Fred Bergsten, a very distinguished and knowledgeable group. They will each deliver 20-minute remarks. We'll hold all questions until the end. Unfortunately for us, Jim Woolsey has been called to testify up on the Hill at the last minute, and so will need to leave before the question-and-answer period. But we're delighted that Jim is able to stay with us for his scheduled remarks.

I hope our plan for the next 90 minutes is clear, and it's now my very pleasant responsibility to introduce Dr. Don Kennedy. Dr. Kennedy started his distinguished career as a neurobiologist. He then served as Commissioner of the FDA and then for 12 years as President of Stanford University. Today, he conducts his research through the Institute for International Studies, focusing on transboundary environmental problems, and is a member of the National Academy of Sciences and editor in chief of Science, the journal of the American Association for the Advancement of Science. At the AAAS, Dr. Kennedy has shown enormous leadership on global warming, among other things sponsoring a superb conference on this topic just last week. It is an enormous pleasure to welcome Dr. Don Kennedy to the Brookings Institution.

[Applause.]

DR. KENNEDY: Well, I'm grateful not only to David for that kind introduction, but for Strobe's and Eileen's efforts in organizing an important meeting on a vital subject that ought to be of serious interest to all of us.

I want to begin with a proposition. The proposition is that we have a great many pressing problems in the world. There's a population growth problem associated with economic development and pressure on resources. There's a continuing global security crisis augmented by the rise in terrorism. There is the chronically inequitable distribution in resources between the rich nations of the North and the poorer nations of the South. And, finally, there is the steadily growing body of evidence that we're about to undertake a major reorganization of the global climate regime.

The proposition is simple. It is that the last issue of great concern to us because it's directly relevant to the future of our children and our grandchildren, but it's also important because it relates in an indirect way and a very powerful way to every single one of the other problems I've just listed.

Let me begin with the science underlying what we now understand about climate change. Last week, as David mentioned, I helped organize a symposium at AAAS and a briefing session for policy and press people here on climate science. We had ten of the most distinguished climate scientists in the United States, led off by Sherry Rowland, the Nobel Laureate in chemistry. And the purpose was to make a careful assessment of the science and be pretty candid about what we know for sure of what we think may be true and what is merely a plausible but unproven possibility. So here is a short summary of what I think the consensus is on each of those categories.

First, what we know. General circulation models, climate models that take into account variations in the Sun's energy, volcanic events, other events that are important in managing the Earth's greenhouse, application of those models to the past thousand years

explained fluctuations in average global temperature very well indeed, up until the last hundred years. Over the last hundred years, they failed miserably unless you add into the models' calculations the addition of the greenhouse gases--carbon dioxide, methane, chlorofluorocarbons--that are the results of human economic activity. That's why the average temperature of the globe has increased by just about a Fahrenheit degree over the past century, accompanied by a rise in sea level somewhere between 10 and 20 centimeters.

The primary causative agent is carbon dioxide, which in pre-industrial times was about 280 parts per million by volume, and now is at 380 and rising steadily as we continue business as usual.

I think since someone mentioned Kyoto and all of its symbolism, there is a certain respect in which Kyoto is a dual failure. It was a failure both because the initial targets were inadequate to take us out of this problem; and, second, because they were unattainable by many of the participating nations. Thus, Kyoto and Kyoto's failure to date has left us without any basis for meeting the goals of the 1992 Framework Convention on Climate Change. And lest we all forget, the United States is not only a signatory but a party to that agreement, and under that agreement we are committed to limit atmospheric concentration of greenhouse gases to avoid--and I quote from the framework--"dangerous anthropogenic interference with the climate system."

Well, why, a dozen years later, is there some doubt about the dangers of this interference? The carbon dioxide we add to the atmosphere will stay there. Its average residence time in the atmosphere is a century. There's no disagreement about whether average global temperature will continue to rise. It will. The scientific dispute is about how much and why the disagreement about how much.

It's reassuring about those general circulation models that when they're applied to past climate in backcasting efforts, like the instance I described at the beginning, they give a reasonably accurate prediction of climate history. Perhaps more interesting, they regularly somewhat understate the magnitude of the real climate change; that is, nature regularly turns out to be a little harsher than the models suggest. So as we project into the future, it would be wise to look at the outside rather than the low side of where they might take us.

And where they might take us first, according to the Intergovernmental Panel on Climate Change, and also to an evaluation by the National Academies following President Bush's request that it undertake such an evaluation, the increase in average global temperature by the end of this century will reach between 1.5 and 5.8 degrees Centigrade, not Fahrenheit.

Well, that's a big range, and so obviously one must ask why the range. These models, like most, contain some uncertainties. Some of these are scientific: how increased cloud cover is going to affect the projections. Some clouds cool the climate by reflecting sunlight from above. Some warm it by trapping heat that is leaving from below. Another uncertainty is how changes in the Earth's reflectiveness, its albedo, may come about due to melting ice and how that might accelerate heating.

So these various feedbacks impose a set of uncertainties of their own. Others are economic and social. We don't know how national policies and international agreements that we undertake between now and the end of the century might serve to constrain the amount of greenhouse gases that we're adding.

So these uncertainties--probably about half of them due to differences or unpredicted feedbacks in the models themselves, and the rest to social and economic unknowns--have provided arguments for those who would prefer to postpone

economically difficult choices for controlling and mitigating our emissions. But it's important that even at the very lowest estimates there will be substantial changes in the nature of human life on the only planet we currently occupy. The rather modest impacts of the past century have already produced profound changes in regional climate dynamics, and we need to be conscious of those. Substantial ice sheet melting and retreat is taking place on both the Arctic and on the west Antarctic ice sheet.

In the Arctic, where climate warming has been extreme, sea ice has sharply diminished and rivers become ice-free much earlier. Low-latitude mountain glaciers, investigated in a very adventurous way by my colleague Lonnie Thompson at Ohio State, are shrinking. The famous snow-capped summit of Kilimanjaro, by the way, will be bare within 15 years, converting hundreds of old African safari shots into priceless historic treasures.

Biological cycles are experiencing the effects of warming, with upward extensions in the range of Alpine flora and advances in the time of flowering or first instances of bird breeding, by an average of five day per decade.

The models have all predicted more frequent and severe weather events, and we have had heat waves in the upper Midwest and Paris, accelerated beach erosion on coasts all over the world, and disastrous floods and landslides in Central America.

Well, that's now, considerable effects and much to worry about. But, of course, we're more interested in the future. What the models tell us unambiguously is that the climate system is headed for further disruption.

Now, the standard scenario foresees a slow ramp of global warming, and our projections are based on taking that out essentially indefinitely. But there's another possibility, and the past climate tells us to watch out for it because the past climate is riddled with sudden events that models applied retrospectively failed to predict well.

One possible alternative, especially in the North Atlantic, invokes a change in the basic ocean circulation gyre that brings warm water from equatorial regions up through the Gulf Stream, crosses eastward in the North, and the possibility is that as melt water from glaciers or added precipitation dilutes that water in the course of its trip across the North Atlantic, it will now fail to sink, and the return current that must match the upward current of the warm water in the Gulf Stream would be blocked.

Well, that scenario, elaborately extended, is the basis for that movie that Eileen told you about, which you should see only for amusement. Beyond the silliness does lie a prospect that is worth taking fairly seriously, and that is that a gradual change in average global temperature may intercept the threshold for some nonlinear dynamic process triggering abrupt change in a direction that we can't now accurately predict.

The bottom line from this concern, it seems to me, is, of course, there is uncertainty. The uncertainty comes because we are engaged in a large-scale, uncontrolled experiment on the only planet we have.

I want to turn briefly to some impacts that what we know about climate is likely to have on other important global problems. Jim Woolsey is going to talk about security, and I will mention only one aspect of that because it happens to have something to do with how I got interested in the climate problem in the first place. I didn't know very much about climate until the Carnegie Commission on Preventing Deadly Conflict asked a group of us at Stanford to look at environmental change and its possible impacts on regional security in the world.

One of the things that we looked at was what might happen in places like the delta of the Ganges and Brahmaputra Rivers, where storm surges now regularly displace large numbers of people and where huge numbers of people, 15 million or so, live

within the first meter or two of normal sea level. Some combination of sea level rise and storm surge from more extreme weather events is likely to produce much larger displacements. We know they will have to go somewhere. In the past, they have fled in much smaller numbers to Bengal, where friendly relationships have not followed. The security problems arising from a massive influx of a traditionally hostile population combined with an almost certainly high level of cholera infection does not present a very optimistic picture.

Water is a desperately important resource in most parts of the world. Drought is often followed by famine or emigration. Here in the United States, warmer winters threaten mountain snowpacks and will soon demand a revision of interstate and even international water allocation agreements. Maritime rivers are already undertaking management steps to deal with saline intrusions due to sea level rise or storm surges. In Great Britain, the barrier that protects London from occasional flooding of the Thames estuary is now being used six times a year compared to less than once a year in the 1980s.

I could mention a couple of others. Agriculture obviously is one of the most vital of human activities. The regional distribution of global warming impacts might provide some temporary help to some kinds of temperate zone agriculture. But surely in the tropics, where the people are poorest and least able to adapt, and where many food crops are near the limit of their physiological tolerance for temperature, the consequence of even a modest warming event could be far more serious.

So my point is that climate change is not a problem that can be isolated and talked about as though it were all alone. Instead, it's likely to interact with most of the other problems humans face all over the world. So I hope that this meeting will help encourage us to prepare a sound portfolio of risk-reducing measures.

These will not, I must tell you, bring us out of the woods. Our destiny is partly built in. It's built in through significantly increased heat storage locked into our oceans. It's built in in the greenhouse gases that are already in our atmosphere and will increase by another 50 percent or more, no matter what we do. And it's built in to the justified economic aspirations for development in the developing world.

So what we will be talking about, it should be clear, are ways of limiting the damage to manageable levels, not preserving the status quo. We lost that years ago.

So the contemporary policy challenge, it seems to me, amounts to a bet about risk. Are the consequences of business as usual likely to entail costs greater than those of beginning to mitigate those consequences now? Other nations--the U.K., several EU countries, and Japan--are making substantial commitments now. Some industries--British Petroleum, Royal Dutch Shell, Swiss Re, for example--have undertaken steps of their own. The insurance burden from the exploding rates of coastal erosion and storm damage has pushed the insurance industry into a lead here. If companies fail to participate in emissions reduction and join with others to resist such measures, questions might well be raised. If you believe so strongly that climate change is a myth, Swiss Re might say: Then surely you won't mind a climate-related event's exclusion from your directors and officers' insurance policy.

But we can't count on voluntary actions, and the United States so far has only announced a long-range research program that, although it looks reasonable, makes no current commitments to mitigate our contribution, which is about a quarter of the world's, to the global warming problem. I think we must have a more aggressive national policy to purchase insurance against this risk. It won't be cheap. It will involve some subsidies for conversion of old and dirty plants to new and cleaner ones. It will require, as Eileen has suggested, some serious efforts at technologies of sequestration. It will involve

an expanded role for alternative energy sources, although that role is necessarily limited. And it will finally involve a lot of determination on the part of people to do things themselves.

All of us, I think, are encouraged by the prospect, convincingly shown to be reasonable in the 1990 Clean Air Act Amendments, that we could have a cap and trade program here that could be made workable, as in the bill proposed by Senators McCain and Lieberman.

I think we're in a position of natural leadership here. We're the world's most powerful nation, the world's leading producer of greenhouse gases. Plainly, it's in our national interest in multiple ways to reduce our consumption of fossil fuels. And to see the nation failing in this most vital and globally sensitive matter, it seems to me, is a national embarrassment.

Thank you very much.

[Applause.]

MR. PURVIS: Good morning. My name is Nigel Purvis. It's my pleasure to introduce Jim Woolsey. I'm going to make that introduction short because Jim is no stranger here at Brookings or to the Washington policy community. And as David Sandalow said earlier, he needs to depart shortly to testify in Congress.

Let me just mention to those of you who are standing in the back that we do have seats available in an overflow room. It is just across the lobby, about 50 feet from here. The proceedings are projected on a large screen. You're certainly welcome to stand, but there are seats available for those who would like to sit, and there are a couple of seats scattered around as well.

Jim Woolsey is currently the Vice President at Booz Allen Hamilton, a consulting firm in Washington and across the country. He is a Commissioner of the National Commission on Energy Policy, a bipartisan group exploring solutions to U.S. energy challenges. He's known to most of us as a former Director of the Central Intelligence Agency, and he has also had a distinguished career as a partner at the law firm of Shane Gardener across the street, where I first met him because my wife practiced law with him.

I know that Jim is a true believer when it comes to addressing U.S. security challenges. He walks the walk on climate change. He announced here at Brookings when he was here in March that he had a Prius on order. I know that he spends his weekends sailing in a zero emissions vehicle on the Chesapeake. He is an author with Senator Lugar of a very interesting article in Foreign Affairs advocating that we reduce our dependence on petroleum and that we engage in a massive effort to develop alternative fuels, particularly biomass. Always informative, always entertaining and provocative, let me present to you Jim Woolsey.

[Applause.]

MR. WOOLSEY: Well, thank you very much, Nigel.

I was, of course, deeply honored when Brookings asked me to be with you today, but to tell you the truth, until I went straight a couple of years ago and went with Booz Allen, I spent 22 years as a Washington lawyer. And I spent some time in the Clinton administration out at the CIA. So I'm actually pretty well honored to be invited into any polite company for any purposes whatsoever.

Let me see if I can in a few minutes here bring together the Talbott issues and the Claussen issues, because in terms of what we need to do, I don't think they're that different.

We have an opportunity, I believe, today to be extremely effective and to

preside over a favorable confluence of ways to deal with these two sets of issues. And that's what I want to talk to you about because I think that those who think that neither of these sets of issues is all that important need to stand aside to those of us who think both are extremely important.

We live in the most technologically sophisticated society the world has ever seen. It's a society of dozens, really hundreds of complex networks of all sorts: oil and gas pipelines, the Internet, food production, delivery, on and on. And those who work in fields such as chaos theory and network theory talk in terms of these networks about butterfly effects. Of course, a butterfly flutters its wings on one side of the world. The ecosphere is a very complex system. You get a tornado on the other side of the world. It seems sort of fanciful until you realize that last August a tree branch fell in Ohio, and the complexity of the electricity grid is such that some 50 million consumers in Canada and the United States were out of power for up to a week.

Butterflies to the contrary notwithstanding, I think that one could reasonably characterize terrible results from those sorts of surges on interactions in complex networks as metastasis, a disturbance of we know not what source creating a terrible result.

But metastasis in the sense of a non-planned occurrence is not what happened to us two years ago September. What happened to us two years ago September with respect to the air transport network was different. It was that a group of--I'll use the President's word--evil men got together a couple of years ahead of time, probably in Malaysia, and said something to the effect to themselves: Well, let's see, the foolish Americans let short knives through baggage checks, they're polite to hijackers, and they have flimsy cockpit doors on their airliners. All of those are great, but flimsy cockpit doors are particularly wonderful because that will let us take over the aircraft, fly them into buildings, and kill thousands of them.

Now, that's not metastasis. That's war. That's someone getting inside your head and figuring out what your weaknesses are and going after you. And in that rather important morning, a tragic one, I think it's important for us to realize that it's not just that 15 of those 19 hijackers were from Saudi Arabia. It's that what underpins much of the, I'll call it, malevolent--as distinct from malignant--the malevolent interference that has occurred and will come again and again with our networks is fueled heavily by our dependence on the Middle East.

It is important, I think, that in 1979 the Saudis got both--the royal family got both terribly frightened and terribly rich. At the beginning of the decade of the 1970s, they were earning some $2 billion a year from foreign oil sales. By the end of the decades, it was $20 billion, headed up to $40 billion. And in 1979 they saw the Shah fall and an Islamist Shi`ite regime take over in Tehran, and they also saw the great mosque in Mecca seized by Sunni Islamists, to a great loss of life.

They control well over half of the world's surge capacity in oil, and the Middle East itself controls the Persian Gulf, something on the order of two-thirds of the world's proven reserves. To put mildly, this is not a stable region these days. This audience may believe that had we not moved into Iraq--or some portion of this audience--we would not have serious problems of instability. Whatever one thinks about the war in Iraq, I would beg to differ. We were not in Iraq the morning of September 11, 2001.

I believe that we will be facing dangers, serious dangers, from terrorism in the Middle East targeted against oil supplies, including Bob Baer's scenario of a 747 being flown into the sulphur processing towers in northeastern Saudi Arabia's big refinery

complex, putting some several million barrels of oil out of circulation in the world's economy for a number of months and creating a huge international economic crisis, to the possibility of even coups in the kingdom and of a takeover at some point by factions within the royal family, such as Prince Nayif, who are extraordinarily hostile to the West and all its forms. Prince Nayif, by the way, is the Interior Minister of Saudi Arabia, and he still believes that it was the Jews who did 9/11.

So in relying on our overall infrastructure and the natural disturbances that it can create, and the potential for malignancy, and malevolent interference, we have a serious problem--two sets of serious problems. One that I think should be front and center for all of us is what we have been called here to discuss in the large. Certainly global warming is a perfect example of a malignant interference in the system, in the world's ecosphere. We, by buying Hummers in this country, are not trying to sink Bangladesh beneath the waves. But we are contributing to that through the increased emission of greenhouse gases.

What we need to concentrate on, I believe, is policies that can both help us make our system in the West as a whole, not just in this country, more resilient against malevolent interference and also deal with the problems of malignancy in the overall system of fuel and the ecosphere, such as global warming. The important thing is not to believe we have to choose, not to believe that we have to deal with one of these to the extent of ignoring or putting the other in second place. We have to deal with both.

If you are, for example, a heavy smoker, you are contributing to the likelihood that you will get lung cancer. If you are standing at your bedroom window having a last cigarette for the day and you glance down and see a cigarette company executive carrying a .45 entering your basement as a burglar, you have two problems, not one. And the sum total of your response should not be, you know, I really ought to stop smoking. You need to deal with the burglar and with what you're doing to yourself with respect to malignancy. We need to deal with the intentional threats from the Middle East and with those that we are helping to create through our own behavior.

Now, I think that there are two major energy issues that are relevant to both of these questions. I see several of my colleagues from the Energy Commission here, and they've heard me on this before. I will only touch on one briefly because I think you're going to spend a good deal of time with it over the course of the next day and a half.

It's important the way we generate electricity and what fuel we use, and I'm a big fan of renewables and, increasingly, under the tutelage of John Holdrin (ph), whom many of you know well, on our commission of integrated gasification combined cycle, for coal with carbon sequestration. Certainly more R&D needs to be done and costs lowered for sequestering carbon by that process, but I believe it offers an extraordinary promise, particularly given the coal reserves in the United States, renewables will be able to do a great deal as well.

With respect to the electricity grid, there are important security issues having to do with the vulnerability of transformers and the vulnerability of the supervisory control and data acquisition systems, the SCADA systems, which we don't really have time to deal with today. They've been dealt with very well by a superb National Academy of Sciences report two years ago.

I want to move, however, past talking about the electricity grid for just a moment to talk about transportation, because transportation infrastructure is, I think, at the heart of what we need to deal with in order to deal both with the malignancy that we are fostering on the world in terms of our gas guzzling, and with potential malevolence.

First of all, two principles. Let us try to do whatever we possibly can with

the existing infrastructure. When I heard the President a year ago talk about it may be possible for a child born this year someday, once they get a driver's license, to drive a fuel-cell vehicle, I did a quick calculation. Sixteen years is more than four World War II's for the United States. We were in World War II for three years and eight months. Within the first six months, the dollar-a-year men who had been brought on board by Franklin Roosevelt had completely shifted Detroit from building consumer product vehicles to building tanks and military trucks. Six months. And we are talking about over four World War II's in the future maybe someone being able to drive an economical fuel-cell vehicle.

I would suggest that the proper response to that is a yawn. The most important thing to do is to concentrate on what we can do with the existing infrastructure. There are all sorts of reports now about the relative advantages of hybrids and in a new generation plug-in hybrids so that one can drive for short trips entirely on electric energy but still have the advantages of having a gasoline tank and being able to use gasoline effectively and efficiently in the way that hybrids do.

Roughly speaking, the 50- to 60-mile-per-gallon Prius that I drive today--it finally came through--if it were operating on E-85--and when I talk about the ethanol component of E-85 here, I'm speaking of ethanol from biomass--I'll say it three times--not corn, not corn, not corn, not a subsidy to ADM, not a subsidy to ADM, not a subsidy to ADM.

[Laughter.]

MR. WOOLSEY: If one is driving an E-85 vehicle and it gets 50 to 60 miles a gallon anyway, and 85 percent of the fuel is coming from waste products such as rice straw that have been fermented into ethanol, one is getting approximately 300 miles per gallon of gasoline. That's not bad. And most of the recent pieces I have seen in Scientific American and National Academy of Sciences and elsewhere rather stress the substantial advantages of plug-in hybrids over fuel-cell vehicles. And the former hybrids are here. Plug-in hybrids are close. Fuel-cell vehicles of the sort that people have been talking about I think are a substantial distance in the future.

The second key principle is to use waste. Waste often has tipping fees associated with it, in some other countries more than here. In Europe, for example, dead cow bodies, if you haul them away from farms, you are paid over $100 a ton. The new process of using biological waste called thermal depolymerization--it's written up in the current issue of Discover magazine and is now commercially producing for ConAgra and a small company out at Carthage, Missouri, using turkey offal from a turkey plant--that process, the head of that joint venture tells me, if it were transported as is now--no R&D, as it is now--to Europe and you used dead cows instead of turkey offal, since there is a $100 tipping fee associated with dead animals in Europe, $100 a ton, you can give away the diesel that the process produces and still make money.

Capital is a coward, and the edge to get over into things like using genetically modified biocatalysts to produce ethanol from waste and processes like thermal depolymerization is to recognize that there's a social value in getting rid of waste.

So if one can move in those two directions, emphasizing existing infrastructure and existing technologies, like hybrids, emphasizing waste disposal as a key component of generating either cellulosic ethanol or diesel or other fuels of the sorts that some of these processes are beginning to do, one can see a multiplicative effect; and instead of talking about 50-mile-per-gallon vehicles in terms of what we care about, one can talk about vehicles getting hundreds of miles per gallon. And that ain't bad as far as these objectives that we have been talking about are concerned.

Now, I think the important point--and I'll conclude with this--is that we

have here the possibility of those who care about the environment, both air pollution and global warming, those who care about developing economies in the Third World because using waste at a village level to generate transportation fuel is something that is ready-made for the substantial share of the world's population that lives on less than $1 a day; also a third group that should be of interest to many of us is those who want to make our society far more resilient against threats from the Middle East and, indeed, to undermine some share of those tens of billions of dollars a year that are being shipped there and some of them shipped back to us in the form of terrorism; and, finally, rural America. It is not irrelevant that we export $2 billion a week to the outside world to pay for our imported oil habit and that many of these processes I have described are processes which in this country and in other countries could help resuscitate not only agriculture and move subsidies perhaps from places where they're not needed in the agricultural world to things like doing away with waste, but can also mean jobs for small towns, rural parts of the United States and other countries.

If I had to characterize this generally, I would say what we have here is a potential coalition between tree huggers, do-gooders, cheap hawks, and soil busters. Now, since my wife and I have recently acquired a small farm, I now consider myself a member of all four of those categories. I would suggest to those of you who are sympathetic to such notions that you consider yourselves part of that coalition as well.

Thank you.

[Applause.]

MR. McKIBBEN: Good morning. My name is Warwick McKibben. I'm senior fellow in economic studies at the Brookings Institution, and I've been asked to make a few preliminary comments on the economics of climate change in introducing our next speaker.

Economists have made a number of contributions -- [tape ends].

-- debate from developing the global economic models for undertaking the long-term projections that drive the climate models that produce the climate predictions, to evaluating the costs and benefits of alternative policies to deal with climate change. Brookings has been at the forefront of this research for the past decade.

Economists have also developed a wide range of policy proposals to tackle climate change, focusing not on mandatory targets but focusing on price incentives and price signals. Policies such as the safety valve and many others hopefully will be discussed at this and future conferences.

There are also a range of policy proposals from economists that deal directly with the problem of climate policy uncertainty and climate change uncertainty, and the ways that we need to recognize how to encourage developing countries to participate in global regimes in their own interests rather than in our interest. The Brookings Institution recently published a book called "Climate Change Policy After Kyoto: A Blueprint for a Realistic Approach," which is available outside this room for free. This blueprint approach recognizes some of these global issues, and I think it would be encouragingly part of this debate.

Unfortunately, much of the climate policy debate is still stuck in the mindset of the targets and timetables approach which created the Kyoto Protocol and in my view has held back sensible climate policy for many years. I hope this conference will move beyond that approach to consider the various other policy options that are out there and can move the world closer to a sensible climate policy.

As much as I would like to discuss the climate policy work that has been undertaken at the Brookings Institution over the past decade, this is not my brief today.

Today, my role is to introduce our next speaker.

Fred Bergsten is known to everybody in this room. He has been the Director for the Institute for International Economics since its inception in 1981. He is Chairman of the Shadow G-8, which advises the G-8 countries on their annual summit meetings. He has held numerous distinguished positions in government such as Assistant Secretary for International Affairs in the U.S. Treasury, senior positions at the Brookings Institution, Carnegie Endowment for International Peace, Council on Foreign Relation. He's also been economic deputy to Henry Kissinger.

He has published numerous books on international economic policy and is probably the most widely recognized economist in international economic policy debates inside the Beltway and outside the Beltway. He is renowned as a great communicator of economic ideas to politicians, policymakers, and the wider public.

One feature of Fred which this audience probably doesn't know is that in Australia he has a reputation as being a great communicator with koalas.

Fred Bergsten.

[Applause.]

MR. BERGSTEN: Well, Warwick, thank you for the very kind introduction, and not only for what you said but for what you did not say. Sometimes when people note that among my past sins I was economic deputy to Henry Kissinger, they go on to add that that's something like being military adviser to the Pope.

I actually made that comment at a conference with Henry recently, and he said, "That is correct. And I want to add, Fred had a distin economic and political terms to move ahead with decisive changes to deal with global warming and other environmental problems that are the focus of this conference today.

So I'm going to talk about that global energy regime. I'll come back then to suggest why I think that's so important for climate change and the environmental issue. But first I want to carry you through an analysis of why I think the current global energy regime is so dysfunctional, so costly to the U.S. and the world economy, and, therefore, why changes in it, though difficult, could be of critical importance for climate change and other environmental problems.

My argument is conceptually simple and has four main components. The first argument is that the world oil price--and I'm focusing on carbon-based fuels and the oil market in particular. The world oil price is determined to a very large extent by a producer cartel, OPEC, and by a single dominant supplier, Saudi Arabia, in a way that we would never tolerate domestically.

There is some intellectual debate about how great is the impact of OPEC and Saudi production controls on world energy prices, and other factors are obviously important. We're now in a U.S. and global economic boom. That obviously increases demand and increases world price. But there is no doubt--no doubt--that world energy supply has been suppressed by a large amount for prolonged periods of time by deliberate production restraints by the main producing countries.

The International Energy Agency in its latest report a month ago reiterated that publicly, and all we need for evidence is to see what happens now when the price does get up to a level that's causing concern throughout the world. The Saudis suddenly announced they'll use their surge capacity, increase production. OPEC goes along and the price will, in fact, come down. Simply, once again, demonstrating the powerful price impact that the producer cartel an costly for the U.S. and world economies. Every $1 increase per barrel in the world oil price leads to a reduction of something like $25-30 billion in global economic output, of which about $8-10 billion per year occurs in the

United States, about one-third of that total.

At excess, which I suggest it has occurred for 50 years and occurs today, of 50 to 100 percent -- that's a doubling over the market-oriented price -- has thusly severely dampened global economic growth on a long-term basis. Economists have puzzled for a long time over why there seemed to be such a sharp turndown in global economic growth after the early 1970s, a sharp decline in productivity growth, particularly in the United States.

The correlation with this sharp increase in world energy prices in the most important market of all is clearly a major factor involved in that.

For now, the excess of about $20 per barrel in the world price takes something like $500 billion -- that's half a trillion dollars -- off the world economy, of which roughly a third is in the United States.

There are brand new studies produced by the International Energy Agency, along with the OECD itself, and the International Monetary Fund. They are supplemented by a new study from the European Central Bank, using somewhat different methodologies, and they all come to the same conclusion, though they are very conservative in their methodology:

They conclude that this excessive 50 to 100 percent, $20 barrel at current level world price, takes at least -- at least -- and these are conservative estimates -- a percentage point a year off world economic growth, including in the United States. This is a huge economic effect. It cumulates over time.

And, incidentally, if you worry about the developing countries, as Jim Woolsey also mentioned, you should be really worried about that, because these studies show that whereas the excess energy prices are taking a percentage point a year off our growth, it's taking two to three times that off the growth of the poorer developing countries who are hit even more adversely by those excessive prices, and have much fewer response mechanisms in place.

Now right now, of course, as I mentioned, the U.S. and the world economies are growing well, can absorb the higher energy prices that we have, and it is also, of course, true, that U.S. dependence and world dependence on fossil fuels has declined sharply over the last 30 years, by about 50 percent in this country. So the costs are much less than they would have been in the past.

Nevertheless, that is taken into account in all the numbers and estimates that I mentioned. It does not diminish by any means those huge impacts that I indicated that are adversely affecting our own economic, that of the world, and particularly the developing countries.

In addition, of course, one has to note that the sharp increases in energy prices add to inflation probably by a percentage point per year on that side of the economic equation as well, and that can lead, particularly if monetary policy is erroneously conducted, it can lead to excessive tightening of monetary policy prematurely, which then can further dampen economic growth and have a second round of negative effects on all of our economies.

What I have talked about so far is price levels and excessive levels on a sustained period of energy prices in the world.

There is in addition the sharp volatility that results from the current global energy regime. No less an authority than Alan Greenspan has pointed out repeatedly that all three major U.S. and world recessions in the postwar period have been triggered by sharp price increases in oil prices.

Jim Hamilton, in his analysis of the issue, over time has shown that nine of

the 10 world recessions that have occurred in the entire postwar period were preceded by significant increases in oil prices, again suggesting that the volatility as well as the excessive levels have been very important deterrents to strong global economic performance.

Hence, the bottom line is simple: If either presidential candidate came on this stage and asked me what would be the most successful economic expansion and jobs program that I could pursue, I would say a change in the global energy regime. To bring energy prices back down at least close to market-based level, you could get a huge payoff, a percentage point or more per year of growth, in our own economy, the world economy, and in addition it would be the most important development policy initiative you could take because you'd get two or three times that payoff in terms of the favorable effect on the poor countries around the world, particularly in sub-Saharan Africa and those that are highly indebted.

And so the need for change in these areas, I think, is very clear.

There's a third positive effect that I should mention, to echo Jim Woolsey. The fact is that the current energy regime does produce enormously excess transfers of revenues to a large number of countries in the Middle East which, as Jim said, are the financiers of terrorism. Whether it's Saudi Arabia, Iran, or others, they are the big beneficiaries of the current world energy regime.

Indeed, I think it is fair to argue that a glaring hole in our entire antiterrorist strategy is our failure to come to grips with this set of issues, which provides much of the financial wherewithal to do the damage that Jim Woolsey talked about so eloquently and which we all know.

Now the final question, and the toughest one, is what to do about all this.

Incidentally, I do not put much weight on the notion of reducing our dependence on Middle East oil. Long term, technological change, obviously desirable if we could do that. But as long as we have a carbon-based, fossil fuel-based economic structure, we are unable to divorce ourselves from the fact that the key component of those resources exists in the Middle East.

And even if we were to become totally self-sufficient in some sense, we would still be part of a global market where price would be largely determined from that part of the world.

So whereas I strongly support the efforts to change the technology of the sector, I don't think in anything like the short to medium run we are going to be able to reduce our dependence on the Middle East in the sense I'm talking about of reducing price and therefore instability and costs from the global energy regime.

The goal of the reform, as I have clearly indicated, is to restore market-related prices somewhere around half where they are now, and to limit volatility around that level to ranges much lower than in the last 30 years.

In short, what I would suggest, with all the diplomatic ramifications that it would have, is a major new initiative between the consuming countries and the producing countries to replace the current producer-dominated regime with a cooperative regime that would aim to stabilize in a wide range, $15-25 a barrel, OPEC's own range of $22-28 a barrel, but to truly stabilize prices at those more market-related levels to a cooperative process of protecting the floor of the range and also protecting the ceiling of the range.

The buffer stock mechanism to do that is well known and, indeed, the fact that we in the United States and the consuming countries as a whole have already built huge strategic reserves which could then be used for that purpose puts us in a very strong starting position to do it.

Why would the producing countries do it? For several reasons:

One, they are terrified by the risks which they have frequently faced of sharp price decline which torpedo investment, torpedo a rational system even from their side. Protection against that would be enormously important.

And we could add a lot of additional attractive elements for them in terms of taking more value-added energy-intensive products from them so they can get a higher share of the total value of the ultimate energy dollar.

My colleague Phil Vellagro, who has worked on this extensively, has laid out a whole series of measure that would add to that idea. I don't have time to mention them all, but I'm happy to go into some, if you would like to do it later on.

So the idea would be to change the regime from producer dominated to producer-consumer cooperation in order to stabilize price around a wide range.

In order to get that cooperative regime, the United States and the consumer countries might, of course, have to offer sticks as well as carrots and threaten to use our existing strategic stocks to drive price down.

By contrast, our administration right now is continuing to buy for the strategic petroleum reserve and, indeed, its purchases have probably added another $3-4 a barrel to the world price right at this time. So they're at fault somewhat as well. We should be selling, not buying, at the current time, but we should do so with a strategic purpose in mind of ultimately changing the regime to one that would be more stable and more balanced over time.

We could also invoke the Sherman Antitrust Act against the OPEC cartel and in some sense it is scandalous that that has never been done. Legally it's a slam-dunk because any reduction in production in order to increase price is a per se violation of the Sherman Act, an obvious but ignored factor.

Even a group meeting, as OPEC always does, to control output violates the law. They don't even have to succeed to violate the law. All they have to do is meet to try to rig the market. And there's no sovereign immunity involved because these are commercial acts of foreign governments, not political acts by sovereigns.

There are private lawsuits -- I don't suggest this would be the remedy to the problem, but if the U.S. government got serious about the issue, its support for legal action of that type would be a powerful signal. And we all know without elaborating that lots of diplomatic pressures could be brought to bear in order to promote the regime change of this type.

The final question obviously for this group is what does all this have to do with climate change and the issues that you are here describing.

A reduction in the price of oil to a more reasonable market-oriented stable level would, I think, be per se good for climate issues. It would reduce the ratio of prices between oil and coal. It would at least push demand in a less undesirable direction as a short to medium-term phenomenon.

But, to me, the more important thing is that a substantial reduction in the world price by leading to a substantial reduction in the U.S. price for gasoline and other derivatives from the oil market and the reduction of instability in the energy market that I have argued, all that would then produce a much different energy policy and energy price framework for environmental policy.

Suppose we could really limit and stabilize the world oil price to say half where it is now or has been for the last 30 years, and be fairly confident that it would stay there. At that point, it seems to me, we would be -- we who concern ourselves with climate change and global warming -- would be in an incomparably stronger position to push for a

carbon tax, a gasoline tax, an energy tax, other measures that would have those effects because then the net effort on our economy of the package put together could hardly be charged as adverse.

By bringing the world price down, we would position ourselves to raise the domestic price, put in place measures that would be lasting, permanent, of which we could count as being consistent, and therefore totally, totally, I think, obviate the case that is made against such measures, that they are going to have adverse economic efforts.

By putting it in this broad strategic context, we would in fact assure that the net impact on our economy was positive because even with a pretty healthy carbon or gasoline tax, we would only be taking back from consumers a part of the major gain we had achieved from the initial international regime change.

Moreover, we would then have a lot of revenue from the energy tax itself that we could use for other climate change or environmental initiatives, or for other purposes, recyling into our own economy to further mitigate the adverse impact of the whole system on our economic fortune.

And so to the extent that concerns about adverse economic impact have undermined or precluded the kinds of positive policy requirements that are needed to deal with climate change and other environmental issues, I would submit that seeing those topics in the broader context of energy policy as a whole, the global energy regime could provide a key to unlocking the door, moving forward and, as Jim Woolsey said, slaying multiple dragons at the same time.

Thank you very much.

[Applause.]

MR. : Well, not only are our speakers knowledgeable, so is our audience, and so now we would like to bring in the members of the audience. Looking around this room, I have to say this has got to be the greatest gathering of expertise on global warming since Spenar Hennius (phonetic), who identified the greenhouse effort, dined alone. And I'd like to just start with a question for each of the speakers on my right and left and then just throw it open, and to start with Professor Kennedy.

It has become commonplace in the media to refer to the scientific uncertainty around global warming, and to always talk about how some scientists believe that the greenhouse effort may be real, some scientists believe that greenhouse gas emissions may be changing the planet.

I'm wondering on whether you could just comment on the nature of the scientific uncertainty around this nature and the nature of the scientific consensus around this issue, and as somebody who has been both a scientist and a policymaker, how policymakers should react to the nature of scientific uncertainty around this issue.

MR. : Well, you have asked a question I get asked most often by people who have a problem with the uncertainty.

Of course, there's uncertainty. There's uncertainty in the models. I tried to outline some of those difficulties.

I think there is also an excess uncertainty that tends to be communicated to people who read about this subject in the newspapers. I sometimes refer to the two-card Rolodex that seems to be in the hands of many of the people who write about this problem.

There's Jerry Rowland (phonetic) or somebody who is known to be a knowledgeable sort of representer of the consensus, and then there's one of three or four persons who argue, sometimes convincingly, that the uncertainties are sufficiently great so that it's much too early to do any particular action.

I guess my answer is the consensus is so strong about what has already

happened and about the general direction of what is going to happen that the argument that we should postpone is not a very good argument.

MR. : Thank you.

Dr. Bergsten, I went to Foreign Affairs to read your very interesting article on the economic agenda for the President and came across in the most recent copy of Foreign Affairs another interesting article by Lord John Browne about this very issue on climate change. I just wanted to read a passage from Lord Browne's article. He wrote:

"Counterintuitively, BP found that it was able to reach its initial target of reducing emissions by 10 percent below its 1990 levels without cost. Indeed, the company added around $650 million of shareholder value because the bulk of the reductions came from the elimination of leaks and waste."

Now as I listened to your remarks, it occurred to me that there may be an analog here at the national policy level and that you may be suggesting that the experience that BP has already had corporately is replicable in national policy, and I wanted to ask whether that is an appropriate conclusion to draw from your remarks, and then ask about the diplomatic feasibility of your very provocative proposal, could this really be achieved.

MR. : Well, on the first, I don't pretend to be an expert on the technology at BP or some of the other aspects of that that were discussed, including by Jim Woolsey, but it has been clear from the examples of a number of companies that there are win/win changes that are quite possible from use of technology, even management changes, and pricing patterns of companies to achieve simultaneously environmental and economic goals.

So I think that is demonstrably correct. The question is scale. I think the question is how far that gets you. My suggestion obviously goes to the other end of the extreme and is very macro in suggesting here we are talking about trillions, many trillions of dollars of potential improvement in the world economy, our own economy, and thus the framework for dealing with the environmental issues. So I would go almost to the other end of the extreme, not to suggest it's one instead of the other. Both should be pursued. As companies can pursue efforts like that immediately, they of course should do so, should be encouraged to do so, but I don't know that that's going to get us nearly as far as we feel we need to go, as Dr. Kennedy was suggesting.

On the diplomatic feasibility, this is obviously a rather tough time for U.S. policy toward the Middle East or the Middle East situation more broadly. But start from the premise that it is in shambles, and that some significant change is going to be required.

I would make what may strike you as a counterintuitive suggestion that a new initiative on the energy policy front of the type I suggested would be a very positive component of a new approach by the U.S., but multilaterally, it would have to be multilateral, consuming countries working together in my model toward the Middle East.

And the reason, as I suggested, is that the basic objective is to work out a cooperative producer-consumer regime that would together try to provide a more stable economic and rational global economic framework. It would be explicitly aimed at a cooperative structure.

Now I acknowledge that it would not be easy to get there. There would be hurdles. There would be costs to some of the producing countries, at least in the short run in some respects, from going in that direction.

But I think even for them, and many of them realize it, there would be long-term benefits and therefore if sincerely and multilaterally pursued by the U.S. and the rest of the consuming countries -- incidentally, including China and other key countries in the Far East who are main drivers of increased global demand are themselves just now

starting to build strategic reserves, and therefore are not only natural but essential players in the kind of regime I have in mind.

I think all that would not only be extension of a cooperative initiative, but would actually be a way to draw the Middle Eastern countries into a cooperative international network which just doesn't exist now. We're doing a major study at our Institute for International Economics on the economics of the Middle East, and one of the first factors, first facts that strikes you just glaringly in the face when you look at the economics of the Middle East over the last 30, 40, 50 years is how despite what I described in the energy regime, it's the one region of the world that has deglobalized in an era of globalization, when globalization is essential to achieve modernization and economic progress.

But the Middle East on every indicator has deglobalized. The countries of the Middle East get less foreign investment than Sweden. They have fewer patents taken as a group than Brazil. They have deglobalized. And this would be one way to try to help overcome that, bring them into a broader global pattern of cooperation, and I think if done correctly -- that's a big if these days -- but if done correctly, that could be a very positive element in the next administration here trying to recoup our position in that part of the world.

MR. : Thank you.

Well, we would like to open the floor for questions. And given the tremendous expertise in the room, also to short interventions on the topics that have been raised this morning.

First hand is Dan Colbert.

MR. : [Off microphone.]

It's a two-part question, but both parts I think require very short answers.

First, keeping in mind that the [off microphone].

And number two, you mentioned the possibility of taking some or all of that money and investing it in other environmental activities. Would that affect the incident, number one? Would that have any effort on the [off microphone]?

MR. : Well, I think the two questions are so intimately interrelated that I'll punt in terms of a single-point answer.

In rough terms, I would think in terms of taking back half the price gain from the change in the global price. If we could get the global price cut roughly in half, I would tend to think in terms of taking half that back with a gasoline or carbon tax, but I would want to figure out much more thoughtfully than I just said how you'd want to use those revenues and, indeed, what the overall economic environment at the time was.

There is a third option, of course. The U.S. faces massive and growing budget deficits. The budget situation is out of control. One might want to, at least for a while, pocket those revenues in reducing the overall budget deficit, further strengthening the economy, reducing pressure on interest rates and the like. Unless the next administration and Congress come up with some more persuasive budget policy than we have got so far, you might have to do part of it for that reason.

And, incidentally, for those of you who would like to see an energy tax, that might become a very strong political driver to get one because if bringing the budget and the external deficit back under control does require some revenue raisers, your basic choice is to raise marginal rates, which most people don't like, going to some new value-added tax, which a lot of people don't like either, or possibly using an energy tax in part for revenue-raising reasons as well as the environmental and climate change benefits that it would have, as you implied.

So there is a complex of variables that go to the answer to your question. I'm sorry I therefore didn't answer it as briefly as you might have wished, but I think that's the honest conclusion, a whole bunch of things would have to be taken into account in setting that level, and dividing up the kitty.

MR. : Sir?

MR. : Carliaga (phonetic) from the Potsdam Institute of Climate Impact Research.

I am very happy to have you here because you bring up the old recurring question of who gets the rent. At the same time I would like to dramatize what you said. The French did it, they actually succeeded in taking a larger share of the rent on oil from North Africa natural gas. But this ties to very, very heavy political conflict, and I think you are fully aware of the fire you are playing with.

It seems to me that the only realistic way of doing this is to be very clear about who shall get the rent, and you were ambiguous. You created the impression that there is a lot of money for everybody in there, and that would create a situation where everybody would block everybody.

It seems to me that if you are serious about saying we can use part of that rent to finance the transition to a carbon-free economy, which I think you said at the end, well, then, we should talk with the people in the Middle East that they should use their revenues in part for that purpose.

It is my understanding that the emirates of Abu Dhabi, places like this, are consciously moving away from oil. It's just the Saudis who didn't understand it. And there may be a scope for a cooperative initiative of the kind you talk about if we frame it explicitly as financing that transition.

If we don't, then we are frightening these people very, very directly and they can't be so stupid as not to understand this.

MR. : Well, it's a fair question, and I agree with your bottom line. But there is another element in the idea, and I have only referenced it briefly. One of the other objectives of many of the countries, particularly in the gulf, has been to get more value added out of their primary fuel production. They have not been very successful in that.

One reason they have not is frankly European countries have kept high import barriers on petrochemicals and have limited the prospect for all the gulf oil producers and gas producers to use their raw material to move upstream in the production process.

I would certainly envisage big liberalization in that area as another element in the scheme.

I think what you said is right, but again, on the probable reality that we've got another couple of decades at least of fossil fuel-based energy, I think a big appeal to the producing countries that are trying to diversify their economy, as you say, is to help them diversify it on the basis of their true comparative advantage, their fossil fuel. And we can make big contributions to that by changing our trade barriers, by promoting investment that will help them and bring the technology in to produce those kinds of industries.

I think we can sincerely, and to our own benefit, incidentally, as consumers, help them diversify their economies even before you get to alternative energy technologies, which even though there is a fair amount of wind in the gulf, and a lot of sun, may not be their comparative advantage like fossil fuels.

MR. : I would just like to add one little point about the difficulty of what Fred has proposed. It's a wonderful opportunity if it can be made to work, but it is really hard to get consumer and producer interests to align themselves, and if you doubt

that, just think about how many times we have tried to do it for agriculture domestically in this country and failed.

MR. : Ward.

MR. : David, I was curious at your comment that BP reducing emissions for production of oil. It sounds very much to me like cigarette companies telling their employees not to smoke, and that solves the smoking problems that we have in society.

But I have a question for Fred. The appeal of what you are saying, as I understand it, is first get rid of existing distortions and then overlay it with sensible policy. But it seems to me a better place to look for existing distortions is actually in the global coal markets. A study that Brookings published in the mid nineties looked purely at coal subsidies and taxes globally, and it was found that the emission reductions from removing the distortions in the coal market, which is very similar to the agricultural market globally, was enough to get a greater emission reduction in the Kyoto Protocol of '97 without the new things that have been added.

And secondly, increase global income, because you are reducing a very large distortion and making people better off.

I wonder what your view is of looking in these other areas where there are distortions, which are part of other systems such as the World Trade Organization would be much more fruitful than trying to solve the Middle East oil market problem.

MR. : Well, I'm all for what you just said, and I agree, it could have an enormous contribution, but I'm not sure I go for one or the other. When you get to the real world, it's obviously the political economy of each. As you know, and as I'm sure that study suggested, the political economy of dealing with the coal subsidies is not an easy one, either.

So I would simply try to proceed on all those fronts. You are absolutely right on coal, but again, as long as we are going to have a world economy that is based heavily on oil and gas, as I think it's going to be for another couple of decades, and particularly if you reduce coal subsidies and coal production, then I think you have to move in that sector as well.

So I would say given the salience of the overall problem, full speed ahead on both fronts, as best one can.

MR. : And along those lines, what impact do you see your proposal having on the fuel mix and electricity generation in the United States? You've got coal in that, you've got natural gas and oil competing at the margin on price. Would this affect substitution of natural gas for coal --

MR. : I think it would, and I probably should have said that, that at least in the U.S., but I think it's true in Europe as well, there is a pretty close tracking between oil and natural gas pricing. So if you could achieve what I was suggesting on the oil side, an additional benefit in the terms I was discussing, economic payoff and spillover then to other things, would be a more or less commensurate decline in the natural gas price with big efforts on the electricity mix.

MR. : Sir?

MR. : My name is Charles Sprawn (phonetic). My background is as a research physicist at NOAA for 25 years, and I do some climate modeling on my own. I'm one of the working scientists.

My response is to you, Don Kennedy, Mr. Kennedy, I would like to maybe make a comment, a brief comment on climate models that might add a little information to this discussion. The coupling between CO-2 and water vapor is very important. The fact

that CO-2 and methane are greenhouse gases, that's basic physics. I don't think there is any controversy about that whatever.

But there are several interesting problems connected with it. In the polar region, where normally the water vapor concentration is very low, there's less of it to interact with CO-2, so that one would expect less global warming at the polar region on that basis alone.

Also it is puzzling to me that mountain glaciers seem to be melting because at higher elevations water vapor and the total pressure of CO-2 are also less, so one would expect less of a greenhouse effort there.

I am just suggesting that these are things that we the modelers have to try to sort out. I think that previous models, too, do not really explain why there was a little ice age from the 14th through the 18th centuries, roughly. I've been talking with some colleagues about the effort of solar activity on this and so on. These are correlations, but they are not established as causes.

So this, of course, leaves other people sort of a wide open target of opportunity to criticize the climate models and to minimize the efforts of global warming. My own very personal opinion is that if we don't act in some way, we are definitely taking a gamble. I mean certainly automobile consumption in this country and lower gas mileage and so on seems to me we really are taking a gamble that is unnecessary, in my opinion. There are other modes of transportation available, intercity railroads, carpooling, and metro and so on.

Thanks.

MR. : Thank you very much.

MR. : Thanks for the additional points about the models. I would agree that there is certainly some uncertainty about the explanation of the little ice age.

As to the importance of water vapor, it is important. It's a major greenhouse gas. Of course, it's exchanged rather rapidly.

I think that the problem in the higher Arctic is very likely that the changes in albedo (phonetic) are probably overcoming the small contribution of vapor. But that's a guess, and modelers will continue to disagree about those.

MR. : Could I ask you to elaborate on both those points, then, in slightly more layman's terms, Dr. Kennedy? On the exchange rates, are you referring to the different residence time between carbon dioxide and water vapor?

MR. : Right.

MR. : And then maybe you could explain what albedo is.

MR. : Water vapor doesn't stay around very long. Albedo is simply the degree to which the earth reflects incoming solar radiation instead of absorbs it. If you have got a large area of land that's covered with snow and ice, and the snow and ice melt back, leaving brown earth beneath, you tend to hold more of the heat and reflect less.

MR. : Thank you.

Richard Benedict.

MR. : Thank you. My name is Richard Benedict. I'm with Battelle Pacific Northwest National Laboratory, and I would just like to highlight a couple of paradoxes which I would ask either Fred or Don to react to.

One of the problems in climate policy nowadays is trying to stimulate a replacement of fossil fuels by renewable energies, solar and wind and so on, and one of the problems of that is that the prices of fossil fuels are so much lower that it's hard to get market penetration by renewable energies.

If we act to lower the price of oil even more, how will that affect this issue?

The second point is in point of fact, oil prices are already very heavily taxed. The Saudis in fact just last week said, you know, if you have a problem with the price of oil, just lower your taxes, and I can testify since I have an office in Berlin. I shuttle back and forth between Germany and the U.S., as Carlo knows, and there when I fill my Volkswagen Golf in Berlin, it costs me $70. And yet it hasn't much altered my driving patterns. If you need to drive, you need to drive.

So raising the taxes -- although here it would be a furor, but in Berlin, in Germany, you still have, when you are on the Autobahn driving at a very economically inefficient, emissions sense inefficient 80 or 90 miles an hour, there's still that BMW that comes up on you six inches behind who wants to pass you. He's going 120.

So even the high price of oil is not markedly influencing consumer patterns in Germany.

Now these are, you know, just a couple of paradoxes to illustrate how difficult for me this situation is. We have to solve it. We need to replace fossil fuel with renewables gradually, as fast as possible, and lowering the price of fossil fuels may complicate that.

MR. : I would make two comments. A number, I suppose, could be made in response.

One is to suggest that price does have a major effort. You may not drive your Golf much less in Berlin, and I don't know what kind of car you have here --

MR. : The same.

MR. : Good for you. But I note that many fewer Germans or Europeans drive SUVs. There's a big difference in the automobile fleet or the transportation fleet more broadly, which at least to some extent, I think, reflects the fact that we have chosen, despite what I said about the high world price, to have a much lower domestic price.

So I think price is clearly a pretty important variable in the whole structure of the transportation network that we have. Europeans take trains, Europeans walk, et cetera. We know our whole society is structured around relatively low energy prices. And you're right, there is a paradox because I'm saying reduce them further.

However, I think that it's a folly and a mistake to say that our economic goals or even our energy policy goals benefit from letting the Saudis, the OPECers, the producers in general, set a price that is temporarily high, fluctuates all over the lot, may drop from 40 to 10 and then go back up, but be both noneconomic in terms of the underlying fundamentals of the industry, but also incredibly volatile. And therefore not leading to the kind of predictability that would underlie what I would regard as sensible policies on all these fronts.

Now it comes back in a way to the first question. If you got my outcome and then chose to raise the U.S. domestic price on a sustained, lasting basis with the rents coming here to be used for national purposes, you could go that way.

I said -- and probably that was a disappointing answer to the first question -- well, I think in terms of taking half of it back. But over time you could, of course, take all of it back or even more than that if you wanted to do so as part of a program in which you were then recycling that generated income from the energy tax to a variety of other national purposes.

And, again, you could make that quite neutral or benign in terms of the overall domestic economy because you were controlling the utilization of the revenue.

So if you chose to go down that road, you would only for a while achieve my first objective of obviating the criticism that you were hurting the economy by driving

price up further from where it is now, but you certainly would position yourself to do much more over the medium and the longer run.

MR. : Ambassador Benedict reflects, I think, some ambivalence a number of us feel about oil prices and their impact on our other efforts, and I hear Fred going in the right direction now. I hear him giving more of it back.

[Laughter.]

MR. : And go. That's the right way.

MR. : My only objective is to get it there. Now I leave it to you guys to figure out how to go with it there.

MR. : All right.

MR. : Thanks. Gary Mitchell from the Mitchell Report. I would like to move to a sort of slightly different consideration of this issue. I have been sitting here thinking to myself, we live in a country where I think still a majority of people think there's a link between al Qaeda and Iraq, and I'm not about to suggest how do we tie global warming to al Qaeda, but --

[Laughter.]

MR. : -- yet. My question is about -- I listened to Dr. Kennedy talk about the scientific research that has been done. I heard Bergsten talk about the economic implications, et cetera. I am interested in whether or not anyone has been doing some sort of communications research to understand how we can successfully talk about this issue in a public way. What are the hot buttons, what are the linkages, and is research being done there, and if it isn't, should it be.

MR. : I know there are some audience members who have thoughts about that, so I would welcome any of their answers as well as answers from our speakers.

MR. : Well, it surely should be. You know, us amateurs go out there and try to say what we believe in as convincing a way as we can, and we meet with people on the Hill, and we meet with people in the press, and talk as intelligently as we know how.

Sometimes we use words like albedo and have to be pulled back and made to explain them, and then maybe we do better the next time.

I know of no systematic research effort about how to communicate effectively as a strategy. I suspect that politicians of all sorts of directions and stripes have mourned the lack of such an intellectual framework for how to get the message across.

I wish I had one on this one, but I know of none.

MR. : I don't have a good answer, but I share your puzzlement in a way. As I said in my remarks, it has puzzled me, having been involved in this issue in government, outside government, now for the entire 30 years since the oil regime changed so dramatically, as to why we have been so passive.

As I mentioned, if a cartel or a dominant supplier drove so dramatically the price of the most important commodity in the world within our borders, they wouldn't last a week. You know, it might be complicated, the court case might take some years, but you'd hit them.

Yet because it's been international and because it has had some of these ambiguous efforts and lead to ambivalence in terms of response around the world, it has been permitted to continue, and given the huge costs involved, even if you only think some fraction of the numbers that I mentioned is correct, and there's debate about that, but even if you only take some fraction of what I mentioned, it is so large and so outrageous in some senses that I have been really puzzled at the unwillingness or inability of leaders, not just in this country but throughout the world, to really address the issue in a fundamental way.

We wait until the price runs way up, or there's a war or supply shortage, and

then we either send troops or we get very excited and lean on the producers, and they grudgingly kind of give way after having gouged for all this period, and will give some of it back, as we're seeing right now.

But it strikes me as a very strange phenomenon in terms of human reaction and political tolerance, and so I kind of share the sense that some communication strategy to put across what I think are fairly straightforward, simple and powerful conclusions is not only needed, but if devised, as I said, a U.S. President, I think, could make a lot of mileage out of it.

MR. : There are some disconnects, I think, between the natural and the political time scales here, Gary. I mean if you ask your average scientist whether something significant is happening here, they'll say yes, and you say what, and they'll say the temperature of the planet is going to go up, what, two and a half to 10 degrees Fahrenheit over the next century. And then you ask your average politician about that, I've got a problem for you to worry about over your next election cycle, ma'am, the average temperature of the planet is going to go up, what, .2 degrees Fahrenheit, that presents some challenges from a political standpoint. It becomes about responsibility, I think, and taking responsibility for the future.

MR. : I was talking more about the energy price, which is the more immediate thing, but that's different than you were saying.

MR. : Yes.

MS. : I'm from Senator Olympia Snowe's office. Judy Warris (phonetic).

I just wanted to follow up with what Fred mentioned on the Sherman Antitrust Act, and for information there. There is a bipartisan group of Senators that have introduced what we lovingly call a NOPEC bill that indeed takes up that issue. Whether it has legs and are now ending our 108th Congress is probably in doubt, but at least it's on the table.

MR. : Back of the room, against the wall.

MR. : Rodney Pearson (phonetic) from American Petroleum Institute. This is for Donald Kennedy.

You were making some comments about Kyoto Protocol at the time I came in and I didn't catch all the comments. If you would reiterate those comments, I would greatly appreciate it.

MR. : Sure. It was a tiny sidebar. I said that the Kyoto Protocol targets were inadequate targets with respect to solving a significant part of the global warming problem as it was viewed even at the time.

And second, that the failure to bring both the developing world and the United States Senate onboard meant that it limped along, and what we have seen in the aftermath of Kyoto is business as usual.

MR. : We have time for about two or three more questions before our break.

In the very back of the room.

MR. : David Nichol (phonetic) with the Center for Transatlantic Relations at Johns Hopkins University.

I would like to go back for just a second to a question that maybe hasn't drawn quite so many questions from the audience because Mr. Woolsey had to leave to testify. But I would just like to make a comment about how difficult I think it is going to be to really flesh out this security climate change, energy reorganization link that we have been talking about, because the implication is that by reorganizing the energy system, we

will be able to somehow draw down the financial resources that were available to terrorists, and it seems that the financial costs of organizing September 11th were only $500,000, whereas the numbers that have been thrown around on the stage are in the billions and even the trillions over time.

Here I would like to make a link to the question that Carlo posed, which is that in order to solicit the producer countries' cooperation in the reorganization plan, we are going to have to make it clear to them that we are not actually trying to drastically reduce the financial resources that are available to them, but to develop their economies in a direction towards a postcarbon future.

But if in fact we are not taking financial resources away from them, we are not limiting the resources that would ultimately be available to terrorists if we are operating on the assumption that the financial resources that we make available to Middle Eastern countries and producer countries are going to terrorists.

It is that part of the link that I think we need to break by demonstrating that we are cooperating with them not only in our own economic and energy interests, but in their own interests in economic transfer of transformation from a postcarbon economy and also an attitudinal transformation.

Jonas Thomas Friedman (phonetic) often talks about the frustration in the Middle East, and that's not going to go away just because we organize the energy system in a different manner. So the links that have been discussed on the podium I think will need to be even broader than the already -- and I agree with the links that have been made.

MR. : Well, there's no doubt that what you say is right, and this is a huge set of problems, of even which the large one that I tried to address is only one piece. But as I mentioned, we are doing across the street a huge project on economics in the Middle East, and if you look at the era of high energy prices with those transfers of rents to the oil producers in the Middle East, to put it mildly, it is not a period of great success for that region. It's been a period of disaster for that region, even in the most straightforward economic term, let alone broader societal, cultural, and security implications, including the fragility with which some of those regimes now sit on their thrones.

So it is not as if we are asking them to contemplate changes in an enormously successful era in their histories. It could have turned out that way. I worked intimately with the Saudis back in the 1970s, when I was at Treasury, and they were pocketing the enormous windfall from the first two oil shocks. And I think many of them were sincerely devoted to taking that epochal change in their histories and putting their societies on a whole different and positive course. . .

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. . . in almost every respect one can suggest.

So acknowledging the difficulties of what you said, it is not as if we are trying to upset the apple cart of some enormously successful enterprise, and at least thoughtful people in that part of the world fully understand that, and I think would actually be quite interested in a regime change that would have a lot more promise for them.

To put it in shorthand, economists call it the curse of oil. It may have been a downer, not a winner. And they certainly need the diversification, and it would have to be part of a broader package of that type.

But I am not deterred by that thought simply because the bottom line for them so far has been so bad.

MR. : We're running over. Let me take the last two questions, right

here and right here. Just maybe take them in order, and then ask our speakers for some closing thoughts.

MS. : My name is _____. I'm a counselor with the French Embassy. It's a question for Mr. Bergsten. I was kind of surprised by your intervention focusing very much on the price of oil and energy market because I am no economist, but I have a vague recollection that whatever the characteristics of the market are, whether there is an infinite number of suppliers and customers, there is a certain connection of the price and the supply and the demand. And I think you didn't mention in your presentation at no stage the question of the demand, and it's quite surprising in the context of U.S. policy because in the '70s, well, there was obviously real efforts on the U.S. policy to have an action on the demand and the efficiency, the energy efficiency, and it produced huge results, and it was a huge success.

On the longer term, and this is, I mean, of course, directly pertaining to our major topic, which is global climate change, the energy market is not only dysfunctional on the side of the supply, but also on the side of the demand, because I mean there are literally today dozens of countries who are literally energy starved, and that's going to be a major problem for the future.

MR. : I am sorry to interrupt. I want to be sure to give everybody a break before Senator Joe Lieberman comes here in about 20 minutes. So with apologies, I'll get a last comment here.

MR. : Let me say two things to that. I did mention U.S. energy dependence in terms of energy input per dollar of output has been cut roughly in half over the last 30 years. So there has been progress on the demand side. Not nearly as much as we would like. It has planed off in recent years. But there has been progress.

But, secondly, I think the instability in the regime is a big reason we haven't had more. You say, well, the price is $40 today, but we'll hope it drops to 10 like it did only five years ago, and then we can go on with our gas-guzzling ways.

I think it's the instability and unpredictability of the regime in addition to the higher level prices that has distorted the demand response.

I agree with you, the demand response is terribly important. If you could therefore get a more stable regime, including with a higher domestic energy tax a la Europe, then I think we would have a much stronger basis for dealing with the demand side.

MR. : One very quick comment.

MR. : I'm Louie Cabot (phonetic), trustee of Brookings and former chairman of the board of Brookings.

I think this discussion has been very interesting, but it's a perfect example of what the problem is. We came here to talk about what are we going to do about climate change, and we have changed the subject pretty drastically, and that is exactly what America has been doing for the last 30 years on this problem.

Thank you very much.

[Applause.]

MR. : Thank you so much.

MR. : My only defense is that's what I was asked to talk about.

[Laughter.]

MR. : So, Louie, you may be right, but I was asked.

MR. : Thank you. Again, for our speakers, thanks very much.

[Applause.]

[Recess.]

MR. : Ladies and gentlemen, if I could ask you to take your seats, our

next speaker, Senator Lieberman, has arrived, and he's on a tight schedule, so I would like to ask you to take your seats so that we can begin without delay.

Once again, if I could ask you to take your seats so that we can begin. Senator Lieberman has arrived and is on a tight schedule, as you can imagine.

[Pause.]

MR. : Ladies and gentlemen, if you could finish taking your seats, or what few seats there are left. There are a couple more seats up in the front, and then we will get started, because we have a very busy day. I guess there is an overflow room across the hall for those of you who would like to sit more comfortably for Senator Lieberman's remarks.

Let me first extend my welcome, along with Strobe and Eileen, to Brookings and with the Pew Center. It is a tremendous opportunity to have such a distinguished group of both panelists and participants in the audience here on such an important issue, and as part of a very core part of what we are doing here at Brookings, the set of issues that you are talking are really as important as any broad public policy that the country and the international community has to address, and so it is especially opportune and fortunate for us to have Senator Joe Lieberman here to talk about these issues.

I have the privilege of being the designated Senator Joe Lieberman introducer here at Brookings, and so it is my pleasure to welcome him back. He has been a very familiar voice here, and it really is a testament to the range of his leadership across so many issues in our public life that we have him here today.

It is a record that I think is known well to all of you. His distinguished three terms in the United States Senate, previously the Attorney General of the State of Connecticut, Democratic candidate for vice president in 2000, and for the presidency in 2004, and really I think one of the most thoughtful and forward-looking voices on the issues of how the United States has to be in the world today, and recognizing that our role and our interests expand across a broad range of issues, from traditional national security issues to the issues that we are talking about today, which is climate and energy policy.

As you all know, Senator Lieberman has been one of the most creative and innovative voices in the U.S. Congress trying to find a path, a new way forward, to try to avoid the extremes and the gridlock that we faced over climate policy over the last decade. And it seems to me, and I think to so many of you here, that we face a really opportune moment where this kind of innovative thinking can help galvanize the political forces in this country and abroad to really make some progress on an issue which is so urgent for all of us.

So without further ado, let me introduce Senator Joe Lieberman. He is going to talk, and then we will have an opportunity for a Q&A after his remarks.

Senator Lieberman.

[Applause.]

SENATOR LIEBERMAN: Thank you. Thank you.

Thanks, Jim. Thank you all for that warm welcome. Thanks more broadly to the Brookings Institution. This is the second time in about six weeks you have introduced me here. It's nice to be back.

Thanks to Eileen and the Pew Center on Global Climate Change for bringing us all together this morning to talk about this challenge that is so critical to our environment and to our health and to our economy.

I do want to give a special thank you to Eileen and her team at the Pew Center for the extended help that they gave to John McCain and me in constructing what we think is a very balanced and creative approach to this problem.

The title of this conference, "Toward a Sensible Center," is in fact an apt and accurate description of the Climate Stewardship Act that resulted from the labors Brother McCain and I were involved in, and we intend to continue to fight for until we get the votes to make it the law of the United States of America.

[Applause.]

SENATOR LIEBERMAN: Now as you probably know, thanks to Pew and others, the Environmental Defense Fund, gave us great help on this. Our proposal is based on free market principles that have worked in past environmental legislation. It sets reasonable goals, and it gives business and industry ample time to meet those goals.

We get a great kick out of our critics who would have you believe that John McCain and I are wild-eyed enviros. Maybe wild, occasionally, but wild-eyed enviros who would destroy jobs and lower our standard of living to chase after and unproven scientific theory. Ridiculous. These critics ignore the facts and cultivate people's fears, telling them that the best policy is to do nothing, and you know in the end it's going to be okay, don't worry about it. Trust me. And looking around this room, I don't have to convince you very much, it won't get better unless we do something together. It will get a lot worse.

In fact, this debate over global warming reminds me of a short, wonderful radio play called "The Fall of the City," by Archibald MacLeish. In the play, written in a very different circumstance, a giant conqueror is moving relentlessly toward a place MacLeish simply calls The City. The people have been warned it is coming, and they are ready to confront it. But their leaders are not. Their leaders tell them we can't win. The giant has already overcome everything in its path. The people must yield to the conqueror, the leaders say. If they fight, the city will be changed so much that it will ultimately be destroyed.

So the people decide not to fight. The conqueror appears at the entrance to the city. The people kneel before him in surrender. The conqueror looks down on the people. Slowly his visor is raised to reveal that inside the conqueror, there is nothing. The helmet was hollow; the armor was empty. The conqueror in fact could have been defeated. But now it was too late. The people had surrendered to their leaders' fear which became their fear.

That really reminds me of the debate on global warming in our country. The fact is not just anecdotally, but in public opinion after public opinion poll, Americans of every political and ideological persuasion say that they understand that global warming is real, and they want to take steps to reduce and reverse it. They see the effects all around them. The droughts are getting worse, flooding has increased in the Midwest and Europe, and the glaciers are melting.

But too many of their leaders, our leaders, are telling them exactly the opposite. We are not really yet sure the planet is warming, they say. Or if it is, there's nothing we can really do effectively or economically to stop it. Or they say trying to reduce greenhouse gases will ruin the economy. Energy costs will be sky high. Jobs will vanish. And if you still have a job, you're going to be forced to drive to work in a tiny, tinny, unsafe car. What could be worse than that?

[Laughter.]

SENATOR LIEBERMAN: We're better off not doing anything, they say. If there is a problem, let's leave it to the next generation, which will know better whether there is a problem to take care of it.

Just as in the fall of the city, these leaders ignore facts and cultivate fears. They lack courage and they fail to lead.

Global warming is not a conqueror to kneel before. It is a challenge to rise to, and a challenge that we the people must rise to. Presidential leadership would clearly take us a long way toward confronting global warming. But, sadly, there is not much evidence that we are going to see that kind of leadership from this administration.

So it really is up to Congress and ultimately the people. Senator McCain and I are working to convince our colleagues to provide that leadership when our Climate Stewardship Act returns to the Senate for consideration.

We got a surprising 43 votes last October, and with your help, we are going to get more this time.

[Applause.]

SENATOR LIEBERMAN: Now given the difficulty in predicting the Senate's schedule, which is far more difficult than predicting the onset of global warming --

[Laughter.]

SENATOR LIEBERMAN: -- it's hard to say exactly when we will have the opportunity to bring this up. But I want to tell you that when we do, I am optimistic that we are going to make some progress.

I know that some say that election year politics may crowd out our climate stewardship cause, but I say let's put our cause at the center of our national politics this year. I believe that our elected leaders will always respond when the public, moved by facts, not fear, demands action. And that's why today I want to issue a call for leadership to everyone in this room and to everyone watching on the Internet.

I know that many of you are already leaders in this cause, but you need to redouble your outreach and bring others to our side. We need leadership from the business community, businesses that are large and those that are small. We need leadership from the best minds in our academic, engineering, and scientific communities. We need leaders on assembly lines and factory floors. We need moms and dads and their kids to become leaders for change.

I have found in a career in public service that now I must say in all honesty spans more than three decades that when people are asked to rally to a cause larger than themselves, particularly a cause which involves protecting the health and prosperity of our country and our children, that the people will demand action from their elected leaders, and that will ultimately move our government.

Passing the Climate Stewardship Act is step one. Step two involves making it work. And here I am confident. I know that will require a different kind of leadership at all levels across our nation. Often when we talk about these kinds of big, historic, national efforts to meet big problems, we use military analogies, wartime analogies. This morning I want to use a peacetime model our nation built within the living memory of most of us here today, and that is the flight to the moon.

President Kennedy called the nation to action with these words, which should resonate to us as we think about global warming. He said:

"We choose to do these things not because they are easy, but because they are hard, because the goal will serve to organize and measure the best of our energies and skills, because the challenge is one we are willing to accept, one we are unwilling to postpone, and one which we intend to win."

In 1969, less than a decade later, President Kennedy's challenge to the nation was fulfilled when Neil Armstrong walked on the moon. We all remember the image of Armstrong stepping from the ladder of the fragile lunar lander, but many forget that it was the broad shoulders of a united nation that lifted him there. The lunar program is an apt model for the broad mobilization we need today to address global warming.

The lunar program also reminds us of the ways in which dealing with a big challenge like global warming will help, not hurt, our economy. Think of it this way. When Kennedy issued his call to go to the moon, we did not need to invent the rockets. Robert Goddard, a great American scientist, launched the first liquid-fueled rocket in 1926. We did not need to invent computer. Electronic computers have roots dating back to the mid '30s. We didn't need to create new industrial practices to manufacture many of the components that were needed for the lunar program.

One of my favorite stories is that spacesuits were manufactured in a bra factory. I'm not going to go into any detail there.

[Laughter.]

SENATOR LIEBERMAN: Existing companies took on the challenge and created processes that, while innovative, were not new. The point I'm making about the factory is that the processes date back to the production lines of Henry Ford in the second decade of the last century.

So the lunar program just took existing technologies and made them better. Made them more powerful and less expensive to achieve an historic breakthrough, in that case putting a man on the moon.

Many of these improvements, innovations, intellectually, and inventions practically, then worked their way into the economy, spurring growth, creating jobs, and cementing our global American scientific and technological leadership. And that's precisely where we stand now and what we can do, and what Jim Steinberg (phonetic) has correctly called a moment of opportunity in the battle against global warming.

We know how to make fuel cells and other solar panels, for instance. We know how to make coal-burning energy plants less polluting. We know how to make cars and trucks that are not only safe and comfortable, but they're less polluting, and less fuel thirsty.

What is required of us now is to create a program, an atmosphere, an environment that will drive and nurture the development of these technologies toward a goal. That is exactly what John and I hope the Climate Stewardship Act will do.

By creating a market that makes greenhouse gas reduction valuable, just like the lunar program, bringing these inventions to the market will spur the economy, create jobs, and again cement our global leadership in science and technology.

But let me tell you something that a lot of you already know: If we do not do this, if we do not innovate, if we do not keep driving technologies forward, I guarantee you that we will be forced to buy these products from other countries that do.

This problem is not going to be wished away. The world recognizes it and people all over the world are moving to deal with it. This is not fiction. It's really happening today.

For example, Ford, as you probably know, recently released its first hybrid car with engine technology licensed from Toyota. German companies have moved now far ahead of ours on photovoltaics. The Dutch have taken the lead from America in the production of wind energy. We are going to pay dearly if we continue to falter and fall behind other nations in this way. High-paying, high-tech jobs are going to be created, but overseas. And our trade deficit, already large, is going to get larger.

Of course, as with anything else, there are good and bad ways to tackle an immense challenge like global warming. A draconian proposal ordering emitters to change their ways immediately with no flexibility could probably do more economic harm than good. But that's not what John McCain and I have proposed.

Instead, we have taken the best of our experience in environmental

legislation and crafted what I truly believe is a moderate proposal, a series of first steps that will allow American businesses and individuals to adjust over time.

All we are asking business and industry to do by the end of the decade is to hold their emissions to what they were in 2000. Putting everything else aside, the average person on the street, I think, will see this as a perfectly reasonable thing to ask. Don't make the problem worse is what we are saying.

As many of you know, our proposal has its roots in the acid rain trading program of the 1990 Clean Air Act amendments. I worked on those amendments. I worked with members of both political parties in Congress and, in fact, with the environmental leadership and the White House leadership of an administration in power then whose President did in fact have the last name Bush, we worked together to develop the cap and trade program to control sulfur dioxide emissions from power plants that were destroying forests, waterways, and wildlife, with acid rain.

I remember at the time of the debate, a lot of people in the energy industry warned it would cost them more than $1,000 a ton to comply with the acid rain cap and trade plan. But using the same flexible market-based system that we now propose in our legislation to use to address global warming, those emission credits sell today not for $1,000 a ton, but for about $100 a ton. And, of course, what is very important, bottom line, we have reduced acid rain significantly.

Critics were way off then, and I'm confident they are way off now with their predictions of sky-high costs if our bill becomes law.

In fact, a recent MIT study estimated that the Climate Stewardship Act would cost approximately $20 per household per year. That's just about a nickel a day for a family of four.

Another study by the Tellis Institute predicted that our legislation would save Americans $48 billion by the year 2020 because of reduced energy demand.

And, remember, as we reduce our reliance on overseas oil, not only will the price of crude naturally drop with demand, but we will increase our national security and strength as well.

Just as with the acid rain trading program, I am sure that once we set clear goals in law, American businesses and entrepreneurs and scientists will innovate. They will find better and cheaper ways to reduce our emissions than we have thought of yet.

I was really encouraged this week when a group of companies that have come together and called themselves the Climate Group submitted to the Senate estimates of the emissions reductions they are confident they can achieve with simple methods that will increase energy efficiency.

Some of them have already tried these and, incidentally, they find they save money at the same time.

Clearly confronting global warming need not be wrenching to our economy if we take simple, sensible steps now.

Consider the costs of inaction, for they will ruin the economy with a certainty far more destructive than any greenhouse gas control program ever could.

Imagine the cost of fighting the rising seas overtaking our cities and towns and lowlying coastal areas. Imagine the costs when now-productive farmland here in the U.S. and around the world shrivels and dies from withering heat. Imagine the growing global famine that would result. Imagine the medical costs to treat insect-borne diseases, now rare in the United States. And imagine the costs of the severe regulatory program that we will be forced to enact if the environmental impacts of global warming arrive here uncontested and we must deal with them in an emergency crisis atmosphere.

The nation truly cannot wait for us to stumble toward an answer. The consequences and costs of inaction are too great.

That is why Senator McCain and I will continue to push for passage of our comprehensive legislation as quickly as possible.

As in "The Fall of the City," we have been warned. We know there is a long and menacing shadow marching toward our shores, toward our cities, and our towns. But we know that if we act now, global warming is not a conqueror to be feared. Historically we Americans have risen to challenges. For us to do less now, when so clearly confronted with this threat, would be to dishonor our past, disgrace our present, and devalue our future.

Global warming is a problem we really needed to start dealing with yesterday. We certainly must get started today. We cannot wait until the day after tomorrow.

[Laughter.]

SENATOR LIEBERMAN: Thank you very much.

[Applause.]

MR. : Thank you, Senator, for that characteristically lucid and incisive remarks.

You know, I am especially grateful for your story about the spacesuits for the moonwalk because it is now explained to me the most inexplicable public policy decisions the Bush administration has made, which was the decision to put high tariffs on Chinese bras, and so I now understand that this was part of our protection to deal with climate in the future.

As I said, the Senator has agreed to take about 15 minutes for questions, so I am going to turn it over to him to call on you. If you could just identify -- wait for the microphone, and then identify yourself, and we will be off.

SENATOR LIEBERMAN: Thanks, Jim.

Yes.

MR. : Reverend Jim Ball with the Evangelical Environmental Network, and What Would Jesus Drive campaign.

Thank you for your work on this. We really appreciate it. We have been working with Tim on helping to improve the bill in terms of its impact on the poor, and we appreciate Tim's working with us on that.

That is part of my question. Actually the center of my question is for us in the religious community, this is a moral issue, and we consider climate change at its core to be a moral issue that we are needing to deal with. One of our main concerns is its impacts on the most vulnerable, especially the poor, children, and then God's endangered creatures, and so just a question to you:

How do you see climate change as a moral issue?

SENATOR LIEBERMAN: First, thanks so much for what you are doing, because you do give voice -- and I'll use the term in response to your question -- bear witness to the moral dimension of this problem. The word stewardship in the title of the act was not chosen coincidentally, because John McCain and I believe that we have a stewardship responsibility over the earth and the people on it, who are, after all, God's creations.

To me, work on the Climate Stewardship Act is, if you will allow me to say so, a faith-based initiative.

[Laughter.]

SENATOR LIEBERMAN: And that faith sustains us.

So, look, this is about facing the reality that we are acting in a way that is desecrating -- and I choose the word intentionally -- desecrating the good earth that we are blessed to live on, and that we have a moral responsibility to act responsibly and to be better stewards of the inheritance we have.

We all know that we have limited times here on earth, and that we have a responsibility as part of that stewardship to pass the earth on to the next generation in at least as good condition, hopefully better, than we received it. There is a Hebrew term which the rabbis have used over the centuries to try to summarize the length of the Bible and the Talmud, and which is tequenolom (phonetic), which means to improve the world or, in the most optimistic light, to perfect the world, ultimately, which God has created. And we are doing quite the contrary when it comes to the environment.

So I really appreciate the work. This coalition has reached out into communities that, you know, beltway types don't think are environmentally conscious, but they are. And you are helping not only to awaken that consciousness from a faith base, but to express it, and you are going to be part of the mighty wave that will flow like the waters of justice to achieve the result that we want.

Thank you.

Yes.

MR. : Hi. I'm Paul Wapner (phonetic) and I teach at American University. I wondered if you could give us some insight about how you and your colleagues think politically about raising environmental issues in Congress. Specifically we have heard today just the timeframes are different. We're talking about issues which take place over, you know, decades and we're thinking about objections of climate change, yet people have to run for office, you know, every two and four years.

So when you talk to your colleagues and you try to get them concerned about this issue, how do you talk to them about their own political calculations and how do you think about your own?

SENATOR LIEBERMAN: It's a good question. Look, this is a test of leadership, as I said before. Let me just paint the picture in this way, which I alluded to in my remarks. There is in this area as much of a gap between those who govern and those who are governed as I have seen in any other area. I can tell you as I go around Connecticut and around the country and go into rooms and people are not wearing Republican or Democratic or independent tags, and we talk about the environment, I couldn't tell you who the Republicans or Democrats or independents are.

There is an extraordinary base of concern about environmental issues. Some are seen, are felt. People get worried when they hear -- to use the local example about lead in the water, right? When people see, as we have in Hartford, for instance, a shocking increase in asthma among children there, they think maybe there's something going on in the environment.

Well, you know, again, here we go to points that are not always -- the connection, scientific connection hasn't been proven, but when there are outbreaks of cancers in areas, people wonder why is this happening. Could it be accidental or is something happening in the environment.

In those cases, they really want us to act. You know, I know people -- what I'm about to say seems like an issue from yesteryear, but people don't like the idea of big government, but let me tell you something. If people think that their health and that of their children is being threatened by air pollution, water pollution, et cetera, they want us in the broadest sweep of the American people to do something about it.

When you get here to Washington, too often the interest groups, the existing

entities that will be asked to change, to improve the environment, are disproportionately represented. I don't know how to say it any better. Maybe I could say it more clearly. They have more clout too often than the people who want change.

But, you know, if the people get agitated and organized and things will happen. I would say that in the last half century, there's probably not an area overall -- we've had our ups and downs, of course -- where government has done better work than in the protection of the environment. We've got a lot more work to do, but we have come a long way.

Now global warming has been a great challenge because we see hints of the problem, but it's not as real as reading a statistic that tells you that tens of thousands of people will die prematurely this year because of dirty air. And that's the test of leadership.

But, unfortunately, we have waited long enough that we begin to see the glaciers melting, and my favorite story -- I apologize for those who have heard it -- but it's that the Inuit tribe in Northern Canada, 10,000-year history, has seen robins the last two or three years for the first time in their history. And they don't have a word, as one of their spokesmen said to us at a hearing a while back in the Senate, for robin because they never saw it before.

Talk about the canary in the coal mine, that's the robin in Northern Canada that's sending us a message.

So the challenge to all of us is to close the gap between what is the understanding and desire for help from the people with the inside-the-beltway influence of groups that don't want to change because they're afraid it's going to cost them money. That's our challenge.

Yes?

MR. : My name is Paul Epstein, Center for Health and the Global Environment at Harvard Medical School.

Senator, you mentioned the business sector, you mentioned the Climate Group, which is a coalition of businesses.

SENATOR LIEBERMAN: Yes.

MR. : Don Kennedy this morning talked about the role of Swiss Reinsurance and other insurance industries, and clearly the Pew Center has devoted itself to working with the business sector, the corporate sector.

I wonder how you see that voice, which clearly is beginning to evolve, different from the dependence on fossil fuels, how you see that voice weighing in on the McCain-Lieberman bill.

SENATOR LIEBERMAN: That voice helps a lot. Those voices help a lot. I just spoke the other day with the CEO of Swiss Reinsurance, who was on the Hill and, you know, this is a powerful story, because in the midst of the back-and-forth debate, here is somebody just saying -- making a very cool, rational, business judgment, that this thing is coming, and if we don't start to do something about it, it's going to hurt his company and hurt the economy.

So those voices are very important.

I will tell you this, though, the 43 votes that McCain and I got for this, that you all got for it last October, was a lot more than the administration and the opponents of the bill thought we were going to get. But they have now dug their heels in, and as we make our rounds and we're in active dialogue with other Senators who said to us last October, you know, I'm voting against it this time, but work with me. They're getting worked over by businesses in their states, and we are going toe to toe, and the voices that you bring and the business leaders that you're talking about are very important.

Let's deal with this directly, in a sense put ourselves in the shoes of some of those on the other side. They are running a business. They've got a board and stockholders to account to, and their perspective is much more on the next three months, the next quarterly report, than it is on what looks like it's happening in the Arctic, and what looks like it's going to happen in the future. Some say soon, some say midterm. And we have got to convince them and their boards and stockholders that the smarter business move is to get with the program and go for the Climate Stewardship Act. And the businesses are the most important allies we have in making that case. The business leaders -- and it's a growing group -- are the most important allies we have in making that business case for our act.

Yes?

MR. : Hi. Bill Mitzer (phonetic) with the Gemstar Group.

Senator, because of your leadership and that of others, it strikes many of us that there is indeed hope in the Senate to actually get your bill through in some form. Can you comment on the situation in the House where Republican leadership seems to have a bit of a lockhold on issues of this kind, particularly with their own caucus, and where to many of us the situation appears somewhat bleaker?

SENATOR LIEBERMAN: Yeah. Well, I cannot resist saying that the voters have the opportunity to bring new leadership to the House this November.

[Laughter.]

[Applause.]

SENATOR LIEBERMAN: You know, this is a process, and in McCain and myself, you have two steadfast and also stubborn advocates. And we've got supporters in both parties. In the House, what's the numbers, Tim? We have the bipartisan group of 10 and 10. It's grown. The original cosponsors of our bill in the House, 10 Republicans, 10 Democrats. So it's growing.

There was somebody who opposes our legislation. I guess I give you this by way of optimism. I read an article, I forget who it was, in one of the papers recent, op-ed piece, and he presented this horror which is that -- I forgot how the initial step was going to occur, but he projected the passage of our amendment in the Senate, maybe as a result of -- the movie. That was it. It was going to be as a result of "The Day After Tomorrow," there would be a motion that would fill the Senate Chamber. This would surge through and we'd put it up, it would go to the House, they'd be in a panic, and adopt it. It would go to the President, he would veto it. Senator Kerry would use this as the centerpiece of his campaign for the presidency, get elected, and we'd adopt the Climate Stewardship Act next January.

[Laughter.]

SENATOR LIEBERMAN: That unfortunately is probably as much science fiction as the arguments used against our act. So that's the most optimistic -- we've got a battle. But in the long run the people are going to have their way.

Look, something like our act is going to pass. The question is when. And that's the challenge we have.

Yes?

MS. : Jonette Rankin (phonetic), the World Resources Institute.

One of the problems with people is that they tend to compartmentalize problems. The very last comment from the floor before you came was that whenever we talk about climate change, we end up talking about something else. In the last session we talked about, we heard from Jim Woolsey about national security. We heard about jobs and the economy. And I think climate change is a problem with its roots in fossil fuel and all of those areas. So maybe you're selling it short to call it the Climate Change

Stewardship Act. Maybe it should be just the Stewardship Act.

SENATOR LIEBERMAN: That's very interesting. I'll think about it.

[Laughter.]

SENATOR LIEBERMAN: I understand what you're saying, and of course, John McCain and I and those who support the bill have the hope that by setting up this market mechanism that we are going to stimulate innovation across the board.

I'll just share with you this story. This unfortunately goes back, oh, God, eight or 10 years ago. I was at, I think it was an Aspen Institute program on global warming, and there were probably 20 members of Congress of both parties, and Jim Greenwood. And the scientists really laid it on. We had a very interesting exchange, and Greenwood said at the end of it, so let me get this straight: If you're right -- no, excuse me. If you're wrong -- wait. No. If you're right, and we act, we will have preserved and protected the earth as we know it. If you're wrong, if you're hyperventilating, all we will have done is reduce America's dependency on fossil fuel, clean up the air. . .

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. . . so that people will live longer, and create whole new industries in America.

[Laughter.]

SENATOR LIEBERMAN: That's a pretty good choice.

[Laughter.]

SENATOR LIEBERMAN: And that, I think, touches your point.

MS. : [Off microphone.]

[Laughter.]

SENATOR LIEBERMAN: Yes?

MR. : Thank you. My name is Angus Dock (phonetic) and I'm with the Bonneville Environmental Foundation. I am here from the Pacific Northwest, and we have seen some of the same kinds of surveys that you cited earlier that a majority of the people, the scientific argument is essentially over.

SENATOR LIEBERMAN: Right.

MR. : But then we push some of the voters a little bit further on it, and we come up with a couple of fairly paradoxical conclusions, almost internally inconsistent ones.

One is that this is not only a cause much bigger than themselves that they should rally to, but it's a cause that's so much bigger than themselves that they just go limp. They can't quite figure out how to deal with anything this big, this remote.

The other conclusion that we see is folks saying, well, yes, but if the consequences are really so catastrophic, the government would be doing something about it, wouldn't they?

[Laughter.]

MR. : And I wonder if you can comment on those.

[Laughter.]

SENATOR LIEBERMAN: I don't know if I can. In some ways your comment speaks for itself. In the debate we had on this proposal last fall, the part of it that amazed and infuriated me most was that some of my colleagues were still contesting the science. You can argue about how soon the worst effects would come, I suppose. You could argue about the impact on the economy. I'm not a scientist; I'm a layperson. But my sense is that there is such a broad consensus on the science here, that it's time to get on with arguing about the responses.

I am very interested in that polling. This is the story of the city that the people have the courage, but the leaders have to strengthen that courage. The leaders have to be strengthened in this case by the people, and in turn give them the courage to move on.

The people know. You know, we see it in all those recycling bins that are filled up. We see it in the waiting lines for hybrid cars.

There was a fascinating moment -- I don't think I'm violating any confidence -- a bunch of Senators, bipartisan group, had a meeting with the business round table CEOs about a week ago, and there was a CEO of one of our major auto companies there who said, you know, we need your help on how to power cars. Some of the other countries in the world, particularly the Japanese, the governments are investing enormously in the future, and we all pretty much see where it's going.

I can't resist reminding everybody how much trouble my old friend Al Gore got in when he said we may be approaching the end of the age of the internal combustion engine, but this is what this man was saying, that we are going to go to hybrids, and then probably to fuel cells that are hydrogen powered.

You know, the Japanese are just investing enormously through the government and we are not. So attitudes are changing, and this is going to hit a point in some ways to mirror the science fiction of "The Day After Tomorrow," where I think there is going to be a political reaction that way, where it is just going to click and people are going to say this is ridiculous. We've got to do something about it now.

Meetings like this really help to hasten that day.

I thank you very much for your interest, for your commitment, and for your leadership. God bless you.

[Applause.]

MR. : Thank you very much to the Senator, and now I would like to invite you to lunch. There is a buffet in the hall just to the left of me, and then seats and tables in the open room that is immediately behind this conference room as well as in the overflow room we have set up. There's a good crowd today, and so I expect that that room will also need to be used. So, please, we will meet back here at 1 o'clock.

Thank you.

[Lunch recess.]

AFTERNOON SESSION

[In progress] --for the chance to introduce Spence Abraham. I've been waiting for six years because back when Secretary Abraham was the Senator from my home state of Michigan, he was good enough to introduce me in my confirmation hearing before the Senate Foreign Relations Committee, which is something that I've always appreciate greatly. I appreciated that not just because the Senator was very busy with many competing commitments, but also because Secretary Abraham and I are, as it turns out, from different sides of the aisle. We don't always agree on every issue, but we agree on plenty. We have potential to agree on a great deal, and even when we don't agree, I always respect Secretary Abraham for his candor, for his key intelligence, and for his long and extremely distinguished career of public service.

Spence Abraham was elected to serve as Chairman of the Michigan Republican Party at the tender age of 30. He served as Deputy Chief of Staff to Vice President Dan Quayle, and then co-chair of the National Republican Congress Committee before being elected to the U.S. Senate in 1994.

He's currently the 10th U.S. Secretary of Energy, where he runs a department with a budget of more than $20 billion, and a diverse mission that includes national defense, energy security, the advancement of science and the protection of the environment.

Secretary Abraham has been very good to take time out of his schedule to come speak with us today. I'm told that after his remarks he needs to return back to his Department. It is my great pleasure to welcome Secretary Spence Abraham.

[Applause.]

x SECRETARY ABRAHAM: David, thank you. Let me just say in response that I am both at the time and today proud to have had a chance to be both the person who introduce you at the hearing, but also to have supported your nomination, and proud of the work you've done both when you were in government and now here at Brookings.

Let me also just say hi to all of you in the audience. There's a great number of folks here that one way or the other we work with, some of whom very directly. Mr. Bob Card I see in the audience here, who have been part of work at the Department of Energy, and I just want to thank all of you for the contributions you make. Let me also say that I very much appreciate the interest expressed here today in the focus on climate change, which this conference is all about.

What I'd like to do today is to explain how our administration, and in particular the Department of Energy, looks at the set of climate issues. In doing so, perhaps I can help identify at least one way by which we can find common ground for future national as well as international focus.

As many of you know, during our first year in office our administration conducted an in-depth study of climate-related issues. We determined that action was needed. As the President said, we must address the issue of global climate change. We must also act in a serious and responsible way, given the scientific uncertainties, and while these uncertainties remain we can begin now to address the human factors that contribute to climate change. Wise action now, he said, is an insurance policy against future risks.

We also realize that ultimately--and this is I think very important--major progress in reducing GHG emissions could not occur, will not occur, consistent with a strong economy at least, absent the development of very significant new technologies to transform how we produce and use energy.

Let me try to put that in perspective. the United States has a gross domestic product of around $11 trillion, with a desired rate of growth of at least 3 to 4 percent per

year. That means that we will unavoidably continue to generate substantial greenhouse gas emissions despite pursuing greater energy efficiency in the use of alternative fuels and renewables, so long as we use traditional or conventional technological approaches. The challenge is even more pronounced in many development countries which are moving toward an explosive burst in energy demand, but lack many of the efficiency measures which we have deployed here in the United States and that either are deployed or are being deployed in other developed nations.

Ultimately then, the only possible path to offset these likely GHG increases is to develop truly transformational technologies that will bring us into an entirely new energy age, and that is what we are about. This is true because no nation, in my judgment, is prepared to trade economic growth to mortgage its prosperity for cuts in greenhouse gas emissions.

This science and technology model then is really at the core of the approach which we have taken toward climate policy, and the President has tasked our Department, the Department of Energy, with the lead responsibility for its implementation.

For the past two years we have been moving aggressively to try to advance this effort. On the one hand we have been determining which technological priorities we should establish, and aggressively launching or enlarging initiatives in these areas. On the other hand, we have concluded that these science and technology efforts are best advanced through international cooperation, both because it will speed the advancement of breakthroughs and also help facilitate the global adoption of new technologies in an expedited fashion.

Today I'd like to spend just a little bit of time discussing our policies on both of these fronts. Our Department has put considerable thought and deliberation into energy technology priorities, and our view is that six principal areas deserve the greatest attention. I call them the six pillars of collaborative climate research. They are hydrogen, clean coal, safe nuclear power, fusion, energy efficiency and renewable energy.

President Bush's Hydrogen Initiative is the first element of our climate strategy. In his 2003 State of the Union speech the President announced his ground-breaking plan to change our nation's energy future to one that utilizes this most abundant element in the universe. The United States is committed, as I think many of you know, to spending $1.7 billion in just the first five years to fund the ambitious Hydrogen Initiative and Freedom Car programs, which we have launched, which will help us to develop emission-free automotive operating systems which run on hydrogen.

As the President said last year, with a new national commitment our scientists and engineers will overcome obstacles to taking these cars from laboratory to showroom, so that the first car driven by a child born today could be fueled by hydrogen and pollution free. I'm happy to say that we are making good progress toward seeing that happen.

In April I was pleased to announce $350 million in nationwide funding for science and research projects to help establish the hydrogen economy as the first phase of this project. These funds are being matched by an additional $225 million from the private sector to advance the President's goal.

Hydrogen represents, in our judgment, perhaps the most attractive option to meet both our energy and our environmental goals. It has a high-energy content. It produces no pollution when used to create energy in fuel cells, and it can be produced from a number of different sources, including renewable resources, fossil fuels or nuclear energy.

In the spring of last year I went to Europe to brief foreign leaders about this

hydrogen plan. I met with heads of state, fellow ministers and representative from industry and academia to try to come up with ways that we could work together on hydrogen. At the International Energy Agencies meeting in May of last year, the United States proposed forming an international hydrogen effort. It was our belief that such a consortium could accelerate the international push to the hydrogen economy by institutionalizing joint research and pooling resources.

In each of the settings where I traveled, we have met with incredible enthusiasm. As a result, in November of 2003, last fall, we hosted ministers representing 14 nations, as well as the European Commission, and we formally established the International Partnership for the Hydrogen Economy. This consortium consists not just of the western industrialized nations, but it also includes India and China, the two countries with the fastest-growing energy demand, along with the Russian Federation, Brazil, and virtually all of the major automobile producing nations. This partnership then is a comprehensive global framework on which to structure hydrogen research and development. It's an ambitious joint venture, breaking new ground in hydrogen cooperation, and it is built on the hope and the expectation that a participating country's consumers will have the practical option of purchasing a competitively priced hydrogen-powered vehicle and be able to refuel it near their homes and places of work by the year 2020.

If our plans are successful, by the year 2040 hydrogen could replace more than 11 million barrels of oil per day in America alone, which is almost the equivalent of today's U.S. oil imports.

The second pillar of our technology plan is clean coal. As you know, coal is our most abundant fuel, but it's also a major factor in greenhouse gas emissions and other emissions as well. Our administration's Clean Coal Research Initiative is an ambitious 10-year, $2 billion program to reduce our dependence on foreign sources of energy while also substantially reducing GHG emissions and pollutants.

The key element of that effort is the Clean Coal Power Initiative, a cost-shared program between government and industry to quickly demonstrate emerging technologies in coal-based power generation and to accelerate their commercialization.

By working with industry, we won't just be sharing the costs and the risks of cutting edge research and development, we will actually be moving technologies, which might otherwise remain in the laboratory, into useful production.

In the first phase of project funding more than $250 million is being awarded by the Department of Energy with additional private sector contributions of just over $670 million to identify and overcome the most critical barriers to coal's environmental performance in the power sector. Second phase of the Clean Coal Power Initiative is now under way. We are currently soliciting the second round of project proposals and we plan to announce new awards of about $280 million this September. I want to emphasize that these awards are now just a one-time infusion or a two-time infusion into clean coal technology, but a major ongoing process to make the clean coal power plants of this country a permanent and substantial part of our nation's energy mix.

Our plan calls for disbursing about 250 to 300 million dollars in grants in roughly two-year cycles over the 10 years of the President's program for a total of somewhere around $1.5 billion in new funding for this part of our clean coal efforts. This effort will go an especially long way toward perfecting the technology for coal gasification. Unlike the comparatively messy process of simply burning coal, gasification breaks down coal into its chemical components, allowing us to more easily capture the carbon emissions that lead to GHG buildup, as well as efficiently generate electricity and produce

clean-burning hydrogen.

That leads me to what is perhaps the most exciting aspect of our Clean Coal Initiative, the Future Gen Program, the cost-shared $950 million project to create the world's first zero emission fossil power plant. FutureGen will be one of the boldest steps our nation or any nation takes toward a pollution-free energy future. Virtually every aspect of the plant will be based on cutting-edge technology. It will be a living prototype, testing the latest technologies to generate electricity, produce hydrogen and sequester greenhouse gas emissions from coal.

FutureGen will help lead to the development of clean fossil fuel power plants all across the world. It will allow this abundant and economical fuel source to continue producing energy without its traditional environmental side effects.

For FutureGen to succeed as a zero emission plant and to make coal a genuinely clean source, of course we must perfect the technology for carbon sequestration. In fact, carbon sequestration really has emerged as one of the very highest priorities in our Department's fossil energy research program over the past couple of years.

In November of 2002 we announced plans to create a national network of public/private sector partnerships that would determine the most suitable technologies, regulations and infrastructure needs for carbon capture, storage and sequestration in the various regions of the country. Last year, following a competitive evaluation our Department named seven partnerships of state agencies, universities and private companies to form the core of this nationwide sequestration network. These partnerships include more than 150 organizations spanning 40 states, three India nations and two Canadian provinces.

To support this enhanced carbon sequestration effort we have increased our requested funding from $20 million in 2002 to about $50 million in the fiscal year 2005 budget request we sent to Congress earlier this year. We intend to carry that effort forward probably for a decade, probably a little longer than that until we are ultimately successful.

Because there still is work to be done, we have also formed a cooperative international partnership for cooling costs and research efforts in this area, much as we have done in the area of hydrogen. It's called the Carbon Sequestration Leadership Forum. The international charter for the forum, a Bush administration initiative was signed about exactly one year ago.

Today 15 nations from five continents, plus the European Commission are part of this global effort to facilitate the development of improved and cost effective technologies for the separation and capture of carbon dioxide.

The forum's goals include research on the transport and long-term safe storage of carbon emissions, efforts to make this technologies broadly available internationally, and finally, finding ways to identify and address wider issues relating to carbon capture and storage. This could include promoting the appropriate technical, political and regulatory environments for the development of such technology.

The forum held a meeting of the policy and technical committees in Rome this January, the second of our meetings to advance the partnership, and then earlier this month met again in London to begin to discuss stakeholder participation. We think it's moving at an exceptionally fast past. The question is what will this do for us? Where will it take us, all of these programs combined?

Let me try to give you a sense of our goal. Our goal--and as I say, we're working hard to achieve it--is clean coal power technology within the next six years, produces 40 percent fewer carbon emissions, and by the year 2020 achieves reductions to nearly one half current levels.

Beyond that, if we can successfully complete FutureGen by perfecting the technology of carbon sequestration, we will be looking at coal power generation with practically zero emissions of carbon into the atmosphere.

In approaching the coal component, we've operated from a very simple point of view. Across the planet, countries including the United States have very substantial reserves of coal at their disposal, and ultimately this coal will be used. The question is, can we make it possible for this coal to be used for power generation or other purposes in a fashion that truly is clean. We are highly confident that the path that we are on today will make that possible.

The third pillar of our plan involves new generation nuclear energy. Obviously, there has been considerable debate going on for a long time about nuclear energy. I suspect at this conference more will be conducted. Proponents and opponents have each had their victories as well as their setbacks, and this has led of course to a very disparate pattern of nuclear power usage throughout the world. The conclusion which we're reached at the Department of Energy is that nuclear energy needs to be part of the overall mix for a variety of reasons, in part because we want to avoid becoming too dependent on any particular fuel or on imported energy, and also because nuclear power simply has such great capacity to provide clean energy to the world.

In my conversations with leaders in foreign countries over the last two years, including, I would note, a number who are Kyoto signatories, and even countries where the nuclear power sector is not today in ascent, it seems to me there really is a growing sense that nuclear energy is pivotal is we are going to successfully address greenhouse gas emissions. Assuming that is the case, it seems to us imperative that we work to address the safety and the proliferation concerns of those who have opposed nuclear energy, and that is what we are trying to do.

To that end we are engaged in a very strenuous effort to develop the most cutting edge technology for nuclear power generation. At the forefront of that effort is an international collaboration of which America is an enthusiastic member, called the Generation IV Program, which I know a number of you are familiar with. This multilateral project includes 11 international partners working to develop new reactor designs that will be safer, more economical and secure, and be able to produce new products such as hydrogen. Through this effort we are pooling scientific expertise and sharing ideas in order to design the nuclear reactors of the future. This Gen IV program, as we call it, holds in our judgment the promise of cost effective and greenhouse gas reproduction of both hydrogen and electricity from nuclear energy by approximately the year 2020.

The fourth pillar of our strategy is fusion. Fusion power itself is one of those future technologies driven by success in basic research that could truly transform the world's energy equation. From an inexhaustible and entirely clean fuel source a fusion plant could generate huge amounts of electricity during the day to power mega cities and at night produce hydrogen for transportation needs with no emissions of greenhouse gases. It carries with it, comparatively speaking, virtually no security concerns with respect to proliferation, and it produces no long-term waste. And that is why in early 2003 the President determined that we needed to bring fusion to the forefront of America's long-term energy plan.

At his direction we joined our partners, Japan, China, Russia, the Republic of Korea, and the European Union to develop ITER, a major international fusion experimental project. ITER, as many of you know, is a long-term multibillion dollar program to develop nuclear fusion as a future energy source.

My Department regards this effort so highly that we have made ITER our

number one facility priority in terms of funding. In addition, the National Research Council of the National Academy of Sciences has endorsed our efforts with ITER, and I think everyone is excited about the prospects as we pursue it. This is a huge project and the first operational experiments will not take place really until early in the next decade. But if those tests are successful, ITER can prove the feasibility of fusion energy. We did not know for certain if we can realize fusion's potential. We do know that it is our responsibility to try.

Many of these technologies I have just discussed, of course, and fusion is probably the best example, will only be developed over the long term. Some will not be realized for another 10 to 15 years. Some may take 30 or even 50 years. So it's not enough to rely only on new technology breakthroughs. It's important that we make the most of the technologies that we have available today for reducing GHG emissions, and that is why we are promoting energy efficiency and renewable energy, both now as well as for the future.

I see these as the final pillars of our plan. Energy efficiency and renewable energy are not afterthoughts in our Department. In fact, our current funding request for these programs exceeds funding levels enacted by Congress during any of the 20 years prior to the Bush administration. These funds support a variety of efficiency programs for homes, schools and businesses, as well as the Federal Energy Management Program, which promotes conservation and efficiency efforts in the Federal Government, which of course is the largest energy consumer in the United States.

We're also working to improve the effectiveness of our renewable energy programs. DOE research and development has brought down the effective cost of renewable technology by a factor of 10 or more over just the last 20 years. In some areas of the country wind-generated electricity is today becoming competitive with electricity generated by natural gas. And we are determined to bring down the cost of wind, solar, biomass and geothermal even more.

I think that it bears mentioning that the United States is the leading producer and consumer of renewable energy in the world today. According to the International Energy Agency, the United States had over 116 gigawatts of installed renewable energy capacity in the year 2001. This is greater than the amount of renewable energy generation capacity in Germany, Denmark, Sweden, France, Italy and the UK combined.

My point here is not to boast. In fact, part of our success I think can be attributed to the bilateral agreements which our Department has signed with other nations to promote shared resources and mutual cooperation in these areas. Just last month in the United Kingdom, Minister Timms I signed the Efficient Energy for Sustainable Development Partnership to Improve the Productivity and Efficiency of Energy Systems.

Complementing all of these efforts is our Climate Vision Program, a presidential initiative launched by the Department of Energy in February of 2003, which is designed to reduce the growth of greenhouse gas emissions by energy-intensive industrial sectors. Participants in that program, which account for between 40 and 45 percent of U.S. greenhouse gas emissions, have already agreed to meet specific commitments to reduce their industry emissions and to use their successes to help others reduce their GHG impacts as well.

The Climate Vision Program works with industry, trade associations to accelerate the transition to practices, technologies and processes that are cleaner, more efficient, and capable of capturing or sequestering the greenhouses gases.

Clean coal, hydrogen, safe nuclear power, fusion, energy efficiency and renewable energy, these I believe are the six pillars which we've established in our Department to meet our growing future energy needs while also aggressively confronting

the challenge of climate change.

Each of these areas holds great promise. Each is fully integrated into a collaborative multinational effort to bring science and technology to bear upon meeting our energy needs. Each area, as it progresses, will bring us closer to reducing GHG emissions. Together and over the long term, I believe they have the potential to overcome our climate change concerns all together.

But while those six pillars seem to hold the most promise today, and are the ones we're currently focused on, we certainly don't rule out the possibility of other new technologies emerging as well as we learn new things. For example, there is Genomes to Life Program. We are just at the beginning stage of this remarkable effort which carries the prospect of microbial organisms that actually eat pollution. Genomes to Life is an outgrowth of the Human Genome Project that our Department launched back in the mid 1980s. Using the knowledge gained by the Human Genome Project we are confident that the Genomes to Life Program will perfect genetic techniques to harness microbes to consume pollution, create hydrogen and absorb carbon dioxide.

Another promising technology is Super Computer. Recently I announced our plans to build the fastest super computer in the world that will be open to all users. We are making this significant investment in our scientific infrastructure with the expectation that it will yield a wealth of dividends, major research breakthroughs in virtually every field of science today. We can use super computers to simulate a design for an efficient, environmentally benign coal burning boiler, or a super clean diesel engine, or a radically improved gas turbine for generating electricity. Today in fact scientists regard computers not just as tools to crunch numbers but as a tool for discovery that is just as important for experimentation.

Obviously, all of this has a price. Let me try to give you a sense of a level of investment our administration has made. In my Department alone we're devoting $2.4 billion to climate change technology this year. Of that amount, almost 800 million, about a third, consists of new Bush administration initiatives. Other climate change programs at the Commerce Department and elsewhere represent an additional $2-1/2 billion of expenditures. What that means is that all together over the next five years our administration is committing $25 billion to research and develop technologies to solve our GHG challenges.

No other nation is pending anything close to these amounts. Moreover, everything I have just mentioned is just the investment by the public sector in climate change programs. There is of course an immense effort underway in the American private sector as well to improve energy efficiency, develop new technologies and mitigate GHG emissions, and our nonprofit sector is also pitching in. Let me just mention a research effort going on at Stanford University. There the Global Climate and Energy Project hosted by a variety of folks is dedicated to developing pre-commercial research on technologies that would foster the development of a global energy system with low greenhouse gas emissions. Much of its sponsorship is private industry including $100 million from Exxon-Mobil, and 50 million each from General Electric and Toyota, just to mention a few. And that is far from the only research project of its kind going on in our country today.

So that is what the United States is doing. Of course, people will continue to debate whether this is enough or whether these are the right emphases, but at the end of the day I find that there is one common thread in my discussions wherever I travel. Whether I'm speaking to officials in countries that are Kyoto signatories or in places that are not, whether they are major developed countries or small developing ones, they all

agree that we need a collaborative international focus on the major transformational energy technologies which are before us. They all agree that science and technology are the keys to solving our problems.

This idea then of a collaborative science-based model for addressing climate change is in my view the most promising vehicle available to allow us to move past the debates and to actually get about the job of significantly reducing GHG emissions.

Clearly I am putting a lot of faith in the power of technology to achieve our goals. Let me tell you why I think that's justified. A hundred years ago, before the invention of the automobile, people were becoming increasingly alarmed at the growing numbers of horses in cities like New York. Horses were the only practical means of transportation, but they were big and smelly, and were stabled on every block and next to homes and businesses. They required vast acres of farmland dedicated to growing feed, and every one of them produced several pounds of manure every day, often in very inconvenient places. All in all they presented serious environmental hazards and health concerns of their own. Yet as the cities grew, so did the unavoidable need for even more horses, so that some people worried whether cities would even be habitable within a few years.

Then along came Henry Ford and everything changed. Who could have predicted that? Who could have predicted the miraculous change brought about by the Internet? The truth is that all we know about the world 50 or 100 years from now is that it will be vastly different from the one which we inhabit today. In the 22nd century we will likely produce and consume energy in ways that we cannot imagine today. And the six pillars for international technology cooperation, I think we should pursue today, may look quaint to our descendants, just as the Model T does to us. But Ford's Model T changed the world. And I like to think that in our national laboratories we have other Henry Fords who will also change the world.

To vindicate that hope and to meet the climate challenges we face today requires that we press forward with cutting edge science and technology.

I'm very proud of the work we're doing at the Department of Energy and throughout our administration on this, and I am confident that if we do not flag in our commitment, we will find even more potential, discover even greater possibilities, for creating a safer, cleaner, better world for future generations, a world in which greenhouse gas emissions will be as quaint and distant a memory as the urban horse hazards of a century ago.

Thank you very much.

[Applause.]

MS. CLAUSSEN: It's now a pleasure for me to introduce Mike Morris, who is the Chairman, President, and CEO of American Electric Power. I think we're really lucky to have with us the head of the largest emitter of carbon dioxide in North America.

[Laughter.]

MS. CLAUSSEN: Well, I had to--as well as someone who represents real corporate leadership in trying to reduce emissions. I think most of you know that American Electric Power has publicly committed and contractually committed to reduce its greenhouse gas emissions. They are a charter member of the Chicago Climate Exchange, and I believe are a really good example of how business is showing leadership on this issue.

So, Mike.

[Applause.]

MR. MORRIS: Thank you very much, Eileen, for that introduction. You

didn't need to do that.

[Laughter.]

MR. MORRIS: You know, this title that we're talking about today is really quite important to people like me and others in our industry. I think Senator Lieberman made mention of that this morning, toward a sensible center. If we are going to make progress in dealing with the GHG issue and the carbon issue as we go forward as a nation, we're going to have to find a way to identify what that center is and how we get from here to there.

Last week one day I was fortunate enough to be in the offices of Governor Huckabee in Little Rock, Arkansas, and on the mantel of his fireplace he has a sign that says, "Let's get together and reason." And that really is one of the reasons that we came today, because for us to address this issue with an audience as dedicated as you all are to this issue, we need to try to find that middle ground. We need to try to find that bridge will get us from the reality of where I sit today and where my very optimistic Secretary of Energy just left us. He was in some future world that I hope we get to, but today we have to keep the lights on and we have a very different challenge in that regard as we go forward.

So I really do thank you for the opportunity to be here, and I think I'm sure someone will introduce later that she also has the CEO of the largest nuclear utility in the country here as well, my good friend, John Rowe from the Exelon Corporation.

Many of you know about our company, but I know there are some of you here from other walks of life and from other countries as well. We are in fact the largest producer of fossil fuels here in the United States with over 38,000 megawatts of generation. We serve over 5 million customers in the 11 states that stretch from the border on Canada with Michigan to the border of Mexico with Texas, and in that regard we do consume a tremendous amount of coal, both eastern and western variety with a real focus on the eastern side as well.

Where we are on the issue of carbon and where we are on the issue of greenhouse gas is not unsimilar or not dissimilar from what Senator Lieberman said this morning. The scientific debate really does still go on, but we do know enough that it's time to move rather than not, and so we have tried in the most cost effective way that we can to in fact do just that, to take the debate forward and to join in processes both voluntary and ultimately in a very significant economic way to see what can be done to improve the overall performance of the production of electricity using fossil fuels as we go forward.

This really is an issue that has built up over a great deal of time and therefore it's an issue that will take a great deal of time for us to find an answer. I think you have heard some very interesting things, particularly from the Secretary of Energy on the many projects that he and others are working on to try to get us to that point. It is an issue that touches all of us, both in a national sense, because this isn't simply a power production issue. This is a chemical factory issue, a refinery issue, a pharmaceutical issue. It's in every manufacturing activities that we involve ourselves in in this country.

The words of Senator Lieberman this morning, and I know Senator McCain later today, encourage all of us to go toward a market-based answer. We have all learned over a number of years that the market answer for the SO2 and NOx performance and control has been beyond any of our dreams. I think again the Senator spoke this morning about people talking $1,000 a ton, it ultimately cost $100 a ton. We might see that same answer if we approach this issue in that same way, and we surely would be there to support that activity.

So where we stand in a domestic sense is that there is no simple answer. There is no quick silver bullet result to this activity that will take care of the issue in its

entirety in the near term. And therefore, we have to strategically work together and plan together to try to find an answer that will continue to allow this economy to grow.

I think you heard the words of Secretary Abraham when he talked about the size of the national economy and how much growth is forecasted in that national economy over the next decade or so. And I think all of you know that no matter how you and I, how hard we try, both in our homes, in our commercial establishments, in our industrial establishments, to conserve the amount of electricity and energy we use, we simply continue to use more day in, day out, as the overall demand grows, not only in this country but on a worldwide basis.

So when we look at this challenge we do see technological answers that are viable, and we will continue to pursue those answers while we continue to work day in, day out, of the challenges of today, which is to continue to keep what we believe are very cost effective fossil fuel generating facilities online, and improving their more historic environmental challenges in the SO2, in the NOx, and ultimately in the mercury issue, as we continue as an industry and as a company, and as a nation, to move forward to tackle these GHG and carbon issues.

To that end I'm happy to tell you that American Electric Power is deeply involved with the FutureGen Project. To believe that there may some day be a zero emission clean coal power plant is a real stretch of one's imagination, and I won't sit here and tell you about horses in New York. I will simply tell you that we are working on that very answer. We do believe that there is an answer that will come to use in the technological sense that over time will allow us to continue to produce the energy that you need to run this city, to run your businesses, to run your agencies, your association, to live your life.

When we look at that technological answer we feel very good about where we might go. It is in fact the IGCC, Integrated Gasification Combined Cycle. We think it's an answer that allows us to control the pollutants before we go into the power production facility. We think that it has a true breakthrough potential for us that will not be as cost effective as the historic technology that we know today.

So when we look at this timeline and we look at the bridge that we're trying to build between where we are and where we would like to go, and I know all of you would like to go, we see that challenge to find a way to blend in the older technology and to do everything that we can to ensure that the older technology continues to improve its environmental performance while we get to this next stage and this next cycle where we really do believe we have the potential to continue to burn that fossil fuel which is very important for this country as we go forward.

To that end, we also are involved at our Mountaineer Power Plant with the carbon sequestration effort that the Secretary talked about. It is very difficult for people who are used to building power production facilities that start at ground level and go up, to drill a hole in the ground two miles deep to sequester carbon dioxide as it's captured in a more traditional sense to test not only the logic of will it work, but also to test the economics of will it work.

Eventually we as a nation will have to debate the issue of are we prepared to sequester carbon as we go forward. And it will be a balancing issue, not unlike the issues that the Senator talked to us about this morning. As we take those steps to get to that future vision that we hope we share with you, we're doing a number of things as best we can in a voluntary sense today. I think you've heard people talk about the Chicago Climate Exchange. We probably should have called it the Columbus Climate Exchange, but at least it's a program that we have joined, and joined in a very proactive way. It is intended to

create a trading opportunity for those of us who will ultimately deal in other pollutants beyond just the SOx and NOx trading that we're all so familiar with.

We think that it makes a tremendous amount of sense for us as an industry. We're seeing that in the international marketplace. We're seeing our friends in Europe take those things on. I had an opportunity during the lunch break to talk to one of our good friends from Massachusetts, and I think many of you know that the New England states are taking a look at expanding the opportunity to make pollution trading a reality in that small sector of our country. These are all very important things that we see as we go forward.

There is no question that we as an industry, we as a nation--and I'm happy to hear the Secretary to talk as he did, about how much more money we need to put back into the research and development of these technologies. I appreciate that there are competing technologies out there. In my world, in our world we focus on the clean coal aspect. We do need to work on the new nuclear. We do need to work on fusion. We do need to work on renewables. We need to continue all of those efforts, and we as a country are woefully behind in the R&D side of this game.

I think you heard Senator Lieberman say something that ought to be eye opening to my friends in Detroit, and that is that the Japanese auto manufacturers are moving forward in a much more aggressive sense to take their technology forward so that they may in fact have an engine of a different breed that will be provided in the marketplace so that you and I can make a choice between what it is that we would like to do and have as we go forward.

We are very individual with an international group known as the E-7. We are the only U.S. utility that's involved with it. It is a mirror of the G-7 countries, all of us dedicated in one way or another to global control of environmental issues in a voluntary sense, not major projects of the size that would have all of you take note and sit up, but in fact projects that are always driven toward doing something that is proactive in an intervention mode to try to be better about what it is that we do.

It's forest land in South America. It's actually energy saving lights in the school systems of bulgaria. It's many projects that don't often by themselves add much, but when collectively put together they do demonstrate that we can all work in that collaborative environment and try to improve our lot as we go forward. We have planted trees everywhere we can. We've bought forest land and set aside forest land, again, in countries as far away as South America and as near as the states of Indiana. We continue to try and do all of those things so that we can build a knowledge base and create at least an effort that will continue to give us the opportunity to address the greenhouse gas issue and the carbon issue.

Internationally we need to make certain that this technology has a chance to spread across the globe. Our friends in India and China, as you know, have tremendous coal resource bases that they inordinate amount of money in the near term for very short-term benefits which would then put us at a further competitive disadvantage in the global manufacturing marketplace, something that I'm certain none of us in this audience would be in favor of.

I was actually heartened when I heard Senator Lieberman say that we need to have a new clean coal power plant because that's where we think our side of the world has to go. I think we have played the natural gas supply base in this country to its extreme. I believe that we have not only capacity but a need for added nuclear capacity as we go and I wish others in my industry all the success that I can in that regard because even though we are a nuclear plant operator at the DC Cook Plant, I don't see us stepping into that world. I think we need to do that, however.

Ultimately we will need to build that integrated gas combined cycle facility. It will cost about as much money as a new nuclear power plant. Therefore, it will yield to you and I a much cleaner environment. It will yield to you and I an opportunity to continue to use a domestic fuel, not in the sense of replacing imported oil. I don't believe that that will happen clearly in my lifetime, but it is a fuel source that we have available to us and if used appropriately should in fact be used.

But it will also cost you and I a bit more money to buy that energy, and I think that it's the sense of this audience, and I would hope it's the sense of this nation that for three or four or five dollars more a month in your cost of your energy bill, that we're willing to invest that kind of capital to see these kinds of results in the overall improvement, and that takes us, I guess, to one of the questions that was asked of the Senator about the moral issue. I think ours is an industry that attracts over a number of years people who have not only a for-profit motivation, because as you know, we are investor owned utilities for the most part, but a group of people who also bring to the marketplace a public interest dedication that simply goes beyond making money for the shareholder.

So it's that balance that I think we see as an obligation on companies like ours and others in the Edison Electric Institute to continue to do what we can to cost effectively keep the lights on, to constantly improve the environmental performance of the existing fleet and continue to crack on that new technological development that will allow us to take full advantage of the fossil-fuel resource base in this country. I do not mean for a moment to say that we do not believe in renewables. We do. American Electric Power is among the largest wind producers in the United States. Unfortunately, those of you inside the Beltway understand the dichotomy that we face with wind. on the hottest, steamiest most uncomfortable days what's not there in Washington, D.C.? That's when we need the windmills to turn, and they just won't if the wind isn't blowing. So we face that reality, and we have to address those kinds of issues. We all continue to work on solar power. We continue to work on biomass. We continue to push the envelope as far as we can in that regard.

But we Americans have a want to have the lights on, to be comfortable. We just don't want any of the facilities that cause those things to happen to be anywhere near where we intend to be ever in our lives, and that's an issue that has to be bridges if we're going to go forward and be as successful as I know you want us to be, and be as successful as we in fact do want to be.

So we see this as an opportunity to continue the dialogue. We came here today to learn, and in fact we have. We came here today to listen. We came here today to share with you some ideas, and most importantly, we came here today to hopefully engage in a meaningful dialogue that will move us all forward in the direction that we want to go.

Thank you very much for your time and your attention. I hope we have some questions.

[Applause.]

MR. MORRIS: Not too bad for the biggest carbon generator in the country I guess.

[Laughter.]

MR. MORRIS: Any questions, please? Right down here in front. Thank you.

QUESTIONER: Charles Braun [ph]. Thank you for that presentation. I do have a concern about the mining of coal, since it does seem to have a considerable environmental impact, production of acid and leveling of mountaintops and things like that. And I know that the amount of coal, there's an enormous reserve but it seems like mining it

will also create an enormous cost to the environment. Can you speak to that issue?

MR. MORRIS: Well, I can, only in that I started out in this world as doing environmental impact statements on coal mining facilities. I will tell you this, that that isn't part of the world that we occupy, but those who do do that understand the rules of reclamation, understand the state laws that are directed toward those activities, and there has been huge progress in that regard. Mountaintop mining is almost a thing of our historic past rather than of our future. As you surely know, the far west mining is a very, very different approach with 80-foot seams of coal with four feet of overburden, versus the eastern mines, 5 or 6 of coal with 80 feet of overburden. But that is a concern. It's a responsibility that I think the coal miners understand and embrace very forcefully. The states have passed as much protective legislation as they can. I can assure you this, that as I talk to the eastern coal producers, they believe that it's going to take between five and ten years to get the appropriate permits to open up a new mine in either Central Appalachia or Northern Appalachia. I think that's a good thing. I think that's a healthy thing for the environment. I only encourage them to hurry up because the eastern side of the production of our national coal resource base is truly slowing down and may well be depleting beyond what is environmentally recoverable.

There was a question in the back?

QUESTIONER: Yes. Does your company have a position on the McCain-Lieberman bill?

MR. MORRIS: Our position on McCain-Lieberman is that it probably some day will be the model that would be followed, but that because of the manufacturing penalty that I spoke of earlier, I just don't think now is the time to put the American manufacturing base, particularly in those states where we serve huge manufacturing companies in the chemical world, the pharmaceutical world, the steel world, almost everything you can think of from the automobile to the bicycle, that we should put that manufacturing base behind that cost 8-ball today, not to say that we shouldn't go forward, and that's why I shared with you some of the things that we're trying to do in a proactive sense, but I think it's a bill whose time is not yet right.

Yes, ma'am?

QUESTIONER: Marilyn Brown from Oakridge National Laboratory.

Back in the '80s and early '90s, the electric utility industry invested quite aggressively in demand side management programs to assist their customers, industrial, residential, commercial, and becoming more efficient in their use of electricity. of course the nature of the market today doesn't incentivize much of that in the utility industry any more. Do you see a future in which that might become--regain some activity in the electric industry?

MR. MORRIS: I surely do. You couldn't be more accurate, that there was a time when the national regulatory scene at the state level was directed toward the integrated resource plant approach, which built in a tremendous opportunity for demand side management, and all of us are seeing that coming back into the marketplace today. I know that this is probably more about our industry than you care to understand, but we really are facing a dilemma on that next generation of power production facilities, because we have on a national basis in probably 20 odd of the 48 contiguous states gone to an open market generation approach.

I can assure you that I don't know of anyone, particularly our company, that's going to build a 2 or 3 billion dollar IGCC facility without some assuredness from a state regulator that there will be some means to recover that. I think that brings us right back to demand side management and is this the best answer for us as we go forward?

Yes, sir?

QUESTIONER: David Hawkins [ph]. You mentioned what you see are the costs of adopting something like the McCain-Lieberman bill at this point in time. Do you think there is a cost to not moving forward with a program like the McCain-Lieberman bill at this time?

MR. MORRIS: Well, I don't think it's a quantifiable economic cost of the kind that we think happens if we go forward. And remember, this is not simply a utility cost. This is a national manufacturing cost. Our advocacy is for a revisit of the Kyoto Protocol debate in an international sense, and I hate to borrow a phrase from our now most recently deceased President, but we need to get other countries not only dedicated to doing it and joining in that endeavor, but present themselves in a measurable and enforceable sense to complying with those kinds of requirement. Once that day comes--and I'm not certain if or when it ever comes--I would think all of us would gladly join in the kind of activities that are called for by McCain-Lieberman. Again, I don't want to leave anyone with the notion that from the utility vantage point alone, it's cost prohibitive to the point that the lights are going to go out. That's an unfair statement.

However, the impact on the totality of the U.S. manufacturing facilities, which just three months ago was probably the largest issue in this town, would simply be aggravated again by not only competing against countries that have very different labor statistics or labor costs and safety requirements, but now environmental requirements as well, and I think that's what drives us, particularly when you look at the part of the country that we continue to serve in the most cost effective way that we can.

QUESTIONER: But do you think that we have time to wait for that international consensus to emerge?

MR. MORRIS: No, and that's why we're doing as many of the things that we're doing even while we go forward with this debate in an international sense.

QUESTIONER: Thank you.

MR. MORRIS: Yes, sir?

QUESTIONER: [Off microphone]. The Secretary spoke rather passionately about the need for transformational technology. As I heard you, I think I heard more than an emphasis on technologies that make more efficient use of what we've got, that is, I [inaudible] technology, coal. We have a lot of coal. Do you want to elaborate on that position and how you see your own [inaudible]?

MR. MORRIS: I will be as respectful as I can because Spencer used to be my Senator when I lived in Michigan for a lot of years.

He's living in a world that we need to live in from a Department of Energy, which is let's do transformational things as we go forward. I'm unfortunately living in a world that has to have the lights on August 4th, August 5th, August 16th. So mine is a much more practical view of let's take what we now know. Let's try to improve it as we go forward.

When he talked about FutureGen, it is an IGCC project. The notion of a zero emissions is something beyond what we think today's IGCC technology will do for us, but he is spot-on on where he sees the world, and I hope I am equally so in the practical reality of trying to make certain we have adequate supply both here and near longer term for our customers as we go forward.

Thank you very much. Thank you, Eileen.

[Applause.]

MR. : It's my pleasure to introduce and welcome to Brookings Larry Schweiger, recently appointed Presidenty want to see action, and I'll share more about that

later.

I personally believe that we're on the verge of a reawakening of the American public to environmental concerns. I see a sense of frustration growing that I haven't seen since the days of the '60s prior to the first Earth Day.

And then second I would like to suggest that legislative signals and incentives are necessary so that America's free enterprise system--

[Tape change.]

MR. SCHWEIGER: -- on solving this problem. We need our innovators, our entrepreneurs and our inventors to go to work in a framework that rewards them for those works. Buggy whip manufacturers, I appreciate Secretary's comment earlier about the problems of New York of many years ago. The buggy whip manufacturers are no longer on, and I would suggest that our energy picture is changing fast, and so we need to be prepared for that change as we go forward.

Political change is in the wind. The public is waking up. Some may hear those messages and be cynical about it since we've had this debate going on for now more than a decade. One of my friends, who is a bit of a skeptic says, "Let's face it, Larry. We're not really going to change policies on climate change until it begins to interfere with our TV reception."

Wildlife are the first responders to change, and as such, they are messengers of that change. Species in delicate balance with a given ecosystem respond by either moving, moving further north in the case of North American species, or suffer from the effects of the new and changing environmental conditions. Therefore, wildlife biologists are often the first to see such changes. A good example of that is Dr. Roger Latham, a number of years ago, who was--Roger was head of the Pennsylvania Game Commission's Wildlife Research Unit, and he recognized, Roger recognized that opossums were moving north. And to put some perspective on that, when Robert E. Lee came into Pennsylvania, he penetrated the southern tier counties. That's about as far north as the southern opossum got during that time.

During the industrial revolution until this day the opossum has moved from the southern tier counties of Pennsylvania, all the way through the Commonwealth of Pennsylvania, all the way through New York, and they're in the province of Ontario now and moving further north. All that has happened for the most part in the last 50 years.

I share that with you because this opossum is an interesting character. He's been around since the time when carbon was being deposited, was being sequestered, and it hasn't changed much during that time, so we can expect that this opossum will probably by around in a globally heated environment.

The opossum has another problem, as it were. One is that he doesn't have any hair on his ears and he does not have hair on his tail. So when you have a bare backside and your ears are not covered, you pay attention to climate conditions. Frostbitten ears and shriveled tails bear witness to an animal on the northern edge of its range.

Conservationists, hunters and anglers with an eye to the land and to living things, then notice subtle changes. A good example of that is my father-in-law who is now deceased. His name was Barrett Hershey, and Barrett lived on the same property for 93 years. And his grandfather used to cut ice on a pond on their property, and he would sell the ice to the community. It was part of their refrigeration system prior to refrigeration. And so as a young boy he remembers cutting ice, and they actually kept records of the thickness of the ice on that pong. They would never cut ice until it reached 17 inches. In his last 20 years of his life, Barrett Hershey used to say, "I don't need a scientist to tell me that the climate's changing because I have not seen ice on my pond over 6 inches thick in

the last 20 years." So in his lifetime he saw on his farm the changes that have occurred.

I think that's true of many people who are close to nature. Those of us who love nature see the changes and are able to identify those. A great example of that is Rachel Carson. I share this book with you because this book was written the year that I was born, and it's entitled The Sea Around Us, and was written by Rachel Carson, who at that time was an aquatic biologist. And Rachel noticed in her research, looking at aquatic resources, particularly looking at oceanic fish, that the fish were migrating further and further north and further and further south in the southern regions. And she also noticed that the bird life were moving further north and they were finding birds in places that they hadn't seen before.

She say this: "Now it is in our own lifetime that we are witnessing a startling alteration of climate." And so Rachel Carson, 50 years ago, warned us because she had been watching wildlife and watching what wildlife does. She recognized that we were warming up our planet and that we were changing the environment for wildlife.

Native people in Alaska are seeing robins for the first time. Senator Lieberman mentioned that this morning. Much more disturbing though is that a village of Shishmaref is forced to relocate because the breakup of the arctic ice has exposed its coastline and making its continuation there more fragile. The permafrost is also thawing so they are in danger of losing their community and are in the process of moving. The eight degree rise in Alaskan winter temperatures over the past 30 years is threatening their very way of life.

Native wildflowers are also being affected by a climate change. Those who pay attention to wildflower blooms are noticing that they're blooming earlier and earlier around the country, and they're noticing in some cases that the wildflowers are actually blooming before the pollinators get there. So we're seeing change, and change that is harmful to resources.

I might say when I'm talking about wildflowers that species like opossums can get up and move and transport themselves. Wildflowers and trees and other vegetation have a hard time moving. They move at a much slower rate, so as the climate changes at a faster pace it's harder for them to make adjustment.

The 500-year, the 200-year flood stages have been reached along the Mississippi River twice in the last 10 years. The U.S. Geologic Survey scientists have warned us that the drought in the west this year is the most severe seen in 500 years. All over the American West I run into people who are concerned about another season of devastating forest fires followed by a season, I might say, of early snow melt. We're seeing the snow melting early again this year. Coral reefs are the ocean incubators of rich diversity of marine life. The 25 to 30 years of bleaching has caused a die-off in many coral reefs around the world.

All of this leads me to a story that I would share with you. It's a biblical story. It's the story of Balem, it turns out, was riding his ass along a roadway, and he was going to a place that was very dangerous, and his ass tried to get his attention on three different occasions through three different attempts. And finally, having failed to do that, his ass sat down and turned and started talking to Balem, and warned Balem that he was on the wrong path.

To fully appreciate that story you need to understand that there were far less talking asses in Balem's day than there are today.

[Laughter.]

MR. SCHWEIGER: My point is simply this: all nature is speaking. America is on the wrong energy course. Are we listening?

Are all these events completely attributable to global warming, to climate change? Ecological scientists studying noisy, complex, natural systems seldom give us a definitive answer on that question. What we do know is all these events that I mentioned before are consistent with what scientists have been telling us to expect from global warming for a long time, and people like Barrett Hershey draw their own conclusions as they watch things change in their own world.

America is waking up and coming to the conclusion that global warming is real, and that immediate action must be taken to address it. The full dimensions of the threat are still obscure to many, but the potential devastating nature is becoming more apparent. Some species like our opossum, as I mentioned, are going to be around and continue to be around, but others are going to perish because they will not be able to adapt to changing environment.

This past January, in the magazine Nature, which is a peer-reviewed publication, there were 19 scientists that looked at six eco-regions of the world encompassing about 20 percent of the world's land base. They looked at the species in that area, in those areas, in those regions, and overlaid those areas and the knowledge that they had on the species in those areas with the information taken from the global climate models. They have concluded, using three different methodologies, that about 17--I think it's 17 to 39 percent of the species studies will be either on the road to extinction or will become extinct in the next 50 years based on the model as it relates to those ecosystems.

This is a surrogate, I believe, for what may happen to wild things on our planet. We are at risk of losing up to one-third of the species for extinction within the next 50 years, particularly in those areas that are most fragile. 50 years, that's the wisp of time it took since Rachel Carson's book was written and I presented it here to you today.

As an advocate of wildlife I'm compelled to the chilling conclusion that global warming threatens to overwhelm generations of conservation accomplishments. The most important chapter in the history of wildlife conservation, I believe, is the chapter we're about to write right now.

Last fall the National Wildlife Federation conducted a poll, as had many other organizations and entities over the last several months. Our poll shows that a wide majority of the American public believe that global warming is a real threat and want to see action.

Earlier this year we asked ourselves if there might be a more quantitative finding behind the anecdotal evidences that people who we talk to are raising concerns about what they're seeing in nature. We decided to poll a sample of the 20 million hunters and anglers. And I might say something about hunters and anglers. Hunters and anglers voted 3 to 1 for George Bush in the 2000 election. They look on environmentalists with skepticism. They generally are more conservative, and they--but on the other side of the coin, they also care about their wild places. They often know special places. They hunt in the same place year after year, climb the same tree on the first day of deer season. They know those special places.

And here's what they have found--and I should saw we hired a Republican polling firm by the name of Bellwether Research--and here's what the poll showed to us. They looked at over 750 hunters and anglers this month. In fact I'm able to share this information with you because we just got it two days ago. Here's the upshot. By an overwhelming majority, 75 percent of American hunters and anglers agree with the proposition that the United States should reduce its emissions of greenhouse gases, like carbon dioxide, that contribute to global warming and threaten fish and wildlife habitats.

A majority of the hunters and anglers also believe that on wildlife and

conservation issues, this administration gives more weight to the opinions of the oil and gas industry and the developers than it does to sportsmen, conservation groups and scientists.

And a conclusion we find most telling--and here's the one I would like to draw your attention to--almost two-thirds of America's hunters and anglers tell us that they believe global warming is already impacting hunting and fishing conditions, or will impact them in the near future.

Finally, the views of the nation's hunters and anglers are consistent with those expressed by mainstream Americans saying by a 74 percent majority that addressing global warming is a high priority and that we can improve our environment and strengthen our economy by investing in clean renewable energy technologies that create jobs while reducing greenhouse gas pollution.

These important findings from the heartland for men and women whose lives are directly involved with wildlife and wild places reinforce the message that I want to restate here today, and that is, Americans are well ahead of their national political leaders in understanding global warming's threats and in supporting action to combat it.

Look outside the Beltway. Northeastern lawmakers and governors are enacting laws to address climate change. Last week California proposed requiring automobile manufacturers to reduce emissions by 30 percent. Half the states have enacted or proposed legislation to tackle global warming. Earlier this week the western governors came out with their own position on climate change and on renewable energies.

Hundreds of local governments and college campuses are taking action to do their part on campus and in their local communities. All this is happening because there's a rising tide among the American people of awareness and concerns about the threats that are posed by global warming. When the people lead, the leaders will follow.

This leads me to my second point. With the right legislative signals, incentives, the American free enterprise system can steer us towards a 21st century successor to our current fossil fuel based economy. The administration's energy strategy is designed first and foremost to find coal, oil, gas here at home and around the world and to continue fueling a fossil fuel-based economy. Even the most sensitive wildlife habitats on public lands are targets for oil, gas, methane and gas development. Pursuing every last remnant reserve on fragile habitats, this policy is doing more and more ecological damage all over the west for less and less BTUs.

I don't need to explain the real cost of increasing our quest for oil from the Middle East and of asserting our interest in oil-rich countries.

Meanwhile, according to the Department of Energy--and we heard a little bit from the Secretary about the growth of energy demand. What was not mentioned was that we're looking at an increase in the amount of carbon dioxide emissions from the United States of one billion tons over the next 10-year period. That growth is twice the total current emissions by our southern neighbor, Mexico.

The Bush energy plan is a failure because it is a slave to these projections of never-ending dependence on fossil fuels and of yesterday's energy technologies. It's hard to take the administration's commitment to technology seriously when one of their first actions upon taking office was to roll back efficiency standards on air conditioners. This move was not only wrong directed, it was illegal and the courts have overturned it.

When any paradigm shifts--and I think we are in a paradigm shift at this time--bad things begin to happen increasingly until we're forced to move to a new paradigm. And in any change, any paradigm change, there are agents of change and there are victims of change. We as a nation have a choice.

Then there's another view, I think a bolder view, of where the future leads

us, and that view holds that tackling global warming is not about economic sacrifice. It's about economic opportunity and a more secure future for Americans. Since 85 percent of the global warming pollution comes from burning fossil fuels, technologies that reduce greenhouse gases will also cut public health risks from emissions, will reduce nitrogen loadings in the bays and estuaries like our own Chesapeake Bay here, and will reduce mercury deposition in fish and shellfish. All who build better, cleaner, more efficient energy technologies can tap a potential global market for energy that exceeds a trillion dollars per year.

We must level the playing field by providing the same level of incentives and tax breaks for alternative energy and efficiencies as we have been providing for the oil development in this country. America has vast intellectual potential to harness renewable energy and the manufacturing strength to produce more efficient energy technologies.

Why should we settle for hybrids claiming just two-tenths of a percent of the automobile market? The fuel economy of cars sold today is actually worse than it was 20 years ago. That's not progress, and it's a tragic failure of leadership to establish auto efficiency standards. Even those forward-thinking business leaders with the courage to meet the challenge ahead have been surprised by how pessimistic the original assumptions had been in retrospect.

Five years ago BP pledge to cut emissions from its own operations by 10 percent from 1990 levels by the year 2010. In the year 2002 Lord John Brown announced that BP had already achieved its target and at a no net cost to the company. According to analysis commissioned by the Apollo Alliance a bold $300 billion investment in new energy economy for America, they project that America can create over 3 million new jobs by shifting to new technologies. This investment is roughly equal--I should say the $300 billion investment is roughly equal to what we give to the carbon fuel industry in tax breaks and other governmental incentives over an eight-year period.

Investments will pay for themselves with increased revenues generated by a stronger national economy. They will reduce our dependence on fossil fuels, and they'll keep American dollars at home. Clean energy is the future frontier of innovation and economic growth, and America must rise to the challenge and opportunity. When we should be funding an Apollo-like investment in better energy technology, the President instead called for a mission to Mars. Before we can send men and women to a planet that has fried its climate, we ought to protect the one we got.

We must create a framework for advancing solutions that will move us in the right direction. The original Clean Air Act, which was mentioned earlier today, was a technology forcing act. We learned through that process, and particularly through the acid rain controls of 1990 that necessity is the mother of invention. Create the framework and people will find ways to meet the goals at one-tenth some of the costs that had been projected.

I believe that we can work together to take this first step on global warming with a centrist proposal like the Climate Stewardship Act, a bipartisan proposal sponsored by Senator Lieberman an Senator McCain, and in the House by Representatives Gilchrest and Oliver.

This legislation offers the national political leadership a chance to catch up with the American public. It embraces the same spirit of compromise as the Acid Rain program of 1990, and it borrows the same innovative emissions trading program that allowed every business to find the best way of meeting broad environmental goals. Others look for common ground, but Lieberman and McCain have crafted it.

Some may ask what technology will get us out of the jam? The truth is I

don't know for certain which technology will get us out of the jam, but I do know this, with the right legal framework and investment incentives, creative and visionary entrepreneurs will find the most efficient solutions. Government investment in technology and new energy economy are certainly a part of the solution to global warming, but this approach alone will simply not get the job done. The solution to global warming is not in a single silver bullet. We need innovation across the economy and in every sector.

The Climate Stewardship Act creates not one technology partnership, not two, but thousands upon thousands of technology incentives by creating a marketplace that rewards innovation wherever it arises, and it creates a market that values environmental performance which gets the cleaner technologies off the shelf and into the factories, into the cars and into the households.

Pursuing technology R&D alone neglects the emissions reductions that can be achieved today with a clear and dependable market-base signal that rewards environmental progress.

Often conservation groups are accused of being unwilling to compromise, but we have welcomed a move to the center on this debate that Senator Lieberman and Senator McCain have pursued as they work to break through a deadlock on this important issue.

From an international perspective, the Kyoto Protocol, which we believe is a better response to the mounting damage of global warming, would require the U.S. to reduce our emissions to 20 percent below what the nation was emitting in the year 2000. The McCain-Lieberman bill, in contrast, merely calls for the stabilizing of emissions at the year 2000 levels. Further, the bill does not only include the emissions trading system that I talked about earlier that businesses have preferred and celebrate, but also allows other flexible approaches such as offset emissions through better farming and forestry practices, or through overseas projects.

We are pleased by the increasing number of allies in this legislative effort. A broad coalition of support for this type approach is emerging, and it includes religious community leaders, forward-thinking companies. I want to recognize several here, Dupont, Alcoa, Nike. It includes state and local elected officials, farmers, ranchers, sportsmen, financial investors, insurance companies and others.

America must regain its environmental leadership. There was a time when the world looked to America for leadership in meeting global environmental challenges because Americans demanded and drove that leadership through legislation. Some offer as an excuse for inaction the fact that countries like China have not yet cut their emissions. Since when has America looked to China for leadership on anything? Is that vision of our future to wait for China's industry to solve the global warming problem so that we can buy technology from them? I certainly hope not.

As we move forward I believe you will see the depth of concern materialize among the American public that goes far beyond what we've seen so far outside the Beltway. The impacts of global warming, despite the name, are in fact local, and they're more and more observable to people throughout the nation. It's entering their backyards, largely unseen by the media. People are experiencing global warming firsthand in their lives.

The issue is becoming real to voters. Politicians who are still trying to come to grips with whether global warming is real or not run a great risk of being rolled over by the public that today is coping with everyday realities of these issues.

We need real solutions today like McCain-Lieberman bill to put American industry to work for the environment and to put the environmental technologies to work for

creating jobs and bolstering our economy and securing our future.

As I noted in the beginning, I approach global warming as an advocate for wildlife. I don't apologize for that. In fact, it's from that perspective that a growing number of Americans are sensing the true dangers of the threat and the need to address it.

I actually come back to National Wildlife Federation through the voice of my unborn grandchild. Let me explain. A few years ago I was out in the West Coast with my daughters, and I wanted them to see an ancient forest that was about to be harvested, and I wanted them to experience this forest before it had been cut. So we spent a day looking at the forest, walking, hiking. We collected sugar pine cones and just had a great time. When we came out of that forest, we were driving back towards Portland, Oregon. And I stopped at a roadside where the forest had been completely clear-cut and there had been a recent rain. And because of that rain there was a mass failure, the mountainside slid down onto the road. I wanted to get a photograph of this as the sun was setting over the site.

My youngest daughter, who was interested in photography at that time went out and watched me take these photographs, and as I finished, I looked over in her big brown eyes, and she was still at that age where, you know, kids believe their dads can do things. And she was preteen, and she looked up at me with her brown eyes, and she said, "Dad." I said, "What, Lauren?" She said, "Why are you letting them do this?" I got to tell you, it was a quiet ride back to the motel in Portland, and that question haunts me to this day.

I just learned not too long ago that my oldest daughter is due to have a baby in August, and I don't ever want to hear that baby say to me, when it's a young child, "Grandpa, where were you when they wrecked my planet?" And that haunting question is what brought me back to National Wildlife Federation and brings me here today.

If we are not the voice for wildlife and if we are not the voice for the next generations, who will be? I think we have an ethical obligation to step to the plate on this one.

The trend in all of this that we've talked about is unmistakable. The American people recognize that the problem is real, and they realize that it must be addressed. The national leadership should catch up, and the McCain-Lieberman legislation offers an approach to do just that. The time for action on this issue is now.

Thank you.

[Applause.]

MR. SCHWEIGER: I'd like to entertain some questions. Any questions? We have two minutes.

[No response.]

MR. SCHWEIGER: If not, thank you.

[Applause.]

MR. : I'd like to invite you to have coffee in the space where the lunch was served, the buffet. There should be coffee and tea, and we will reconvene here in about 10 minutes.

We will have a panel of state and business leaders, followed by John Rowe and Senator McCain.

Thank you.

[Recess.]

MR. : We're going to get started in just a minute if people can find their way back to their seats, please.

[Pause.]

MR. DERINGER: Good afternoon. My name's Elliot Deringer. I'm Director of International Strategies at the Pew Center. I'd like to join the parade of Pew and Brookings representatives to welcome you to this conference. I'm up here for just a moment because I've had the pleasure, along with my friend and colleague Nigel Purvis, as serving as co-organizer of this conference. In that capacity, I welcome you and thank you for being here.

Just a couple of quick announcements before I turn the podium over to Sally Ericsson of the Pew Center. First, there will be a reception immediately following the program today. We had originally planned to hold that reception at the new Museum of the National Academy of Sciences. Unfortunately, we've had to move it here, so we'll be right across the hall. Save us a little transportation time there.

Second, I just want to take a moment to recognize a couple of people without whom this conference would not have been possible. I'm not sure if they're in the room actually, but Mike Cummings of the Pew Center and Josh Busby of the Brookings Institution. There's Josh. I see Josh.

[Applause.]

MR. DERINGER: These two gentlemen have given new meaning to the word "tireless." So if you don't mind, join me again in one more round of applause, because really, we wouldn't be here without them.

[Applause.]

MR. DERINGER: And with that, I will turn things over to Sally Ericsson, Director of Outreach for the Pew Center.

MS. ERICSSON: Thank you, Elliot. I'm pleased to be here to moderate this Roundtable: Action by States and Business Leaders.

Each of our distinguished panelists will highlight the concrete activities of their companies or their state governments in climate change, and these actions are very important especially because they can inform sort of the policy debate as we move ahead and help serve as examples to other state governments and other businesses.

We're going to have each panelist talk for a few minutes, and then we'll open it up to questions at the very end.

Our first speaker is Jo Cooper, Vice President for Government and Industry Affairs at Toyota Motor North America. She recently joined Toyota after five years as President and CEO of the Alliance of Automobile Manufacturers, and she has a long career in environmental issues in the forest and paper products industry, the chemical industry, and also at EPA and on Capitol Hill. As you all know, Toyota is a leader in the automotive industry in developing and deploying the technologies we need to deal with climate change.

Next we're going to hear from a representative of another leading company in climate, BP. Chris Mottershead is Distinguished Advisor at BP, which is a title we'd all really like to have at some point.

[Laughter.]

MS. ERICSSON: He's a Distinguished Advisor, where he advises the senior leadership at BP, including Lord John Brown, on their climate change policies and strategies. As you've heard several times today, BP set its greenhouse gas reduction target in 1997 and has been a leader on climate, an outspoken leader on climate every since.

Our next panelist is Stephanie Timmermeyer. We're honored to have her join us. She's the Secretary of the Department of Environmental Protection in West Virginia, a state where the politics around climate change are especially challenging, given the coal base and economic base of the economy.

Finally, our last panelist is Doug Foy, who is Secretary of Commonwealth Development in the Commonwealth of Massachusetts. Before he was Secretary, he served as President of the Conservation Law Foundation in Boston for 25 years. Massachusetts, as you know, is a leader in climate policy and a very active participant in the regional greenhouse gas cap and trade program that's being developed in New England and the Mid-Atlantic States.

So hold your questions till the end, and we'll start with Jo.

MS. COOPER: It's really a pleasure to be here to address such a distinguished group, and I hope that my southern accent doesn't put any of you all off too much. It's a real opportunity for Toyota to be here and to really share some of the things that we're doing with regard to the environment, greenhouse gases, and advancing I think societal good.

Last fall Toyota Motor Corporation President Fujio Cho brought together more than 1,000 leaders of 224 Toyota companies from 143 countries. In item 1 on his agenda was Toyota's future in technology especially the technologies that favor the world's environment. By the time the conference ended, he left no question in the mind of anyone there that Toyota is going to advance environmental technology, and that we will bring the industry with us into a new era.

We are here at Brookings today to talk about moving toward a sensible center on future climate policy, but first I'd like to talk about the sustainable present, because while a vision of future technologies is vital, delivering that vision is certain to be difficult. We know that it will be unpredictable. It's likely to take longer and cost more than any of us might have hoped, and what's more, dwelling only on the future could distract us from what we can do today.

What we know is that we can significantly advance sustainability in the present by putting today's technology into the hands of consumers now. And Toyota is doing that. On roads all over the world we are delivering an important new technology that is reliable and robust, dramatically cleaner, more fuel efficient, and even more cost effective than anything that will come along before at least the year 2010. We call it Hybrid Synergy Drive. It is Toyota's most recent entrant in the race to clean, energy efficient transportation. Many of you know of this technology because you've heard about the 2004 Toyota Prius, a name that means to go before, or lead the way.

I know that many people within our own industry have an incomplete understanding of hybrid technology and its application in the Toyota Prius. Why, they ask, has Toyota invested millions of dollars in a car that has such limited market potential? Well, our answer is, we've sold worldwide more than 180,000 units to date and we're confident of selling nearly 50,000 this year in the U.S. alone, and I can tell you, if we could get more vehicles, we'd sell more than that.

They ask about selling a car that many people still think has to be recharged, plugged in every night, and we answer, of course, it doesn't have to be plugged in, and we're trying to spread the word about that as far and as wide as we can.

And people also ask why we're excited about a car that may offer only minor fuel efficiency and emissions advantages. Here we answer with Prius performance data: 51 miles per gallon on the highway, 60 miles per gallon in the city and 50 miles per gallon average according to EPA's federal test procedure. In addition, 90 percent lower emissions than the average new car that's 99 percent cleaner than the cars from 15 years ago. And finally, we can tell them that it goes from zero to 60 in 10.1 seconds and has nearly the interior room of the Camry, which is America's favorite car.

About 10 years ago, when Toyota was developing a business case for

hybrid technology, we decided that the engineering would be done almost entirely in house. This meant that nearly every bit of design, engineering, parts production and assembly would be done by our people. No partnerships, no contractors, no suppliers of major components or systems.

The downside was a huge initial investment and risk, both in financial terms and in engineering resources. Recovery of our investment would be long range, and more important, require patience and commitment from upper management.

The upside, a decade later, is where we find ourselves today. We've recovered Toyota's initial investment in the development of the first generation Prius, and our heavy investment in gas/electric hybrid technology has accelerated the pace of Toyota's fuel cell electric hybrid program.

The future is created by developments today. We must continue to explore alternatives and advance sustainability in all forms because it's the right thing to do for the environment. This is how we at Toyota believe we will move closer to the sustainable future that we all seek. With modern technology we are doing more with advanced technologies today than we ever dreamed possible, and going way beyond the battery-driven electric vehicles of the past decade. We are building on that knowledge and from our experience with pure electric vehicles to bring out bigger and better hybrids, and eventually viable fuel cell vehicles.

In addition, we need to keep advancing and adapting our knowledge to benefit other areas of transportation in the future. To do this we need to cooperate more, form partnerships to develop new products, and work together with governments around the world to advance environmental standards. Now is the time to throw society's full efforts behind the all out development of advanced technologies like hybrids and fuel cells.

We also need Washington's support for tax credits for consumers to try these technologies, access to carpool lanes and funding for hydrogen fueling stations, among other things. As good as a Toyota or a Honda or a Ford or a General Motors may be, one auto company alone can't develop all of the technologies and the standards needed for tomorrow. To that end Toyota has entered into an historical agreement with arch rival Nissan to provide our hybrid technology for their vehicles in 2006. We also have alliances with Volkswagen to share recycling breakthroughs, with General Motors to develop advanced fuel cell technologies, and with Exxon Mobil to develop cleaner fuels for the future. And we're open to new partnerships with both large and small companies, with our suppliers.

We're doing all of this because Toyota recognized from one day that our success was fully dependent on making the world a better place. In fact, Toyota's original purpose for being in business states that Toyota will contribute to society by producing high quality products and services, and all of us try never to forget that.

But the reality is these issues are much bigger than one company, one industry, one nation. We are talking about the sustainable ways of living, and I think we all play a role in that.

I believe a new golden age in the auto industry has begun, and we are at the right place at the right time with the right ideas to prosper from it. I think the only thing that can stop us right now is ourselves. We've got to make sure that we don't become our own worst enemy by limiting our vision of the sustainable future.

By working together and encouraging each other's progress we'll prosper. We will reap the greener harvest and we will create a better world for tomorrow. By creating a sustainable present, taking advantage of today with today's electric drive technology, the Hybrid Synergy Drive, and those of all the companies who are entering

into this arena, we are moving toward the sustainable future that we all seek.

Thank you very much.

[Applause.]

x MR. MOTTERSHEAD: I'd like to bring us back to the title, which was a sensible censor, because it occurs to me that actually there is a case to be made for cautious optimism about the center that we are actually just making small steps, which is a long journey, but progress is being made. And if we celebrate the success and work from a position of an incentive, then I think that we will make much further progress.

So I'd like to break down what I was going to say into three parts from a BP perspective. First perspective was on what the science says about the future energy business and the targets that we would take from the science as we shape our future business. The second thing is just to share with you a little bit about the journey that BP's been on for the last decade, and then finally to wrap up with a few comments that I think really echo what Jo just said about the future, and particularly the future of policy support that we need in order to make these actions actually tangible.

So the science. I think Don this morning made an excellent case for why precautionary action was necessary, and in our business judgment, that's absolutely necessary. We can see that the consumption of fossil fuels is adding to the amount of carbon dioxide that is in the atmosphere, and simple science would lead you to believe that if you add carbon dioxide to the atmosphere, you should expect a temperature rise, which you can also see. And there is a great deal of uncertainty, debate, and sometimes contradiction in between, but an increasing degree of clarity that these two things are properly correlated, and therefore precautionary action is absolutely necessary.

Within BP we believe that you need to set targets if you're going to deliver something, and therefore I'm about to make something a numerical target. We believe that anthropogenic human-induced climate change has to be kept below around 2 degrees, that the consequences of changes above 2 degrees are so dreadful if they were to occur--and it may still be only a maybe occur--that we need to avoid that. If you choose to keep your temperature below 2 degrees than you have to stabilize atmospheric concentrations at somewhere between 500 and 550 parts per million.

Of course this is only provisional science. Science is always provisional, but you have to take action on things that you know have a reasonable expectation will come to pass.

So we would translate that that by 2050 you have to have offset around 7 gigatons of carbon from the emission of fossil fuels by 2050. So by 2050, we would argue, if you assume 3 percent GDP growth, if you assume that energy growth continues at somewhere just under 2 percent and the emission growth consequence on that is about 1-1/2 percent, that actually by 2050 you have to have reduced the emissions from fossil fuels to be at a similar level as they are today, and that you have to have invented a new primary energy industry as equal to the current size of the primary energy industry today, and that's the way that we view the world.

So on the BP journey of how did we get to this statement, well, back in 1997 we decided that action needed to start with yourself, and therefore we set ourselves a 10 percent target, and as has already been mentioned, we actually met that target 9 years ahead of when we expected. There's an interesting story about why that occurred. It was because our staff were inspired, and because all the projects that they actually generated in order to reduce the reductions turned out to be profitable projects. So managers felt terrific because they could say yes to these projects, and therefore, this was a self-sustaining virtual circle, where the staff and management cooperated to deliver an 18 percent reduction over three

years in our emissions.

We didn't set off with that objective. We actually set off with a very conventional compliance view of we were going to reduce our emissions. We put in place a global compulsory emission trading system with inside our operations, and we approached it very much in the same way as you might say McCain-Lieberman Bill is doing. But actually we found the world was very different. We found that there was lots of business value to be generated. There was lots of enthusiasm in the workforce, and in the people we work with and our partners in order to actually generate the reductions.

So after three years we found we generated an extra $650 million of shareholder value. In the two subsequent years that followed that, we've generated something like $100 million in net income in the year that we made the reduction. These are enormous reductions, and we thought we knew a great deal about energy. We're an energy company. So if we think these things exist for us, we believe they exist for other people as well.

However, having said that, this is only a story so far about the emissions from our own operations, which are just under 100 million tons of carbon dioxide a year, which is insignificant in the global scale of things.

However, the emissions from our products are 15 times that. The emissions from our products are something like 1.3 gigatons of carbon--

[Tape change.]

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[Tape change.]

[In progress] --on the planet. Therefore, we have to take the conversation to the products. This is not now something we can simply do by ourselves, which is the importance of why policy and business has to work together in a way that it hasn't done in

the past. It's clear that there are things that we can do. We have a very successful solar business that we've grown at about 30-percent per annum for the last 25 years. This is not new business to us. This year, we expect it to be profitable for the first time. This is good business to be in.

We expect to make our target of that business having a billion dollar revenues in 2 years' time. There are good pieces of business. Of course, that doesn't do anything for the 1.3 gigatons of carbon dioxide that also should have that. We need to be in new businesses as well. Some of the new businesses are taking gas to coal-rich places. Some of the businesses are actually sequestering, where we're past the experimental stage, and as I speak we're commissioning in Algeria a carbon sequestration project that will store 1.2 million tons of carbon dioxide a year from a gas field. This is not a small experiment. This is an investment, and interestingly an investment that wasn't just made by us, but was made by our partner, the Algerian National Oil Company. So we're not the only people who think that action is necessary.

But we need to move on. We need to move to this place where we clearly understand what the future will bring, that in the future, if you take 2050, then 50-50 by 2050. So 50 percent of the energy will come from fossil fuels, and there is a good reason to continue to have fossil fuels. It's difficult to see anybody inventing, for the next 2 or 3 decades, anything that is going to surpass gasoline as a principal transport fuel. And the things that Joe has talked about make that an even more sensible solution.

However, there are other things that need to be done, and we would like to see policy instruments to support that, and we'd like to see policy instruments, in particular, in two areas.

We fundamentally believe in cap and trade systems, and by that we mean regulated caps. Voluntary caps are an interesting way of getting started, but unless there is a regulated cap, then the system doesn't work properly. So we think things like the European Emission Trading Scheme are absolutely core to the future of managing climate in the future. However, there are things that need to change. I think the system was set up as in a compliance system, but actually, as it goes into operation, it's moving much more towards being a process that's in incentives. It's opening up. It was changing to the Lincoln Directive.

The national allocation plans people are having problems with. They understand that in a single market targets have to be set uniformly amongst all players in that single market. There is a gap, as somebody mentioned this morning, between the aspiration of Kyoto, which was modest, and the way that people view it from an economic point of view which has driven people away from taking the necessary steps. People have to resolve that contradiction.

And, finally, these systems have to be much more open to learning. There is too much debate about single solutions and debate about whether it is the ideal solution. The solution has to be developed through a process of learning, and therefore the system in itself has to have learning inherently inside it.

The second area we would like help on was absolutely the area that Jo talked about which was technology and Toyota's example. We would argue that if you take this 7 gigatons of zero carbon business that will exist by 2050 and carve that up into 1-gigaton businesses, and less than 1 gigaton it's not really material for us, and what we've done is gone away, with the help of some academics at Princeton, and identified those areas. And we've somewhat surprised ourselves by finding that there are 16 business segments that already exist where the technology has already demonstrated at scale that can deliver at least one of those gigaton reductions.

And we've got 16 options to actually get to a solution that only needs 7. And, for example, one of those would be repowering coal-fired power stations with gas. You'd need about 1,400 gigawatts. Equally, you'd only need 700 gigawatts of coal with sequestration. You'd need a thousandfold increase in photovoltaics, but a thousandfold increase is only half the growth rate that we've managed for the last 25 years. You'd need a 70-fold increase in wind.

Well, that's not an impossible task. We think all of these things are possible, as long as you don't waste time debating over trying to find the silver bullet. There is no silver bullet. There is a suite of technologies that are required, and the market needs to incentivize the choice of those technologies, not administrators set in buildings.

And what you need to do is unleash the talent inside business to go away and reduce the costs in the energy industry that we're very familiar with doing.

Thank you very much.

[Applause.]

* MS. TIMMERMEYER: Just by way of reminder, I'm Stephanie Timmermeyer with the West Virginia Department of Environmental Protection, and I want to thank the Pew Center and the Brookings Institution for asking me to speak. It's an honor just to be in the presence of the scholars, scientists, the business and government leaders here, let alone to share the stage with them.

I like to say that I'm a Marylander by birth, but a West Virginian by choice. And although I enjoyed my time growing up in Maryland, for any of you who have been lucky enough to visit the State of West Virginia, you know that there's a combination of the breathtaking scenery there and the uniquely warm and welcoming people that make it a great place to call home, and that's why I have.

Our tourism industry there thrives due to the world-class mountain biking, hiking, camping, and all of the outdoor activities you can imagine. While our abundance of natural resources makes West Virginia a haven for outdoor enthusiasts, it is also our abundance of natural resources that support our manufacturing and industrial economies. Not surprisingly, that economy, which is a carbon-based economy and of which coal is very much a part, that economy has traditionally provided a barrier to any serious discussions about climate change policy. The following facts on West Virginia's economy sharpen that point:

In 2002, West Virginia mined 150 million tons of coal, second only to Wyoming's 373 million tons.

Methane liberation from coal-mining activities account for approximately 13 percent of our greenhouse gas emissions.

Approximately, 80 percent of our greenhouse gas emissions result from the use of fossil fuel for energy. Sixty percent of that is for electrical power generation.

Approximately, 70 percent--and this is something I want you to keep in mind--approximately 70 percent of electrical power generated by coal-fired power plants is exported to users in other states.

Moreover, in reaction to a concern that the EPA may begin to administratively implement the provisions of Kyoto, in 1998, the West Virginia legislature entered the climate change debate by enacting legislation which prohibits the West Virginian Department of Environmental Protection from proposing any rule intended to reduce the emission of greenhouse gases.

I've seen a lot of you carrying around Barry Rabe's "Statehouse and Greenhouse" book. I brought my own copy from home. The passage of that statute is what has made us become categorized as a "hostile state" in Professor Rabe's book. With this

backdrop, it's easy to surmise that climate change discussion in West Virginia has been nonexistent for fear that any controls on greenhouse gases would negatively impact the economy in West Virginia. This all changed in 2004, when Governor Bob Wise elevated the climate change debate by repositioning West Virginia's stance on climate change from a reactive role to a leadership role.

So, if Professor Rabe is watching on the webcast, it's time for a second edition.

[Laughter.]

MS. TIMMERMEYER: In his 2004 State of the State address, Governor Wise profiled climate change as a substantive, legitimate and serious issue and urged West Virginia to take a leadership role as a means to protect the vitality and viability of our energy-based economy.

To further elevate that debate, Governor Wise introduced legislation to require facilities to report their emissions of greenhouse gases and to voluntarily register any early voluntary reductions of greenhouse gases.

In explaining the bill before the legislature, the Department of Environmental Protection provided three primary reasons:

The first important reason was to create a current and accurate inventory to protect West Virginia businesses in the event that federal legislation does impose mandatory caps or reductions of greenhouse gases. During federal legislation of nitrogen-oxide emissions, we feel that EPA underestimated West Virginia's growth and emissions which, in turn, may limit the future ability for new facilities to locate in West Virginia. So accurate data on greenhouse gases will help us avoid any inaccurate inventories and allocations and allow for future planning efforts.

The second goal was to create a current and accurate inventory to track any voluntary efforts to reduce greenhouse gas emissions and to provide credit for those reductions in the event of any federally mandated reductions.

The third, and important, although it's last, was to enable West Virginia to participate in the national debate on climate change and to contribute efforts towards addressing what we feel is an important environmental issue. Currently, many of the nonenergy producing Northeastern states are driving this debate through state legislative initiatives.

Governor Wise's greenhouse gas recording bill received stiff opposition from the coal industry lobbyists and United Mine Workers. These groups asserted that the bill was anticoal, that it would ultimately force shutdown of boilers, coal-fired power plants, thus reducing the demand for coal and reducing the demand for mine workers. In fact, our agency was jokingly giving kudos for bringing two groups together on an issue for the first time in West Virginia history.

While several members of the legislature saw the bill as a moderate first step toward understanding our greenhouse gas emissions in West Virginia and for preparing and protecting our West Virginia businesses from any federal climate change legislation, the bill did die without any formal consideration by any House or Senate committee.

The legislature's failure to act on Governor Wise's bill has thus far limited West Virginia's ability to protect its businesses by establishing a credible greenhouse gas emissions inventory and reduction registry. However, despite the legislature's inaction, West Virginia has gained access to the national debate on climate change, which is one of the three primary goals of the legislation. Quite frankly, that bill has provided Governor Wise and the West Virginia Department of Environmental Protection a state and national

platform for discussing this issue. Participation in this climate change forum today is one such opportunity.

Our role in the policy discussion on climate change is not unlike those with other states which have introduced state legislation in the absence of any federal policies. The dual form of government established by our Founding Fathers envisioned that states would serve as laboratories to experiment with innovative ways to address national policy concerns like this one. West Virginia welcomes this opportunity in the context of the national climate change debate.

As an energy producing downwind state, the factors that West Virginia considers to address climate change issues will inherently be different from those of upwind, nonenergy producing states. Yet all of these factors are important and must be addressed for any viable climate change policy. West Virginia's contribution to this effort has all started with Governor Wise's recognition that climate change is a serious issue that may have serious impacts on the West Virginia economy and, in turn, that West Virginia must be a leader, rather than a follower, or a conscientious objector in the policy debate.

Although Governor Wise is not running for a second term, the Department of Environmental Protection plans on carrying forth his vision for the greenhouse gas recording and registration by pursuing similar legislation next session. Certainly, we are already strategizing and planning on assembling a coalition of interested parties to make a renewed effort next January.

We know that there are several West Virginia businesses that will agree to be a part of this coalition. We hope that some of those are businesses that are represented here today. American Electric Power and Toyota are business leaders in West Virginia.

We also hope to educate others in the energy sector over the next few months. Coal is an important part of the nation's energy matrix today and will remain an important fuel in the future, but the future of coal lies in the industry's ability to adapt to the changing climate of the economy, the changing climate of the national energy plan and the changing climate of the environment. Then maybe we can joke that for the first time in West Virginia's history, the Department of Environmental Protection, the Coal Association and Labor were linked arm in arm in an issue.

As a major energy supplier to the rest of the nation, my state will likely never adopt a climate change strategy based solely on possible detrimental effects to our environment. If a climate change strategy is adopted in West Virginia, it will be because of the possible benefits to our economy which entail protecting our vibrant energy sector and looking forward to future opportunities in carbon sequestration and clean coal technology, and that in turn will benefit the environment.

With that in mind, we certainly counsel caution in any climate change discussions at the federal level and suggest that impacts to states like West Virginia be seriously and thoroughly considered, but we welcome the opportunity to work with the nation to find voluntary solutions today so that we may have the combination of a healthy environment and a health economy tomorrow.

Thank you.

[Applause.]

MR. FOY: Well, I'm afraid I'm going to be a big disappointment because this panel certainly has the greatest collection of accents of anything I've seen here today.

[Laughter.]

MR. FOY: And I really, to hold up my end of this bargain, I'd have to talk about the "cars from Boston," and I don't actually possess that accent, so I'm going to let you all down.

I'm Doug Foy, and I'm Secretary of Commonwealth Development in Massachusetts. I thought I'd chat with you a little bit about what we're doing up there. Most of it you can find on our website, so I'm not going to go into the details at great length. But as you probably find in the materials that are handed out, I come from a history of environmental advocacy, where I was running the Conservation Law Foundation for 25 years. So I've been on a number of sides of these issues.

And then I was recruited into the Romney administration, Governor Romney elected in November in the Commonwealth of Massachusetts. I didn't know him before he was elected, and he came and dug me out of the woodwork in the nonprofit sector and handed me this interesting job, which is to head a new mega agency that combines Transportation, Environment, Energy and Housing in what is called the Secretariat of Commonwealth Development. And the concept, which is actually quite relevant I think to what we're dealing with here today in terms of climate change, is an integration across those agencies, a strategic alignment of their missions and their efforts to build a sustainable future for the Commonwealth of Massachusetts.

I actually love the term of the agency, "Commonwealth Development," because our goal, our job is to develop the common wealth. And so that's what we're up to. And as part of that effort we have promulgated I think a very comprehensive and interesting state climate plan, which you'll find on the web.

Just to set the context here, the other thing that's intriguing is the number of New England transplants that are speaking to you today. John Rowe, one of my oldest friends--and he and I don't admit how long we've known each other, but it's a long time--is not off in Illinois running Exelon, and Michael Morris who, for many years, ran Northeast Utilities out of Connecticut and is now heading AEP. So it seems we are colonizing New Englanders in this issue around the country.

When we announced our climate plan--now, again, get the image. This is a Republican governor in a painfully democratic state--

[Laughter.]

MR. FOY: And I say that as a Democrat--standing on the Esplanade in downtown Boston, with the Charles River behind us, and the trees starting to leaf out in the early days of spring, surrounded by business leaders--Bank of America, Gillette, EMC Corporation, a bunch of biotech companies--business leaders, a bunch of environmentalists. Backdrop, a Toyota Prius II, Toyota Prius cars that were recently purchased by our Massachusetts Highway Department as sedans and two CNG GMC pickup trucks, which I wish actually had been hybrids. And if you can get those hybrid pickups built, Jo, it would be a big help.

[Laughter.]

MS. COOPER: We'll work on it.

MR. FOY: As backdrop, and then the governor announces the climate plan, which involves the work of 18 agencies--four of them my agencies and then other agencies throughout state government--18 agencies, 78 major initiatives, some of them regulatory change, some of them investment policy, a very wide-ranging collection of initiatives aimed at doing what we can do to address climate change in a thoughtful, progressive, but economically responsible way for the state. And we are just one state. We're not in a position to have a major impact on this without working in a way that builds on market forces. So it is very much built around the notion of market tools.

But that announcement got rave reviews throughout New England. I think it really is a very aggressive program, and it has launched a series of major initiatives in our state, some of which are already underway, some of which have been tuned up quite

aggressively. I'll go through a couple of them just so you know what we're up to, but then I wanted to dwell on a few that are maybe off the normal radar for folks here.

My four agencies spend $5 billion a year--$5 billion--and that's a fair amount of money in Massachusetts. It's roughly three-quarters of all of the capital invested each year outside of education in our state. So my agencies build all of the roads, the transit, the sewers, the water, we buy the parks, we maintain park systems throughout the state, we build housing or subsidized housing of all sorts, and we have a major role in energy planning and how that capital is invested has an enormous impact on how our commonwealth grows, what energy we use, how we use it, and what our ultimate impact is on climate.

And so part of the core of our climate plan is to think more carefully about how that capital gets spent. In our 4 years in office, if the governor serves only one term, we'll spend $20 billion. John Adams and other friends of mine from the environmental world, just imagine having $20 billion to spend. And how we spend that and how every state in America spends that will have a signature impact on climate futures.

So, for example, we will now objectively measure the carbon output, the carbon dioxide emissions for many new transportation projects. When we build a new road, we'll at least try to gauge what its carbon impacts are, when we build a transit system we will. By the way, our trains need to be a lot cleaner than they are because, as we are now trying to push transit more aggressively in our state, we have really dirty trains. It's incredible how filthy the diesel engines are that run our locomotives. We actually I think Britain has just done the analysis that actually take a Gulf diesel car, with four passengers, has fewer climate impacts driving from Manchester to London than their high-speed inner-city rail with full seats per person. That's a bad thing. That's a bad thing.

So we are working on transportation investment. We're working on we have a trading negotiation going on cap and trade with Governor Pataki and NRDC and others helped launched that we are actively and aggressively pursuing as a region, along with the Canadian premiers. That extends throughout the Northeast. We're now getting overtures from the Western states, California and the Northwest, to perhaps participate in that conversation. So we will get to, I think, a regional cap and trade system.

We have goals. Our goals as a state are 1990 levels by 2010 and 10-percent reductions below 1990 levels by 2020. We will measure and report. We have already come up with a report that measures the output of all state building emissions today, and we will monitor that on a quarterly basis. We've eliminated SUV purchases from our vehicle fleet, except in actual need-based use. So all of the take-home SUVs sitting in driveways that were being driven to work as commuting vehicles by state employees are now gone. We're trying to buy a lot of Priuses.

We've extended the investment term on state investments in capital to 10-year paybacks. Most states still use 2- and 3-year paybacks on energy efficiency investments. So you've got a hurdle rate that is really quite extreme to do energy efficiency. We've now established a 10-year payback, which is actually still too short, given the cost of capital for a state. If you think about what we can issue bonds for, our cost of capital is rather low. We could probably justify a 15- or even a 20-year payback on energy efficiency investments, but we've adopted a 10-year one.

A bunch of other things. You'll find them all on the web. The two that I wanted to dwell on because they're a little bit unusual is we're doing a lot of work, as are several other states, on school siting. One of my great frustrations is that, in Massachusetts, one of the great competitive advantages Massachusetts has, my second-favorite state in America is Wyoming. Anyone from Wyoming here? No? Darn. Wyoming is a gloriously

beautiful state, and I've spent a lot of time rattling around in its mountains. It's truly magnificent, way more magnificent than Massachusetts. I'm going to get in trouble for that at home.

[Laughter.]

MR. FOY: Really wonderful landscape, but it's got pretty ugly towns. We have world-class towns, truly world-c't--I'm not going to--in Massachusetts--MIT and Harvard may come up with the stuff on sequestration and coal gassification, whatever, but the State of Massachusetts is not going to do that research. Our private sector may well.

What we can do is deal with the short- and the mid-term challenges and come up with really finely crafted pragmatic solutions that actually build on a lot of what we all know about design. So school design was my first issue that we actually--school location was the first issue that we actually bolted into the climate plan. School siting is part of our climate plan.

The other part of our climate plan is how we're going to fund transit. If you look at the current way we fund transportation in this country, it's fuel taxes. It's the gas tax. And the environmental community has been arguing for decades to get the gas tax up, and we're still arguing to get the gas tax up. And Toyota is actively working to eliminate the consumption of that fuel or reduce it dramatically so the proceeds from that tax system will decline dramatically if they succeed, and I hope they do.

And as a consequence, how we pay for public transit, which itself has enormous climate potential benefits, is a really interesting challenge. So here's what we're doing in our state. We get a lot of federal money. We get a lot of state money we put into transit. But the average new transit corridor in a state like Massachusetts costs a billion dollars. We have 8 or 10 of them we would like to build, a billion each.

There is not going to be that amount of money coming out of the federal government nor coming out of the state bond cap. We're going to have to finance those through value capture. We're going to have to figure out a way to actually extract from the development value you create around a transit corridor the price of the construction. And the best example, come to Boston. Boston has had an interesting renaissance in the past 20 years. We've cleaned up our harbor. The city has been rebuilt. The waterfront is spectacular. And we've recently--thanks to everyone in this room--

[Laughter.]

MR. FOY: --torn down the central artery, which is this hideous highway that's no longer there in the center of the city, and we're now connected to our ocean. And as that happened, the next beachhead of development in Boston is a thousand acres of land 100 yards from the center of the city, with 40 million square feet of potential development. It's in the South Boston Seaport District. It's literally next to downtown Boston. So it's fully all of downtown Boston again, 40 million square feet. Everything in Boston, from Boston Common to the sea, could be built again in this new area of the city, which is currently covered with surface parking lots.

In order to make that happen, we have got to build transit to that location. There is no way we could get automobiles in there, and if we did, we will have a devastating impact in our own small way on climate futures.

So we're building transit to that area, but it's going to cost us billions of dollars. And in order to pay for it, we're telling the 40 million square feet of development that they're going to have to help pay for it. And on an average per square foot, over a 20-year payout, for a condo that will sell for a thousand dollars a square foot, it's not a big number to pay for the transit to make the place viable and to get transportation there in a way that is climate friendly and economically sensible.

Our job, as a state, is to figure out how to do that over, and over and over again. And what I offer you is our own small model, which I hope others will use, and improve upon, and send us good ideas on how we can do much better.

We were criticized by the environmental community when we issued the climate plan not because it wasn't a great plan--they all loved it--but because my governor is an agnostic on the science of climate and refused to say, "Oh, of course, this is the worst thing that's happening, and the science is clear it's over oil," and they kept saying, "You have to say that we need to come in brief him."

I said, "No, no, no. He's been briefed. He understands the science of climate. That's not the issue. We're going to just do it. We're going to just do it. Isn't that good enough?"

"No, no, no. You have to make a statement on climate."

[Laughter.]

MR. FOY: And we didn't. We just did it, and we will continue to just do it, and I suspect that that's what this whole group is all about--finding that sensible, let's just do it center on these issues.

So thank you very much for having me.

[Applause.]

MS. ERICSSON: I'm sure there are some questions, given the diversity of approaches of this panel. Please identify yourself.

MR. KENNEDY: Don Kennedy. I thought that was a terrific series of presentations, something to learn from each one of them. Because I'm sort of stuck on hybrids, I did want to make two quick points about hybrids.

With respect to policy encouragement, we live here inside the Beltway in this little "Taxation without Representation" island between two great states. And if you ask yourself, Can I drive my hybrid through the diamond lane in these surrounding states, the answer is, yes, for one and, no, for the other. I never can remember which one. My hybrid, unfortunately not one of yours, is in California. But it's interesting that we can't get together on such a simple matter.

Second point. I'm fascinated with the conjunction of electricity and internal combustion. And as you know, it was a battle back at the turn of the 20th century which would succeed. And the Secretary of Energy made I think an interesting historical error. It wasn't the internal combustion engine that drove the horses out of New York City. The entire New York City taxi cab in the first few years of the 20th century was electric and so were all of the delivery vehicles. They decided that in the city electric was the way. It lost out in the competition eventually, but there was a shining moment.

[Laughter.]

MS. ERICSSON: Janet?

QUESTIONER: I actually wanted to ask a question to Chris and Jo. I'm glad they're sitting together because they've got a lot in common.

Number one, their customer base is largely in the auto sector or the transport sector, which is one of the largest-growing sources of emissions in this country and certainly many others.

Number two, their products are about--it's the real problem--it's the order of 10 to 15 times the emissions of their direct operations.

And, three, they both invested, to their credit, quite heavily in lower emission products. And they both alluded in their presentations to the need to help galvanize their competitive position here and support for the policy.

And Jo mentioned tax credits and access to High Occupancy lanes, and

Chris mentioned that BP likes cap and trade. But neither of you mentioned the word "product standards." It didn't pass by your lips. Perhaps the possibility of tradeable product standards, that was raised as a possibility in a recent Pew report, and that's a way to link it to the cap and trade that you support, Chris.

I wonder what your view was about that as a policy approach to helping you do better with the products you're developing.

MR. MOTTERSHEAD: Well, I agree. I think we've got an enormous amount in common. I think that hybrids have enormous potential, and we talk, unlike some of our competitors, very, very supportively of them, even though ultimately it reduces the amount of product that we sell, which is an interesting thing for a company to stand up and say, "We want you to use less of our product because the product that people like Toyota make is so much better that we think you should use their product rather than a conventional combustion engine."

I think when it comes to standards, we're a little fearful that people talk about standards as something that gets imposed. And our view would be standards are something that is actually the consolidation of best practice. And therefore what you do need is to have some degree of experimentation. And once that experimentation has run its course, then absolutely you need the process of rationalization. And you can see that in the number of varieties of gasoline that exist in this country that isn't even necessarily in anybody's interest and that there is a proper economic reason then to rationalize into the limited number of standards. But I think, at the moment, we're still in the experimental stage, as far as these lower carbon-type solutions are concerned. So you absolutely need to get to where you are, but not yet. Otherwise it's simply people choosing their favorite answer, which may or may not ultimately be the right one.

MS. COOPER: I think we would echo what you said. I think the experience that the auto industry had in California with electric vehicles imposed, you will produce so many for sale in California. And the public, the vehicles didn't deliver exactly what the public wanted. So they weren't as successful as the regulators hoped. So I think we learned from the experience that when you begin to put those requirements out, in some cases you have a chilling effect on the research in different areas and alternatives.

So our view is to try to encourage and incentivize research and development cooperative agreements. And then when the technologies do get into the marketplace to try to incentivize them and try to encourage consumers to purchase them because when they first come out, there is a cost differential that can be very substantial. And I know, in Toyota's case, that there was a substantial amount of providing to the market at a substantial cost to the company. But being able to do that and introduce it and get it out there I think is really the way to go and not have a product requirement in the marketplace.

MR. BENEDICT: Thank you. Richard Benedict, Pacific Northwest National Laboratory. I have sort of a rhetorical question for anyone on the panel or even in the audience, and I'd also like to echo, by the way, Don Kennedy's statement on how refreshingly diverse and promising these panelists' reports have been.

It concerns the power of government to influence markets. Now, we have representatives of state governments here, and there are, in addition to U.S. Government representatives, there are also at least people from the United Kingdom, from France, from Germany and maybe others.

My question is this: Given the power of the government, why do not governments--state and national--do more in the way of their procurement policies? For example, they could demand--require--a certain percentage--I would say 100 percent--of their government fleets, auto fleets, use the kind of cars that are now more than prototypes.

They're already proven on the market. This would help to expand the market for these kinds of vehicles and enable the companies, the producers, because of the economies of scale, the lower the prices for general consumers and thereby really expand use of these automobiles that are more efficient.

For example--this is just one example--you could look at other areas of government procurement, but I think that if governments are really serious, our British and German friends--I mentioned I live in Germany as well--they haven't done that yet. Chancellor Schroeder still drives around notoriously in used Mercedes. They make fun of him about that. Anyway, if they're serious, there is a way of doing it.

And I just launch this kind of rhetorical question. Thank you.

MS. TIMMERMEYER: I'd like to take a shot at that one. I think, in a sense, that it's a little bit of a cultural change. At our agency, and in my state, we actually did switch over to a partial natural gas fleet. And then with so few fuel-up centers throughout the state, it ended up not being convenient, ended up not working right, so we went back to regular vehicles.

Well, I'm excited to say we bought our first Prius as an agency fleet car, and that may seem like a baby step to some of you here, but now that we have that car, we can track numbers of mileage. What we want to do is prove to our Department of Administration that this car saves money in the long run. Believe it or not, it was a fight to buy it because it cost a couple grand more. So we've got the car. It's on order. I got to pick the color. I was excited.

[Laughter.]

MS. TIMMERMEYER: Sometimes I get an easy decision. And so I'm really excited about getting feedback from the folks that are driving it to talk about that it is a good car. You do hear bad things about any type of alternative fuel vehicle. So we are excited to get it and to show folks that this is the way to go, that we want this and to eventually switch over to that.

In addition, we built the first green building in West Virginia. Our new Department of Environmental Protection building is a certified green building, and so the press and the media that we've been getting with that has inspired other businesses and other folks to do the same.

So there are some things like that that need done, but I agree that it's our job to do that. Certainly, we need to lead by example.

MR. FOY: Can I add one thing to that?

We have actually quite an interesting procurement program in Massachusetts, which I highly recommend to anyone who would like to pursue that suggestion of government purchasing.

I spoke to the annual gathering of a thousand state employees who are in the business of buying sustainable products of all sorts, ranging from automobiles to green energy, to building products, to buildings themselves, and these folks take it, they are very seriously engaged.

We have a whole manual that we published the day we dropped the climate plan, a manual on sustainable purchasing, which is about that thick, that covers all agencies of state government, and it's really quite an impressive document. I highly recommend it. You can, I don't know if we have it on the web, but you can certainly pull it out of or have access to it out of our website.

MS. ERICSSON: We have time for about two more questions.

QUESTIONER: Michelle [?], with ICLEI, the International Council for Local Environmental Initiatives.

I actually don't have a question. I feel compelled to represent a sector which I don't see here today--local governments. And I think they're an imperative in the context of this policy discussion. For the past 10 years, ICLEI's Cities for Climate Protection campaign has been working with local governments across the world, and in particular a 150 local governments now in the United States, and collectively effecting positive change and realizing quantifiable benefits. Last year alone, the 150 local governments here that include Los Angeles, New York, Denver, Chicago, et cetera, reduced by 115 million tons greenhouse gas emissions and realized cost savings of almost half a billion dollars.

So I encourage all of us to think about the power of local governments in this context of the debate.

Thank you.

MS. ERICSSON: Thanks very much.

Right here. Thank you. Sorry. Last question, please.

MR. BRAUN: Yes. My name is Charles Braun, formerly of NOAA and now on my own, Planet [inaudible].

I've heard very little about public transportation today as a means of conserving energy, and I think the automobile is reaching its limits in urban areas, even a pollution-free car will not alleviate the problems of traffic congestion and building highways and parking lots and infrastructure to support it. I think that would be especially true in countries like China and India, where population density is much higher.

However, my question is why can't the auto industries think of themselves as transportation industries and build a form of transportation that's appropriate for the particular environment involved?

MS. COOPER: I guess other companies need to think in a much broader way than we have in the past. We started out with mobility, and I think our society has largely, in this country, certainly, and I think what you see in China, and India and other places, that mobility that the auto gives one or gives society has really allowed us to be able to develop our country, to live all over, to work where we want, to vacation where we want. But I think now we're in a different place, and I think all of these modes of transportation we really do have to look at.

But I'm not sure the auto companies are necessarily the right group to do that. I know a lot of our companies do have interests in buses, natural gas buses. I know one of our competitors, General Motors, has produced a lot of natural gas buses in cities around the country, but I think we've got a societal, a mind-set right now that isn't as much in the mode of public transit. And I think things that are going to happen, as urban areas become less and less willing to take on vehicles, I mean, I know in London there's a real emphasis on taxation to go into cities.

And when we reach that point here, I mean, I was at EPA in 1970, when we tried to put in place tolls, and taxes, and all kinds of things on the American public, and it went nowhere. We may be in a different place in this century, and I would expect that to be the forcing mechanism because, in that, we have to have a mechanism.

MR. FOY: Just to add to that thought, two observations, because I agree, public transit is a critical ingredient of a sensible climate strategy, as is the renaissance of cities. We need cities to be doing the kinds of things we're seeing happen to the New England cities. But in order for that to happen, you need to solve the issues of public schools in cities, you need to solve the issues of transportation in cities to make density possible.

The interesting challenge that we found, in addition to financing transit, which itself is intriguing, is there is a surprising absence of innovation on transit vehicles.

What you see happening in the auto industry, it would be nice if Toyota was building subway trains or transit vehicles. Just to give you one example. We have been hunting around for shuttle commuter trains. In the old days, you used to have self-contained one- or two-unit trains. We called them "budliners," where the engines were in the train, and the passengers were in the same car, and they're gone. You can't buy those things anywhere any more.

So, if you want to run transit-quality frequency on a commuter rail line, shuttling trains back and forth, the little ones, you can't buy the train sets right now or they're hard to find. And we've got a bunch of commuter rail lines where we could do that and provide, without having to drill tunnels and put brand new mega-costly subway systems into place, we could just run shuttle trains on those lines, but the technology is not well-developed, so that's a really interesting problem.

QUESTIONER: If I could ask a follow-up question, would that be something suitable for a government to fund in the form of a pilot study?

MR. FOY: Well, it would certainly be interesting. We finally found a producer in Colorado that claims to produce this stuff, although they have not yet been run in any transit system in America, which is a problem, and not one that has snow, which is a big problem.

[Laughter.]

MR. FOY: But, yeah, it would be nice. I've been surprised. You see the high-speed train technology, which is very impressive--the European and Japanese train technologies--but the more moderate-scale stuff that's surface 100-mile-an-hour or 80-mile-an-hour vehicles that are going to run on existing commuter rail lines is really poorly developed.

The other thing that is interesting and is a fascinating challenge in London, the thing I found out about London, in addition to charging for entry fees, which is intriguing and has been very successful, apparently, it turns out that London Transport, which runs the subway system in London and the bus system, also possesses control of the streets. So, when they run surface bus systems, bus rapid transit, which is one of our transit solutions, they can actually require that those lights change when the bus approaches the intersection. They can force clearing a corridor or a lane.

Contrast that with American cities.

[Laughter.]

MR. FOY: We have a corner--I'm sorry to go on, but this is--we have a corner in downtown Boston where our--we have a bus rapid transit system, the Silver Line, which is spectacularly successful, that connects an inner-city neighborhood, Roxbury, to downtown Boston, buses on the surface in a dedicated corridor, until they hit the center of the city, when they get into mainstream traffic.

They get on a mainstream traffic corridor at Tremont Street. They need to make a left turn onto another street. These are articulated, double-ended buses. There is a corner with two parking spaces on the side of the road that prevents, if the cars are parked in the parking space, prevents the bus from making the turn. It can't make the turn. Will the mayor of Boston remove those parking spaces? No.

[Laughter.]

MR. FOY: Now, I don't get it, but this is a problem, and we won't solve long-term surface transit issues without getting some control over the way we run our streets.

There, I'm done with my tirade.

[Laughter.]

[Applause.]
MS. ERICSSON: Thank you all very much. Thank you.
[Applause.]

MS. CLAUSSEN: I just want to tell you in general how we're going to run this session, and I'm going to start by telling you that Senator McCain had a 4 o'clock vote, but he is coming here as soon as he votes. So hopefully John Rowe will fill the space beautifully, and then Senator McCain will be here. And after both have spoken, we'll sit down here and we'll have questions for both.

So let me start by introducing John Rowe. John Rowe has had a distinguished career in the utility industry. He's now Chairman, President and CEO of Exelon. In addition to that, John serves as one of the Tri-Chairs of the National Commission on Energy Policy, a group of 18 distinguished and bipartisan experts who are working to develop a long-term U.S. energy strategy that promotes national security, economic prosperity and environmental safety. Their report is due out in early 2005, and I think I can say that I'm looking forward both to what the Commission says in 2005 and what John Rowe says now.

[Applause.]

MR. ROWE: The genius of the American public utility is of course that we are there before others come.

[Laughter.]

MR. ROWE: I say that in jest, but in reality much of what you see in the activities of utilities has to do with the day-to-day, hour-to-hour, minute-by-minute obligations that you have in this business as you try, as Mike Morris said, to do some useful long-term things, and also keep things together in the here and now.

Recently the New York Times, I think the Post as well, ran extensive articles on how industry won the battle of pollution control at EPA, and the articles suggested that the utility industry is unified in opposing any sort of carbon emissions limitations. As I think you could tell from Mike Morris's remarks earlier, that is not literally true. Moreover, it is the case, however, that some utilities, in fact a substantial number, are intransigent on the point, and we at Exelon want to stake out a difference.

We accept that provisional or not, the science on global warming is for the present overwhelming. We believe that there should be mandatory carbon constraints. We believe that the U.S. can do something without waiting for China. We support small, increasing ratcheting limits. We support higher energy efficiency standards in both buildings and appliances, and if anyone cared, we would also support tighter and more extensive CAFE standards.

Since we are the largest nuclear generator in the country, our position could be characterized as self-interested, and in the short term we do have such an interest, but one should remember that we purchase a very large amount of our electricity from coal-fired power plants, and controlling the price of that is very important to us. One should also realize that on the margin the next capacity we add will probably be wind, and what follows that is more likely to be a pulverized coal plant than a nuclear plant, simply a matter of time and need.

What we have tried to do at Exelon is look at all of the 3-P and 4-P bills that are about and try to discern what seems to catch the knee of the curves. That is, where do we think the economics is best for getting the maximum amount of pollution control, including carbon, with the least amount of cost?

The bill that we have supported as a result of this analysis is the so-called

Carper Bill. It is supported not only by Exelon but by a group of utilities called Clean Energy Group. We think it is a good balance of realistic carbon legislation, and 3-P standards, which are tighter than the Clear Skies Bill, but not as costly as the Jeffords-Waxman Bill. Do we have it exactly right? I doubt it, but it is the result of a very intensive analysis of what we think the industry can afford and can collect in the short run.

Taking carbon by itself, if I look at it as a one-pollution matter, one is constantly teased by the efficiency of tax mechanisms. A low, but ratcheting, and increasing consistently and predictably, carbon tax, would have the advantage of being able to measure its cost very clearly, to determine its course very certainly, and to avoid a great deal of allocation issues. We have observed, however, that tax suggestions are welcome regardless of the number of economists one brings along.

[Laughter.]

MR. ROWE: There is a joke about the destructive power of economists, but it seems that it's less when taxes are involved. There's a lesson there somewhere.

As a result of this I have been working with my colleagues on the somewhat self-entitled National Commission on Energy Policy in an effort to develop an intensity-based cap and trade system with a safety valve which would provide teeth in the goals that have been set by the Bush administration, and real progress in terms of setting the U.S. as a country that is willing to bear its part of these global obligations.

The concept we're working on includes a safety valve, that is, a level at which additional emissions could be adopted. That is very important, indeed essential, to some of us, because we do not know whether this will be an area where creativity brings about vast improvement at costs lower than those which are anticipated, or one in which the costs will be very much greater, and a safety valve that ratchets itself. That means it goes up year after year, allows one to keep a relatively sure handle on the cost.

We commend--and it's a little early but I'll do it again later--Senator McCain and Senator Lieberman for the work that they have done on developing a cap and trade system for carbon and proposing it in legislation. We do believe they need to address allocation issues and also safety valve issues to make a truly--

[Tape change.]

MR. ROWE: Now, what I'm trying to say is that even as a company which has to look toward future energy requirements in a world that's still largely fossil based, we are willing to accept the challenge of real legislation and real mandates, but we have to issue a challenge at the same time.

When Secretary Abrams described his faith in technological innovation, there were more than a few smiles in the room, and I was reminded of one of my environmentalist friends saying only 48 hours ago, "That's what they call faith-based technology."

[Laughter.]

MR. ROWE: But when you stand up and say, "We will require it and innovation will develop it from renewables of efficiency," that is simply a different fate, and one which has even less of a book.

The challenge that I would issue to everyone here is if you really want a world that deals with carbon, we have to make it easier to build and to run low-carbon energy sources and those will not be confined to each one of our favorite sources.

The principal bridge in our decade from where we have been to where we ought to be is natural gas, and much of the policy established by the government in my industry for the last 15 years has been based on cheap natural gas, and it's no longer cheap, and few of us think it's going to be cheap for a while. So those of you who want to see real

carbon reductions, I suggest that you support a new pipeline from Alaska where there is gas--and I'm told it doesn't have to be ANWR--I suggest you help find ways to get LNG terminals because the only war we're going to be able to keep a handle on gas prices in the next few years is LNG terminals.

Now, along with gas we ought to be doing more on efficiency. Foy hammered that into me over the years. He found that utility executives hammer well, but they perform better when they're bought.

[Laughter.]

MR. ROWE: But to my way of thinking, we have innumerable areas, starting with his example of three-year paybacks and 10-year paybacks in long-life government buildings, where we ought to be doing much more on efficiency. And most of that should be done either through the economic forces of prices at work or the regulatory forces of real standards and requirements. There is probably a role for utilities inefficiency. I think it is not as large as some would say, but it is large in terms of our work. We are very proud of having expanded the output of our nuclear fleet by more than 1,000 megawatts, by simply making our machines better.

The next challenge I want to lay down is nuclear power and nuclear waste. I have looked many, many times at the different sources of energy that can make up a low carbon future. Yes, I think good efficiency measures can cut growth and should often come first. I hope that the Secretary and my friend Mike Morris are right when they talk about cleaner coal in the future, but zero-carbon coal sounds like a long way away to me. We are, I believe, the leading purchaser of wind power in the Eastern half of the United States. Mike may be second. We're not as big as several in the West. We will end up buying more wind power. But I cannot see any energy future in which we can have lower carbon without an expanded nuclear base.

I say that as someone who does not believe that lots of nuclear plants are right around the corner. I want to see high prices stably for a very long time before I make such an investment. My company lost between 5 and 10 billion dollars on the last round, and we're making a little of it back now but not a lot. But this is not a matter of John Rowe's portfolio. John will have diversified his portfolio in time. This is a matter of whether you really believe it's important to have low-carbon energy. I don't see that you can have it without a new generation of nuclear plants, and I don't see that we can have that if the government will not keep its 50-year-old promise on waste disposal.

So what I am here to say--and I'm trying to say it relatively briefly because of the hour--is that, yes, the carbon threat is real. Yes, I believe carbon climate change is probably real. Yes, I accept that it must have mandates to bring about the kind of change we need. But I say to the rest of you, if you really have this concern, you've got to be for something that's real and things that really work and we won't do it all with windmills.

Trying to end that on a more cheerful note, I am reminded that in the 1930s the WPA paid a lot of brilliant people to do creative work, which at the time was controversial, and in the '50s became more controversial because they identified the political connections of some of those brilliant people, but now is a very important part of our cultural legacy.

One of the most profound parts of that legacy to folks like me is Woody Guthrie singing "The Greatest Thing that Man Has Ever Done," about the Grand Coulee Dam. I'm not sure we could resurrect Woody to sing about a dam today, but if you really want a low-carbon future, we need Woody Guthrie singing "This Land is Your Land" in front of an LNG terminal, or in front of a nuclear waste depository, or in front of something that allows us to meet this need.

And what we're likely to get if we're not careful is Arlo Guthrie singing "Alice's Restaurant" in front of a carousel at Disney World, and that's no substitute.

[Laughter.]

MR. ROWE: Thank you very much.

[Applause.]

MR. ROWE: I am told to take some questions, so I can defer to the Senator when he arrives. Yes, Bill?

QUESTIONER: Bill Nitze at Gemstar Group.

John, I take it you would be prepared to see a so-called level playing field, and you make the portfolio choices that make sense to you at Exelon based on a uniform pricing structure that reflects social and environmental externalities, no subsidies, no special favors, nice level playing field.

MR. ROWE: I have never wanted a level playing field in my life.

[Laughter.]

MR. ROWE: Nor have I met anyone else who did. I would be prepared to accept that, but I have observed that the game of deciding what an environmental externality is is a grand one, and I will even accept a slightly unlevel playing field if you'll let me write the externality about this.

Yes?

QUESTIONER: I'm Louis Cabot [ph]. Could you talk a little bit more about what it might take for this country to begin to take a serious look at more nuclear power?

MR. ROWE: First, I think it's inevitable, and I think the worst thing that we could do as an industry to bring it about is to try to do it too soon and too fast with too much arrogance. We tried that.

But what it will take, in my view, is the following. A shortage of base-load generating capacity which does not exist across most of the country at the present time, but will exist in a 5- to 10-year period. Gas prices that have stayed over $6.00 for an extended period of time. A simplified more passive reactor design, which will exist in that time period. And a publicly-accepted response to the problem of waste disposal. I believe the fundamental sin of the nuclear industry--and frankly the government sinned first so we were just in the wrong bed--is going to the public without facing the nuclear waste squarely. Those would be my preconditions.

Yes, sir?

QUESTIONER: I'm Frank Loy [ph]. My question relates to your remarks about the McCain-Lieberman Bill. If I heard you correctly you said that you could accept that, but you thought that there needed to be some changes in the allocation and in the--you wanted to see some sort of safety valve. I wonder if you could expand on that?

MR. ROWE: Sure. As I understand the current version of McCain-Lieberman, and you'll have the man who knows here shortly, but I believe they are fleshing some things out and making some changes so I don't know that it's a standing subject at the moment. But the current version leaves to EPA the whole issue of allocations. That's like taking one of the major property right questions in the United States and deferring it to an energy without guidelines.

Most of my colleagues who burn a lot of coal will think most of the entitlement should go to the existing coal burners. Some of my friends think none of the entitlement should go to the existing coal burners. I think we ought to start with most of them going there, but slowly ratchet it down just because--you'll note I use the word "ratchet" a lot. I think when we're doing big things like this we should start slow, make

changes in a direction, and do them consistently and repeatedly so that the market knows that the result is inevitable. Markets respond very well to inevitability.

And also I think that there should be some kind of safety valve, meaning some level at which the government will sell additional permits if it turns out that the costs of compliance are excessive.

Yes, sir? It sure does help to have the guest of honor late. It gives me a lot of time.

[Laughter.]

QUESTIONER: Dan Goldberg [ph], Center for International Environmental Law. On a similar point to the one that Frank just asked, I thought just before you talked about--or in the same paragraph, I guess, that you talked about the safety valve, I thought you mentioned intensity-based cap and trade, I think was the term you used. And that's a little different than McCain-Lieberman as I understand it.

MR. ROWE: You're correct.

QUESTIONER: I wonder if you could also elaborate a little bit on that point.

MR. ROWE: Well, you can get to the same end either way, but in the positions that I have been advocating in our National Energy Commission work--and there are no consensuses on anything in that body till there's a report--but in our work on that, we think using an intensity measure is a bridge to make it more bipartisan, and by just gearing the numbers right you can get the same result either way. It's simply an effort to try to build a bridge between two differing views of how to do this.

Yes, Bill?

QUESTIONER: [Off microphone, inaudible] -- and you then addressed the McCain-Lieberman Bill. I'm trying to understand how you see the relationship between them. And also ask a question, are not the same uncertainties about the cost of using [inaudible]?

MR. ROWE: Of course. But the at least initial steps in the Carper Bill are somewhat more modest than McCain-Lieberman, but we think McCain-Lieberman bringing in the trading system is in itself an immense improvement. So as you taught me 25 years ago when you were young--

QUESTIONER: [Inaudible].

MR. ROWE: Well, one, I wasn't quite so young.

Legislation is the making of sausage and we would like a little stir frying going on here.

QUESTIONER: [Inaudible].

MR. ROWE: No, not as they stand, not without a safety valve. You'll be the last person to ask me that too. It's not that world is waiting for my opinion on the subject.

Yes, sir?

QUESTIONER: Jimmy Segia [ph] from the Joyce Foundation, which is a business customer of Commonwealth Edison.

MR. ROWE: Right.

QUESTIONER: [Inaudible]. You expressed some skepticism about the ability of renewables and efficiencies to provide the ultimate solution to the problem, and I'm hoping you could elaborate a little bit about exactly what you think the limits are there, and what's the basis for that skepticism?

MR. ROWE: Well, I've spent a lot of time working in efficiency. I believe substantial improvements can be made. I've never seen any situation in which efficiency

eats up all of the growth in energy demand, just haven't ever seen it, don't believe it. It could happen some day. All things are possible in an empirical world. Don't believe it.

On renewables, forewall(?) takes are still exceedingly expensive in nearly all applications. The ones we put in in Chicago are costing 40 cents a kilowatt hour. I'm sure there's something more efficient in the last three years, but that's a long way.

Wind is the most economic renewable available in substantial supply. It is an intermittent and erratic source of generation that has to be blended with some sort of backup power to cover. It competes economically against base load power, but tends to be priced against peaking capacity, which makes it look good. It's very clear that wind is the renewable of the day and we will make deals in both Illinois and Pennsylvania to add more wind to our system.

But I do not know what the limits are on public acceptance of wind, and I don't know how much wind a system can work with and be stable. I've heard some numbers from Europe on the order of 10 percent. We shall see. They're doing very heavy wind experiments there. We shall also see--if they get higher than that, they'll have to back it up with some other kind of capacity.

You know, renewables in the sense of biomass is, you know, where I would like to think the big hope is. I've just never seen somebody bring me a whole biomass fuel cycle that was close to economic under current circumstances. I mean no one would be happier than me to see it develop. I mean, I'd love to go buy 1,000 megawatts of biomass if I could do it competitively with pulverized coal. But I haven't seen such a proposal and the people who follow it for me have not either.

QUESTIONER: A follow up on that?

MR. ROWE: Sure.

QUESTIONER: The [inaudible] for your company is 2 or 3 percent. You don't think a real aggressive efficiency program could change that [inaudible]?

MR. ROWE: For a couple years. But the answer I think is no. I mean I had, when I was at New England Electric, thanks to Foy, the most aggressive utility-financed efficiency programs in the United States. Cabana [ph] got bigger ones in California because California is very big. They measure everything out there at--but we spent more money per customer and per revenue in Massachusetts and Rhode Island. We had the biggest, and I think we had some of the best. And we didn't stop load growth till the economy stopped load growth.

I rarely met an efficiency project that I didn't like as long as the customer is paying for it, the government's paying for it, or it's being required. I have a little more trouble being required to pay for everybody else's myself. I'll pay for my own, like Foy. But I do not see any basis to accept the proposition that in any long term period you can get everything you need through efficiency. I mean someday there may be a technological innovation, but that's right up there with fusion in my judgment.

Yes?

QUESTIONER: If your supposition that nuclear is part of our ultimate strategy, low-carbon strategy for United States, wouldn't that also then be true for the local solution? And if that's so, what would be your thoughts about how the proliferation of nuclear plants in the world can be controlled or moderated or however, such that the ultimate potential dangers could be mediated?

MR. ROWE: I know virtually nothing about proliferation. The guest of honor has arrived. I'm saved from your question.

[Laughter.]

MR. ROWE: I think, Senator McCain, no one was ever gladder to see you.

[Laughter.]
[Applause.]

MS. CLAUSSEN: I'm going to be exceedingly brief because obviously Senator McCain doesn't need an introduction. He's been in the Senate since 1986. He's known for straight talk, integrity, and persistence, and I am so glad he's on the same side that I am.

[Applause.]

SENATOR McCAIN: Thank you very much.

I apologize for being late. We were forced to vote on some important sense of the Senate issue of the day, which I'm sure will be remembered forever.

[Laughter.]

SENATOR McCAIN: It's great to be back here at Brookings. It's very difficult trying to do the Lord's work in the city of Satan, and I appreciate my visits here and my chances, particularly occasionally I come for lunch here at Brookings, and we have a very spirited discussion of all of the issues.

I'm going to be brief in my remarks because I think that what you'd rather do is have a dialogue with John and with me on the issues of the day. You've already been well briefed on the issue of climate change. I would like to remind you again, because everybody has their expert on this, the National Academy of Sciences, and I'm sure you've heard this quote before, but I repeat it all of the time, the National Academy of Sciences has stated, "Greenhouse gases are accumulating in the earth's atmosphere as a result of human activities causing surface air temperatures and subsurface ocean temperatures to rise. Temperatures are, in fact, rising. The changes observed over the last several decades are likely mostly due to human activities, but we cannot rule out that some significant part of these changes is also a reflection of natural variability."

You know, that statement is very, very interesting because there is no more cautious group of Americans than scientists, and this is a very, very definitive and strong statement.

As you know, Joe Lieberman and I--both losers--

[Laughter.]

SENATOR McCAIN: --have an amendment concerning this issue, a very modest proposal which I know you've already been briefed on. And we got 43 votes, but the interesting thing about the debate, and we wanted to have the debate because we want people on record. We want to know where they stand on this issue, and we didn't expect 43 votes. And like in a lot of issues, we were maybe, rather than 7 votes short of 50, we may have been about 20 votes short of 50. Some viewed as kind of a free vote. I might add that was probably, I think the first time we forced a vote on campaign finance reform I think we got 9 votes. So we I don't think view it as a 7-year odyssey, as campaign finance reform was.

But, you know, we had our scientists, and I think very credible scientists, but also the opposition dug up their scientists, so we had various quotation battles, battle of quotes. And so I thought at the end maybe it might be a good idea to get some pictures. And so I had three pictures, as we ended up the debate.

One was Kilimanjaro. My favorite author is Ernest Hemingway, and of course the famous short story, "The Snows of Kilimanjaro." Kilimanjaro isn't going to have any snow left on it any more, and there's a picture of Kilimanjaro in 19--what was it--sometime in the 1940s, I guess, covered with snow and now a small amount;

Glacier National Park, which has to be renamed now. There's no glacier

left;

And, finally, an overhead satellite view of the Arctic ice cap, which has shrunk considerably.

So it's like everybody has their--is entitled to their opinions, but there's only one set of facts, and the facts are that climate change is real, it's devastating, and it's going to have a dramatic impact on the way--I'm getting pretty long in the tooth now. It may not change my life, but I have children and grandchildren, and I'm very worried about what kind of an environment they're going to inherit.

We have had a series of hearings in the Commerce Committee, very interesting individuals. We have had a guy who spends 5 months a year in the Antarctic. He was a very interesting witness as to what he's seen over the last decade.

We had a witness that is an expert on the Great Barrier Reef. I'm sure that many of you are aware--I don't think that all Americans are aware--that the Great Barrier Reef is dying. These manifestations are real, they're there, and they're compelling.

I come from the State of Arizona, which has always had a shortage of water. Barry Goldwater used to say we have so little water in Arizona the trees chase the dogs.

[Laughter.]

SENATOR McCAIN: But we have never had a drought in memory, and the folks up in Flagstaff look at the tree rings, of this significance and this depth.

Lake Powell, a wonderful recreation area, is now at 43 percent of capacity. It has never been that low since it was filled. So the signs are all around us all over this wonderful earth of ours. And by the way, in August, I'm going up to Spitzberg in Norway, at the invitation of the Norwegian Government, the northernmost inhabited place on earth, and the Norwegian Foreign Minister came to my office and invited me. He said, "You'll see tremendous impacts of climate change up in Spitzberg," and so I'm looking forward to that visit.

What we have--and I'll stop--what we have, my friends, is an education problem. The facts are there. The trend is terrible. We've got to educate our fellow citizens as to what climate change is all about and the danger that it poses to the world.

The Europeans are very aware. When I talk to the Europeans about U.S.-European relations and why they dislike us so much, one of the first issues they mention is our failure not only to join Kyoto, but in their view to seriously address the issue of climate change. So there are people around the world that are far more involved in this issue than we are, and we, I believe, are lagging far behind.

So I want to thank you for being here today. It's a fight that we will win because of the terrible things that are happening to the world. The question is how late will it be, how late will it be when we win this fight and how difficult will it be to repair the incredible damage that's been done to our, in the word's of Chairman Mao, "It's always darkest before it's totally black," but we won't quit, and we will continue our struggle. And it is a worthy, worthy cause.

I thank you, and I thank you for coming today.

[Applause.]

SENATOR McCAIN: Here at Brookings you have to answer questions in a different place from which you give your remarks.

All right. Has John got one?

MS. CLAUSSEN: Do you have one?

I'm going to start with a question for each of you, and then we'll open it up to everyone.

Senator McCain, let me start with you. I think a lot of people were

surprised by 43 votes, 44 supporters, however you want to look at it, but you're going to need more than that, and you're going to need a vote in the House, also. And I was wondering if you have any thoughts about how you see this moving forward.

SENATOR McCAIN: It's one of these issues that once, I say with classic Senate snobbishness, once that it passes the Senate, then it's a matter of time before it passes in the House.

[Laughter.]

SENATOR McCAIN: You know, when you go from the House to the Senate, you get a lobotomy, and I--

[Laughter.]

SENATOR McCAIN: But it has to be done in the Senate because the way the House is run, as we all know, they would not allow, in the rule, for any piece of legislation that's on the floor of the House to have an amendment that would apply to climate change. I mean, that's just the way the House of Representatives is run.

You know, it's harder to lose a seat in the Politburo in Havana than it is in the House of Representatives.

[Laughter.]

SENATOR McCAIN: So it's hard to get significant action, although there are a number of members of Congress who are very much involved, and I'm very appreciative of their involvement in the issue. But if we can get 51 votes in the Senate, then we can assure them that we will have a vote every time that there is any bill for consideration, and so then we would get them.

And, second of all, we've got to get better support from the administration than we've had in the past, obviously.

MS. CLAUSSEN: Thank you.

John Rowe, I was really pleased to see you start off by saying that you thought that we needed something that was mandatory, and I certainly agree with that, but what kind of--what will it take to get another 50 CEOs to say the same thing?

MR. ROWE: Something mandatory.

[Laughter.]

[Applause.]

MS. CLAUSSEN: Okay. I'm done.

[Laughter.]

MS. CLAUSSEN: How about questions?

Yes?

MR. BECKER: I'm Bill Becker. I direct an association of state and local air pollution control agencies.

Senator McCain, President Bush and Senator Kerry have been courting you quite aggressively for the past few months for their support--for your support. And the famous President Bush hug ran on the first page--of you--ran on the first page in every newspaper in the country this past week. And I guess it seems clear that you have a lot of leverage right now, and I'm wondering whether you've thought of using that leverage to extract some kind of commitment from President Bush with respect to climate change and, in particular, with respect to your bill.

SENATOR McCAIN: Well, first of all, I mentioned on "Conan O'Brien" the other night, when asked about the vice presidency, I said that I had spent years in a Vietnamese prison camp in the dark, being fed scraps, and why would I want to do that all over again?

[Laughter.]

SENATOR McCAIN: I think that--here's what I think has to happen. I'll be glad, and will continue to talk to President Bush, and I have talked to John Kerry about it as well. But what's got to happen, what happened to me in the year 2000. Every town hall meeting I had someone stood up and said, "What are you going to do about climate change, Senator McCain?"

You know that climate change is real. It's got to come from the grassroots. It really does. I think Washington is more in need of reform than at any time since Theodore Roosevelt was President of the United States, but I still believe that the Congress and the President of the United States react to the will of the people. Our whole campaign in 2000 was about campaign finance reform, and everybody said, including the political pundits in this town, said nobody cares about it. Well, we made sure that people did care about it. And that's what's got to happen in this upcoming political campaign. Grassroots people have to make candidates focus on the issue.

If you accept the premise the facts are on our side, as we just talked, then that I think is the best way. It's election time. This is the best way to get the attention of officials who are up for election.

And, by the way, I want to mention one other bit of good news. Governors in the West, governors in the Northeast have joined together, and I'm sure you're part of that, in working together to try to address the issue of climate change. I think it's also very important that Governor Schwarzenegger has taken on this issue as an important one as well.

So we are starting to get some grassroots and state and regional involvement, and I thank you for yours.

MS. CLAUSSEN: Other questions?

SENATOR McCAIN: Thank you very much. Oh--

[Laughter.]

MS. CLAUSSEN: Not so fast.

MR. RIGGS: Jack Riggs from the Aspen Institute.

A question for Senator McCain. Before you came, John Rowe said that he would be more interested in your bill if it had a ratcheting standard that started slowly and a safety valve. How does that strike you?

SENATOR McCAIN: Well, you know, I'm open to any proposal that works, that we can get our grassroots support people to support. I worry a little bit about a moving cap because I think it distorts the market somewhat. And I'd be glad to get into those details, but first you've got to sell the concept, and you've got to sell it as modestly, I mean, make it as simple as possible, so that it's black and white. Are we going to do something about greenhouse gas emissions or not? It's a matter of principle.

Most people didn't understand campaign finance reform when we forced votes on it, and we got into the details once we got the votes. First, you've got to get the support behind you. I don't happen to be very agreeable to it, but I think the fact is that we've got to work together and get the principle sold and get the support, and then we can probably come up with not nuances, but the details of the proposal. We're trying to achieve the same goal. There's just a different methodology here.

But Joe and I decided two things: make it as simple as possible and as modest as possible. I have no illusions that just this cap and trade will have some profound effect, but it will have a profound effect on actions we will take afterwards. First, we have to establish the principle.

Do you agree, John?

MR. ROWE: Totally.

MS. CLAUSSEN: I agree, too.

Karla?

MR. YEAGER: Karla Yeager [ph] from the Potsdam Institute of Climate Impact Research.

As a European, I'm, of course, flattered by you saying that we are so aware of things, and we are taking action, and actually we may have some reason not to like everything that's happening in America.

On the other hand, as a European, I'm also ashamed of the fact that you Americans allow us to get away with very, very cheap talk at some stage. And I really hope that the effort by you, Senator, and Senator Lieberman will lead to a more healthy situation, where there is going to be true competition between what Europeans actually do, not only talk about, and we are doing some things, of course, and what America does. And that's my question here.

How do you see the relation between cooperation, shared agreement, international treaties on the one hand and competition on the other, where each side tries to outperform each other, and thereby advance of the common cause?

SENATOR McCAIN: Thank you. A very important and I think seminal event took place in the last month or so when Russia decided on their membership in Kyoto. If Russia had opted out, as many of us feared, that would have made Kyoto much less effective and, in fact, perhaps neutered. Now, we all know that Russia did that because the European nations demanded in return for their acceptance into WTO. That's fine with me.

So I talk a lot to my European friends. Anti-American sentiment is higher than it's ever been. Certainly, the only time that I can remember that anti-American sentiment was as high as it is was when Ronald Reagan was deploying the Pershing and cruise missiles to Germany back in the early '80s.

And they have a number of problems with us: climate change, international criminal court, perceptions of arrogance, weapons of mass destruction. Some of them we can't do anything about. The glue that kept our alliance together for 50 years was the Cold War. The Cold War is over. That glue isn't nearly as strong, but we still have shared interests and values, and those interests and values lie from the war on terrorism to environmental issues, to Africa, to AIDS, many other issues that demand our cooperation and working together, not lend themselves to.

And there's another thing we've got to do, and that is go back to my hero, TR, Teddy Roosevelt, who said, "Talk softly, but carry a big stick." Talk softly. We've got a big stick. We should talk real softly. There's nothing like a little humility. I don't practice it often myself, but--

[Laughter.]

SENATOR McCAIN: --but I'm always attracted to it.

[Laughter.]

SENATOR McCAIN: So I would hope that we install a democratic government in Iraq, and we make some progress, and do not underestimate how tough this is going to be. This is a terrible, tough time coming up in the next couple of months, as far as Iraq is concerned. Get them on the road to democracy, as rough and as difficult, and then let's start on an effort to restore relations and a cooperative relationship between ourselves and the Europeans.

One caveat, if I could, and this may offend someone, but President Chirac has said that France is a counterweight to the United States. I don't know how you can be an ally and a counterweight at the same time. I just don't know how you achieve that.

Now, in the case of the Germans, they've got troops in Afghanistan. They're

guarding our bases. We can move forward with the Germans. And I don't mean to pick on the French, but I just don't get it, how you can be a counterweight, and yet can be an ally at the same time. So I think there's going to have to be an attitudinal change or a behavioral change on the part of the French. But the rest of the Europeans, I think it's sort of our obligation to reach out to them.

MS. CLAUSSEN: You haven't asked a question yet, Doug.

MR. FOY: I have a question for the Senator. I'm Doug Foy from Massachusetts, Senator.

Your comment about growing this up from the ground, from the states and from the communities and the electoral process, you also mentioned that there's a lot of interesting things happening in the Northeastern states, in my state, in Massachusetts, in California, in the Northwest, and there's some effort to bring all of those states together. And many of those states are headed by Republican governors, including my boss.

Can you comment on what you would like to see those states do in terms of their own message here in Washington. What would be the most useful? Do we just keep burrowing in and doing it where we are? Are we getting a voice here that is useful?

SENATOR McCAIN: I think these compacts between different groups of states, if they could spread, and they could even maybe, I don't see why the Northeast and the West shouldn't work together. They're basically, they don't have to be contiguous boundaries in order to work together, number one.

Number two is governors are very influential in their states. Governors are, they're the ones that are out there at the ribbon cuttings. They're the ones that are constantly exposed to the state media. And if these governors, including the governor of Massachusetts, would make this a high-level issue, in California, as you know, they're passing some CAFE standards which is, because of the size of the market, it can have a profound effect on the automobile manufacturers. I'm not sure I would advocate that, necessarily. Although having visited California quite often, because they steal our water, so I have to go over and visit it every once in a while--

[Laughter.]

SENATOR McCAIN: I can see why they would be in favor of some very strong measures.

I would advocate one more coordination: higher visibility, more lobbying. For example, the National Governors Association, I've never seen this issue on their agenda. I'd love to see enough states to say at the next meeting of the National Governors Association, okay, climate change is an issue that we, as an organization, are going to address. Now, I'm not sure that governors in some states, but at least start that push.

We listen to the National Governors Association. We listen to the League of Towns and Cities. We listen to the county and municipal employees organizations. I would say that those organizations should be galvanized as well.

Thanks for the question.

MS. CLAUSSEN: We'll take two more.

Paul?

DR. EPSTEIN: Paul Epstein, Harvard Medical School.

This morning's New York Times' financial pages reported that the soybean crops are down significantly in the U.S., Brazil, and Argentina because of severe weather. In the West, we're in the severe fifth year of the drought. We're looking at timber, agricultural yields. Clearly, there are economic implications--

SENATOR McCAIN: Forest fires.

DR. EPSTEIN: Forest fires and the timber industry, and the watersheds.

Clearly, the insurance industry are getting concerned about this. How much, I asked Senator Lieberman this morning, how much are these economic impacts, and particularly the insurance and reinsurance industry, what is that doing to the people's votes?

SENATOR McCAIN: Well, as you know, Senator Lieberman isn't very smart, so I'll try and improve on it.

[Laughter.]

SENATOR McCAIN: He's very nice, though.

[Laughter.]

SENATOR McCAIN: I think the economic impacts can be devastating. A small example. In my state, we've not only got the forest fires, but we've got the bark beetle. When it gets dry enough and a tree starts being without moisture, the strength of the tree dies, and the bark beetle can come in because the trees are weakened. You can drive in parts of my state and see a third or half of the pine trees up in the Northern part of our state are dead or dying. I mean, the impacts are tremendous.

And when you get the combination of my state, which is such rapid growth, dramatically rapid growth, and the use of water continuing to go up, and the water not coming down the Colorado River, then it is going to affect the very life of my state. And so the economic impacts of climate change are, as we all know, phenomenal.

Look, I don't think this is "The Day After Tomorrow," but it is factual that the numbers of violent weather occurrences are on the increase. That's a fact. Ask the U.S. Weather Service. And violent climate, we lose lives sometimes, as well as the homes and businesses, et cetera.

So I think that perhaps, now that you bring it up, that maybe we haven't cranked that into the debate nearly enough, to talk about the economic impact, because the major argument against doing something about climate change, besides just denying it, is the economic costs associated with it. So I think you raise a very good point.

And I'll tell you one thing, seriously. Joe Lieberman is one of the nicest men in the Senate, and it's a great pleasure, seriously, to work with someone of his integrity and honesty. He really is a great guy.

Yes, sir? We can take another one after you, if you'd like.

MR. MITCHELL: Gary Mitchell from the Mitchell Report.

I just wanted to say, Senator McCain, that a few minutes ago, when you started to say that we need a democratic administration, and then--

[Laughter.]

MR. MITCHELL: --and then finished it by saying "in Iraq," I was very disappointed.

[Laughter.]

SENATOR McCAIN: I hope I said "democratic government."

[Laughter.]

MR. MITCHELL: I wanted to ask a question about the political realities of getting this legislation passed, and I'll put it in simple terms.

It seems to me, because of the global nature of this issue, it seems to me that it's pretty difficult to imagine getting this legislation passed, as opposed to campaign reform, if the President ultimately isn't for it. And my question is what's more realistic: changing one vote in the White House or eight in the Senate?

SENATOR McCAIN: I think that's a good question, and there's no doubt that the President of the United States has more than a 50-vote impact because the great thing about being President of the United States is that you set the agenda. And so I would never understate, in any way, the importance of the President of the United States. But I

again would remind you of campaign finance reform, appointment of the 9/11 Commission, which was a Lieberman- and McCaign-led piece of legislation, and a number of other pieces of legislation was either opposed or not supported by the White House that we've gotten passed if you stay with it.

I think the climate change is at least much further ahead than we were of campaign finance reform, I really do, because I think that young Americans are probably more aware of this issue than young Americans were on the issue of campaign finance reform. It's more real to them. It's more palatable. And I believe that it's not going to take us too many years. But, yes, I would give anything to have the President of the United States more deeply involved.

Now, on behalf of the President of the United States, if he were here or Secretary Evans, he would say, "We're taking the following steps: A, B, C, D, and E. We're spending billions for observing climate change" and a number of other steps that they're taking. Those are legitimate actions that are being taken, and the administration deserves credit for it. My problem is that it's not enough, and that's a legitimate difference of opinion.

Yes? Could we have the guy all the way in the back. He's been asleep up until now, so--

[Laughter.]

SENATOR McCAIN: Yes, please, go ahead. Stand up. There you go.

MR. BUSBY: Josh Busby from Brookings.

My question for you is something that was highlighted earlier today by potential opponents of McCain-Lieberman, is that the competitiveness losses associated with kind of unilateral disarmament are such that the United States shouldn't adopt a mandatory cap and trade system. And I wondered what your response would be to those folks.

SENATOR McCAIN: Well, as you know, the Europeans are engaged in cap and trade, but if their point is that Kyoto was unfair in the present formula and giving India and China a free ride and the United States very tough strictures, they're right. They're right. They're correct. I agree with them. But I believe that if we had joined Kyoto and set certain conditions, we could have made that formula much more fair and balanced than it would have been. When you're inside the tent, you can get a lot more done than when you are outside, obviously.

I can't--look. We just talked about economic impacts. We just talked about the future. What happens to Australia if the Great Barrier Reef dies? I would argue that is probably going to have profound economic impacts on the nation of Australia if the Great Barrier Reef dies, and that's what they're predicting. If we continue to have these violent climate conditions, then they are severe. But perhaps more importantly, our way of life is in danger. Our way of life is in danger. If this drought continues, and I don't know maybe tomorrow it will start raining all over the Southwest and everything will be fine. That's why, you know, like they say about rain dances. It's a matter of timing.

[Laughter.]

SENATOR McCAIN: But from what I've seen, and everything that I'm told by people that are a lot smarter than I am, this is a serious, serious problem, and relief is not on the way. And so this gets back to this vote thing. If the conditions continue to worsen, and I pray every night that they don't, but if they do, then that's going to get people's attention I think in a very real and significant way.

One more. Yes, sir?

QUESTIONER: Thank you very much for allowing me to ask a question of

John.

[Laughter.]

MR. BERTOLUCCI: I had an earlier question for him. And the reason I come back to this question, John, is that--I'm Mike Bertolucci from Interface. And we have a corporate goal by 2020 to become climate neutral, which means we're going to get unhooked from the wellhead, both materials and energy. And nuclear more than likely, to your point, is more than likely going to play a role in that.

I agree with your comments on PV and wind. There are certainly issues around there with regard to cost, and availability, and distribution and all of those other things, some of which may also be an issue for thus looking for energy perhaps from nuclear. As a scientist, I'm going to make the assumption that we are going to solve the problems with regard to waste and how we handle it, sequest or make it neutral, whatever. But for me to become climate neutral by 2020, I'm going to need, more than likely, the nuclear part of that energy solution.

And all sustainability is local, but global warming is global or sustainability is local, but all of the global warming is global, of course. So my concern is, is that if we develop the technologies for nuclear that's going to effectively supply my needs to become climate neutral, it's going to be proliferated in the world, and there's going to be issues associated with that, either in terms of control or all of the other things that are going on today.

From your knowledgeable perspective about that and what you know about the technology, can you give us any feelings or confidence that "proliferation" of nuclear reactors around the world is going to be safe or are we going to trade global warming for a bigger issue?

MR. ROWE: Well, as I said earlier, I am truly not expert in it and would refer you to the very substantial study that MIT did recently. And they had a large group of folks from MIT and Harvard trying to do an interdisciplinary study on all aspects of the nuclear fuel cycle, including proliferation. And basically that study concluded that the first requirement with present technology was to stay with the single-cycle nuclear power plant, meaning don't use breeder reactors and produce separable plutonium and make it too easy.

But it goes beyond that to make certain suggestions about how to enforce the existing international atomic energy agreements on proliferation. And here you run into a double or triple or quadruple problem because proliferation exists already because of lots of people have nuclear plants who may not use them in ways that we want them to be used. Proliferation exists already because lots of people have weapons-grade nuclear materials that we would prefer didn't have them.

And the people I know who think seriously about proliferation believe that, on an international scale, it takes a whole new set of agreements to control proliferation, that just wishing for the enforcement of the existing set is probably inadequate. So I can't give you a definitive answer to your question, except the sort of grim judgment that you're going to be dealing with these problems anyway. But I would refer you to the MIT study, where it's pretty thoroughly addressed.

SENATOR McCAIN: Thank you, Eileen.

MS. CLAUSSEN: Well, thank you all very much.

SENATOR McCAIN: Thank you very much. Thank you for having me. Thank you.

[Applause.]

[Whereupon, the proceedings were adjourned.]w about the technology, can you give us any feelings or confidence that "proliferation" of nuclear reactors around the

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SENATOR McCAIN: Thank you, Eileen.

MS. CLAUSSEN: Well, thank you all very much.

SENATOR McCAIN: Thank you very much. Thank you for having me. Thank you.

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MR. ROWE: Well, as I said earlier, I am truly not expert in it and would refer you to the very substantial study that MIT did recently. And they had a large group of folks from MIT and Harvard trying to do an interdisciplinary study on all aspects of the nuclear fuel cycle, including proliferation. And basically that study concluded that the first requirement with present technology was to stay with the single-cycle nuclear power plant, meaning don't use breeder reactors and produce separable plutonium and make it too easy.

But it goes beyond that to make certain suggestions about how to enforce the existing international atomic energy agreements on proliferation. And here you run into a double or triple or quadruple problem because proliferation exists already because of lots of people have nuclear plants who may not use them in ways that we want them to be used. Proliferation exists already because lots of people have weapons-grade nuclear materials that we would prefer didn't have them.

And the people I know who think seriously about proliferation believe that, on an international scale, it takes a whole new set of agreements to control proliferation, that just wishing for the enforcement of the existing set is probably inadequate. So I can't give you a definitive answer to your question, except the sort of grim judgment that you're going to be dealing with these problems anyway. But I would refer you to the MIT study, where it's pretty thoroughly addressed.

SENATOR McCAIN: Thank you, Eileen.

MS. CLAUSSEN: Well, thank you all very much.

SENATOR McCAIN: Thank you very much. Thank you for having me. Thank you.

[Applause.]
[Whereupon, the proceedings were adjourned.]