

SPECIAL PRESENTATION

“SCIENCE IS THE STUFF OF PROGRESS”

**WELCOMING REMARKS:
JOHN PODESTA, PRESIDENT AND CEO,
CENTER FOR AMERICAN PROGRESS**

**KEYNOTE ADDRESS:
NEAL LANE, PH.D., FORMER DIRECTOR, NATIONAL SCIENCE
FOUNDATION AND FORMER DIRECTOR, WHITE HOUSE OFFICE OF
SCIENCE AND TECHNOLOGY POLICY UNDER PRESIDENT BILL
CLINTON; MALCOLM GILLIS UNIVERSITY PROFESSOR AND SENIOR
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UNIVERSITY**

**MODERATED BY:
R. ALTA CHARO, WARREN P. KNOWLES PROFESSOR OF LAW &
BIOETHICS, UNIVERSITY OF WISCONSIN-MADISON LAW SCHOOL**

**FEATURED PANELISTS:
ANDREW R. BADEN, PH.D., PROFESSOR AND CHAIR, DEPARTMENT OF
PHYSICS, UNIVERSITY OF MARYLAND**

**KIT BATTEN, PH.D., MANAGING DIRECTOR FOR ENERGY AND
ENVIRONMENTAL POLICY, CENTER FOR AMERICAN PROGRESS**

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THE UNIVERSITY OF CALIFORNIA AT BERKELEY**

**KATHY HUDSON, PH.D., FOUNDER AND DIRECTOR,
GENETICS AND PUBLIC POLICY CENTER**

**CLOSING REMARKS:
RICK WEISS, SENIOR FELLOW, CENTER FOR AMERICAN PROGRESS**

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DR. JONATHAN MORENO: (In progress) – so welcome formally to the Center for American Progress and to our science progress fair. My name is Jonathan Moreno. I'm a professor at the University of Pennsylvania, a senior fellow and editor-in-chief of *Science Progress*. You're not going to hear much from me today, which is probably a blessed thing.

Our goal is this effort is to put science back on the public agenda and to convey the same kind of excitement and enthusiasm about science that you have, and in particular it's important for the future of the country. I'm a father of two more or less grown children and what happens to the country in the next 30, 40, or 50 years is going to be of decreasing personal significance to me, but an increasing importance to them and to their children.

In the 21st century we have a view at CAP that science is not optional for a prosperous and powerful and important country. A hundred years from now, people will look back at what we do – partly what we do in this room in this place – and ask themselves if we met the challenge of the future of science and the sense that science has not gotten its due, which is not characteristic of the history of the country.

So that's all I want to say. I'll come back a little bit later and thank a lot of people. This could not happen without tremendous effort and I particularly want to thank John Podesta, president of CAP, and the CAP board, who saw the importance of this effort from the very beginning and saw that it's really an important and novel thing for us to do.

So John Podesta will introduce our keynote.

(Applause.)

MR. JOHN PODESTA: Let me start by thanking Jonathan Moreno for having led this effort really from the beginning and it was – we'll hear, I think, a little bit more from him later today. But I want to thank you all for joining on this exciting occasion the launch of a print version of our new journal of *Science Progress*. As some of you know, the – and I'm going to say a little bit more – the electronic version has been up for a little while.

I'm going to introduce Neal Lane and he could testify that when I say that this is an exciting occasion – particularly for me. First of all, it's the first science fair we've had at the Center for American Progress and I thank the events staff for pulling that off. That's probably not the usual fare at a think-tank. And second is that, as I was about to say, Neal's going to testify that I'm a science geek and so he knows that this is particularly meaningful for me.

When the Center first launched *Science Progress* last October, we – as Jonathan mentioned, we wanted to improve the understanding of science and technology amongst

policymakers to further the common good. As a web magazine, scienceprogress.org had almost 30,000 unique visitors in its first month and it's nearly doubled in that in six months and I think we're getting more traffic every day. I think that's due to the fact that people recognize that science is the stuff of progress. The Center for American Progress responded with the goal of generating new ideas, to build capacity, to shape the national dialogue, influence the media and policymakers on a range of policy issues. And in that vein, our policy experts cover quite a wide range of issue areas and often work across disciplines that tackle complex and interrelated problems.

This year, we're really kind of focused because I think the nation is really focused on four big challenges that the country faces. One is economic mobility at a time when we see growing disparity between the wealthy and the poor in this country. Second is universal health coverage and how we're going to connect up and improve and make more cost-effective and cover everyone with affordable, quality health coverage in this country.

Third, which I spent a lot of my time in particular on, which is the energy challenge we face from climate change and our addiction to oil. I think it's perhaps one of the biggest challenges that the country faces, to move from a high-carbon economy to a low-carbon economy in a very rapid order and an industrial scale that probably challenges the way we think about the capacity of government to really move change in this country, but it's something we – that's vitally important to our own security and the security of billions of people around the world. And finally, building that platform for sustainable security that deals with both the challenges that we face here at home as well as abroad.

Those are tough challenges that are going to require new ideas and innovative solutions. Hopefully, we've been able to put some of those out to date. The good news is that science and technology have the potential to address all of those specific issue areas. And, you know, we're working and drawing on our expertise in the science arena across, again, that whole range of issues.

Our commitment to examining current issues in science and technology, both practical and ethical, springs from our commitment to progressive change. Our first print edition of *Science Progress* and its sister online publication are charged with ensuring that the best and most pragmatic solutions are presented to the public, but that we thought them through – we thought of consequences – and then trying to have a healthy debate and promote the best of the best in constant dialogue with policymakers and in state houses and university campuses around the country in the media. As I said, we're engaged in great policy debate right now and in the context of our national election.

With that being said, I want to congratulate my colleagues Jonathan Moreno, Ed Paisley, Andrew Pratt for making today's event possible, for the tremendous work getting the project off the ground. We're also joined – you'll hear later from Kit Batten who is our resident environmental and energy scientist on our staff and who's really had a major commitment to this. For Chris Moody (ph), Mike Rugnetta, Shannon Ryan, and Sam Berger is here, I think, who really helped get this started, who has now just finished his

first year at Yale Law School, but he's back for the American Constitution Society convention. I saw him there earlier this morning. He said he would be here.

And it's really a great, great, great privilege to announce – you'll hear from him later – that we've been able to, I think as a result of this commitment, attract really one of the great science writers in the country, Rick Weiss from the *Washington Post*, who's going to be joining us here as a senior fellow at the Center for American Progress, and we're really, really excited about that.

So now, I'd like to turn the mike over to Dr. Neal Lane, a lifelong scientist and educator. Let me tell you a bit about him. Dr. Lane is the leading authority on the role of science and technology in public policy. He served – we served together, had a lot of fun together – in the White House, where he was the president's science adviser and ran the White House Office on Science and Technology Policy. Before that he had been the director of the National Science Foundation we founded in the late 1990s. There's a news story on earmarking today in the *Washington Post*. Neal and I seem to make a cottage industry of preventing earmarking of the NSF budget in the late 1990s. That probably broke down a little bit in the last couple of years.

But I think that Neal was really a great advocate for science in the White House across, again, that whole wide spectrum of issues in terms of protecting science funding and the increases that we saw at the end of our administration, but also bringing to bear the latest in knowledge to the president's attention. I had the privilege of actually organizing the information that went to the president, both in my earliest days in the White House and then as chief of staff, and he got weekly reports. And the only one he really ever wanted to see was the one from Neal as he will – he can attest to which he would mark up all over. I think he was extremely curious about scientific development and it was great to work for somebody like that, but it also meant that we needed a science adviser who could really present that information in a way that he could absorb and really convert into policy.

Before coming to head the NSF, Dr. Lane served as the chancellor of the University of Colorado, Colorado Springs, and the provost at Rice University in Houston. He's currently the Malcolm Gillis university professor at Rice. He's also a senior fellow at the James A. Baker III Institute for Public Policy. I've been down there to visit him and the work that he's doing at Rice. And it's a great pleasure that he's been able – that he agreed to help us launch this product, but also that he's able to be with us to participate in this event.

Please join me in welcoming Dr. Neal Lane.

(Applause.)

DR. NEAL LANE: Thank you very much, John. I can indeed testify that John Podesta is a science geek. As you know, John is not probably among the world's most patient individuals that you might know or you might have worked with, but he exercised enormous patience, I must say, in allowing me to take some precious time at a staff meeting to talk to the White House staff about issues I thought were very important:

the cloned sheep Dolly's family relations and how the kids were doing, and so forth. You may remember the attack on Pluto. (Laughter.) Yeah, so things were – then there were even lesser important things that we talked about.

More seriously, John as a chief of staff was quite extraordinary. He was evenhanded, so yes, he cared about science and technology as he does now and protected me from time to time, I guess, when I was about to get my legs cut out from under me – but fair to everybody and much appreciated. I felt very privileged to serve in the administration of Bill Clinton and Al Gore and was very fortunate to serve at a time when John was chief of staff.

So I thank you for having me here. You may have noticed that I was not invited to actually give a science presentation. I don't know what that might mean, but I'll do the best with what I have here.

I have been excited about *Science Progress* since I first heard about it, in part because progress is what America's all about and science has been a very important part of helping the nation, indeed the world, to make that progress. Now, of course, early in the nation's history, progress was about the exploits of America's adventurous explorers and also about the grueling hard work of waves of immigrants – most of our ancestors coming to America.

But in recent decades, progress has been more about research and education, science and technology, especially information technology. And from American human ingenuity and innovation has come so much of this progress. Again, it's hard work, but it's more brain than brawn and in my view it's in part – maybe in large part – the message of *Science Progress*.

Now, all of that has happened in this country in the blink of an eye. Our lives, for the most part, have been more productive, more comfortable, and perhaps even more satisfying than the lives of our parents and grandparents before. The know-how and the tools of science and technology have given most of us the things that we need or things that we think we need.

Now, I grew up in Oklahoma in the '40s and '50s and I have moments of nostalgia, but they don't last very long. I remember my childhood dentist. I remember the clunky cars my parents drove. I remember the sound of the record player like it was yesterday, and the movies that we went to, the cost of long-distance telephone calls, and my parents explained that to me very carefully. No air-conditioning in a hot Oklahoma steamy summer. No warning of tornadoes coming, and all those other things. And the clunky grind calculator that I used for some of my first research problems. I don't miss any of those kinds of things.

Our kids and grandkids, for sure, have no notion of life before laptops and cell phones and iPods and iPhones and Blackberries and Treos and all the rest of it. Technology is central to their lives and their future. They have – they live and breathe technology. It's embedded in their psyche and often it's attached to their ears and in time other body parts as well.

American scientists and engineers have made many – in many cases, most of these extraordinary discoveries and technological advances – at least in the last half of the 20th century. True, America has benefitted and still does benefit today from discoveries and inventions in other parts of the world. Bright people, inventive people are born everywhere. But in this country, everyone has a chance to be a player and by making the breakthroughs on our soil and in our universities, in our laboratories, we get first dips on the fresh ideas and the innovative new tools, as well as the skilled women and men who go on to invent new devices, to market new products, create new industries and jobs to make money and fuel American progress faster than much of the rest of the parts of the world. Again, I think that's a message of *Science Progress*.

But looking forward, the quality of our lives and the lives of our children and grandchildren in the 21st century will depend on the U.S. continuing to be a leader in science and technology and the research that underpins that advancement, and I believe that kind of continued leadership is well within our grasp, but it is not a given. Our success will depend on America making many of the new discoveries, the new inventions, but it will also depend on how we use that knowledge and technology to deal with a host of serious problems that threaten Americans and in some cases billions of people across the globe. And I'll mention three.

First, global warming, climate change, and the rising world demand for energy. The world must find this energy, use it more efficiently, and it must be carbon-free and most likely we're going to need to sequester the carbon that's already up there. We can meet this challenge, I believe, but it's going to mean a fresh attitude about international cooperation and revolutionary technological advances in all energy domains – solar, biofuel, fossil, nuclear in particular. There's no one silver bullet, but I believe nanotechnology still remains the most promising path to success.

Second on my list, competitiveness of American business and industry, the quality and quality jobs for all Americans in what would be an increasingly tough world market. And we can meet this challenge, but not by continuing our 100-year-old K-12 classroom methods. We need serious, systemic change that tailors teaching of math and science and everything else to the backgrounds, the capabilities, and the needs of individual kids. And that means, in my view, developing and using new learning technologies that are based on how kids learn – and we know a lot about how kids learn – and on the accelerating power of today's multitude of digital devices and the internet.

And my third issue: affordable, quality healthcare for all Americans. We actually can do this as well by putting in place systems at the national, state, and local levels to make effective use of technology – for example, electronic health records – and also by developing new, minimally invasive diagnostic imaging, testing, and treatment devices made possible by advances in nanotechnology. As an aside – unsolicited commercial – I think some of our Rice University researchers work in golden nanoshells provide a very good example.

Now, tackling any one of these problems will require forward-looking policies and major increase investments in research and education. So let me close then, by

asking how do I think we're doing? Well, troubling answers come from many directions, many fine reports. The Council on Competitiveness has spoken out regularly on this matter. And Tom Friedman wrote a book. But I'll quote from one report in particular: the National Academy's 2007 Report, "Rising above the Gathering Storm," which garnered strong, bipartisan support from the Congress and the White House and which made a compelling case for increased research support, especially in the physical sciences and engineering, and for programs to enhance science, math and ensuring education.

Here's a short quote from the executive summary. "It's easy to be complacent about U.S. competitiveness and preeminence in science and technology, but the world is changing rapidly, and our advantages are no longer unique. Market forces are already at work moving jobs to countries with less costly, often better educated and highly motivated work forces. For the first time in generations, the nation's children and grandchildren could face poorer prospects than their parents and grandparents did." End of quote.

So finally, I'm going to add two concerns or challenges that in my view deserve attention as well. First, with regard to research funding, we should increase research funding not only for the physical sciences and engineering, but also for biomedical research, with significant increases for stem cell research, including embryonic stem cells. The funds should not simply be used to grow ever larger medical complexes around the country and run them on federal dollars. Universities and medical schools need to face up to the fact that they must find non-federal resources to pay their share of the salaries and operating costs of the facilities. Otherwise, there's no controlling the spiral.

And for all funding agencies, higher priority, I believe, should be given to supporting early career researchers and funding high risk research that's potentially transformative that has a chance of changing paradigms with science, engineering, medicine technology. A recent report in the American Academy of Arts and Sciences, a panel chaired by Nobel Laureate Tom Cech, has recently made recommendations on these issues.

My second point is the federal government needs to restore the public's trust in the integrity of science by making clear through the president's statements – through our new president's statements and actions that science will not be used for partisan and political purposes to spread dogma, that government publications and websites will be scientifically accurate, that government scientists can speak openly, that only the most qualified individuals will serve on advisory committees, and policy will actually be based on the best science.

Ten years ago, I never thought that I would – (applause) – thank you – I never thought I would ever put that down as bullets in a talk as something we needed to accomplish. It seemed very obvious to me. So there's plenty for the new administration and Congress to do. They'll need our help and our support. So we need to roll up our sleeves to do that.

I sometimes end my talk with a question. Given all these challenges, why are my grandkids smiling? And I'd show a slide with my grandkids smiling, and I say that's because I'm their granddad, you know. But the real reason, I think, is that there is cause to be optimistic. It is precisely because what many of our children and grandchildren are prepared to do. They have the technologies, particularly digital technologies, and the savvy that we did not have. They know quite a lot about challenges and they sense that the U.S. cannot go it alone in the future, but rather will lead by example and by collaboration.

And finally, they know how to work with others. They've had that experience. They know how to work with women and men of different backgrounds, different cultures, different belief systems, of different colors. It's obvious to them that all people who need to work together and when necessary lift up others in this country and around the world who need help, but their success will depend on our efforts now to demand from our political leaders a forward-looking agenda for America and offer our assistance in putting that together. And *Science Progress*, in my view, is an excellent way to get that moving.

So thanks for coming today to anticipate and celebrate what I think is America's bright future. Thank you very much.

(Applause.)

DR. MORENO: Thank you, Dr. Lane. Next time, we're going to get you in the science fair.

So it's my pleasure now to introduce our panel. Many of you have had the opportunity to meet at least one of them during the informal phase of the program. After I introduce them, I'll ask them to come up. First we'll have Andrew Baden. Drew is professor and chair of the Physics Department at the University of Maryland. Kit Batten, who is here at American Progress, is the managing director for energy and environmental policy. Kathy Hudson is the founding director of the Genetics and Public Policy Center. And Tom Kalil is a senior fellow here at CAP, is assistant to the chancellor for science and technology at the University of California at Berkeley.

And our moderator will be our colleague and friend R. Alta Charo, who is the Warren P. Knowles professor of law & bioethics at the University of Wisconsin-Madison Law School.

Folks?

(Applause.)

MS. R. ALTA CHARO: (Audio break) – reactions to Dr. Lane and a signal of your areas.

DR. KATHY HUDSON: So I appreciate the emphasis, particularly at the end, of sort of where we need to go in terms of increased research funding. Am I not on? Can you hear me now? Okay. No? It's his problem, not my problem.

I appreciated the comments particularly at the end of the three areas that we need to focus on and I'd like to sort of comment on those and maybe extend those a little bit. The first is the issue with increased research funding, and I think we argue for increased research funding fairly effectively although there's always room for improvement. But we tend to ignore sort of what happens with all that research and what the obligations of government are beyond just the funding of the research.

And so I think we need to extend our plea and our arguments and our advocacy to include support for those agencies that are going to be recipients of that. So in the case of biomedical research and genetics research – I'm signaling what I want to talk about – specifically looking at the regulatory agencies. So we saw a doubling of the NIH budget and very little increase in the funding for the agencies that are involved in regulating the products that come out of NIH research. So that's a big problem.

Secondly, the issue of high risk research. I was – spent some time with an MIT professor earlier this week and I was talking about a grant that was under review at NIH and he said, well, what research have you done? I said, well, no, this was research that I plan to do. He said, oh, no, you didn't submit an NIH grant for work you hope to do; you only submit NIH grants for work that you've already done. I think that's a very sad commentary about our willingness to fund high risk research.

And then the last point I wanted to make is about public trust and I totally agree that it's awful that you have to make the call that you had to make about integrity of science and science not being a servant to politics, but I think there's other issues also involved in trust; and namely, the conduct of science and scientists has to earn the trust of the public. And I think we've made some flaws in the past. The public, by and large, does trust science and scientists, but we have to be always attentive that we are listening to and responsive to what the public's needs, interests, and values are.

That's all I have to say.

MS. CHARO: Thank you.

Drew?

DR. ANDREW R. BADEN: I'm not necessarily a policy wonk. I'm sort of more on the frontlines of science, although I'm now chairman of the physics department at Maryland and doing some administration, and – but I plan to go back to it. My research is in particle physics and I'm currently at – working on an experiment with 2,000 other people around the world at CERN. You might have seen in the newspaper a month ago worries about black holes being made at CERN and everybody dying. In fact, the whole universe was supposed to die. So this is amusing. This was an example of there's no such thing as bad publicity. (Laughter.)

Anyway, I agree with everything Neal said. I want to give a – you know, a slightly different perspective – not different perspective, but an additional component of that and that's all about global warming. And as a member of the physical sciences, global warming is something that came out of people interested in the effects of nuclear war, how the atmosphere would respond to that much stuff dumped into it, and it propagates nuclear into a global warming, and people who did a lot of computer codes simulations at a time when they really didn't have the kind of computer simulations that we can do now, just because they didn't have computers.

But people did some simulations and they said this is really a problem and now, you know, I'm in a position where I can fold my arms and smile and say, ah, I told you so. It was real. But so a lot of us in the physical sciences believed it 15, 20 years – I can't remember when this started, but not recently. And why is it that it takes – that there's no real input into not just the community, but the political community from the scientist? What's happened such that a scientist can say, you know, the earth's going to warm up and the seas are going to rise and it's going to be a disaster and, you know, when you put – as a physicist, you know, when you tell me you're going to warm up the atmosphere by a degree, I immediately think of energy. Where's that energy going to go? Well, it's going to actually evaporate some more water, so you're going to have a lot of more rains and it's going to make a lot more storms. Hello, I think this is what we're seeing.

You know, it's rocket science, but it's not rocket science that nobody's done before. But yet it took the culture, you know, our scientific – not just scientific, but the basic culture a long time and I think pretty much everybody believes, yeah, this is a problem, just like people now believe energy is a problem.

So I don't know what we have to do to get more science input into how things are run, but I think we're getting to the point where the problems are getting so serious that if we don't start being successful in doing this, in having a positive effect just from a scientific point of view, you're going to come across problems that no amount of economic activity is going to solve. And, I mean, I – you know, I'm happy that your grandchildren are smiling, but I'm worried about your grandchildren because they're going to have to foot the bill for this and it's going to be a big bill.

MS. CHARO: Thank you.

Tom?

MR. TOM KALIL: I agreed with everything that Neal said. There were just a couple of points that he made that I was interested in amplifying on. One is that I'm really concerned that because those people who have really not wanted to do anything on climate change have held out technology as the solution – oh, don't worry about climate; you know, in 20 years we'll have the hydrogen car – that many people who work on climate policy on the progressive side are now sort of pooh-poohing research and development because they're reacting to that.

And although it is clear that as the need to stabilize greenhouse gas emissions as our sense for what the threshold number that we ought to be trying to meet has gone down as we've learned about all these non-linear feedback loops and tipping points and things like that, I totally understand the sense of urgency that people have, and clearly there are many things that we need to be doing right away, like retrofitting buildings.

But we need a portfolio approach. We need to be investing in long-term, high risk research so that we're going to have some additional energy options, whether it's on the efficiency side or the carbon neutral energy production or sequestration or whatever. So I don't want to see the progressives fall into the trap of reacting to those who are using technology as a delaying tactic to therefore conclude that progressives should not be for investing at the long-term, high risk research as one of the many things that we need to do.

Building on the point about "you have to do the research before you can write the proposal," an area where this has had a particularly pernicious impact is in DARPA, which has historically played a very important role in supporting long-term, high risk research and has recently moved much more in the direction of wanting to see results in the 12 to 18-month period. So one of the things that I hope the next president does is to appoint a DARPA director that believes in the value of supporting this type of research because they play a very important role in America's innovation ecosystem.

I think another issue that I think is important to discuss is how is the nature of the innovation process itself changing and what are the implications of that for science and technology policy? So innovation is becoming increasingly interdisciplinary. People are talking about the convergence of bioinfo and nanotechnologies. Innovation is occurring in a much more open way. You're seeing open source software, for example, and innovation marketplaces, things like InnoCentive where companies are posting problems and then having thousands of scientists and engineers around the world try to solve them.

As Neal mentioned, the capacity to innovate is no longer confined to North America. You're seeing centers of innovations spring up all over the place. And so although there's a lot of things that people have been calling forever that we still haven't gotten done like, you know, increasing funding for research and making the R&D tax credit permanent, I also think it's worthwhile to take a look at some of these changes in the nature of the innovation process and saying what are the implications for policy that should flow from that?

The things that I am particularly interested in these days that I would love to get some questions about are the link between science and technology on the one hand and global development – things like global health and poverty alleviation. I think that the United States clearly has a lot work to do to restore its reputation and image in the world, and I could think of no better way to do that than to harness America's capacity for breakthroughs in innovation and apply those to some of the challenges facing developing countries. If we believe that every human life has equal value, it's unconscionable that there's a 30 to 40-year gap in life expectancy between the United States and many countries in Sub-Saharan Africa.

And to Neal's point about young people. What are young people doing? At Berkeley, I started a program called Big Ideas that provides grants directly to students, and I think some of the ideas that students are coming up with are really phenomenal and this notion of supporting student-led innovation I think is really interesting as well, and I'd be delighted to talk about that.

MS. CHARO: Thank you.

And our last panelist, Kit.

DR. KIT BATTEN: Well, we've heard a lot about climate change and energy and I'm very glad that you brought that up as one of the top three issues. In addition, American competitiveness in industry. And there're real links between those two and what we've done a lot here at the Center for American Progress is to draw those links and also to build upon your last very good point, which I agree with, which is the optimism. If we're going to be placing our emphasis on addressing the problem of global warming by investing in American ingenuity, by investing in innovation, by really taking this problem head-on and being able to create new jobs, transition the way that we power our economy from increasingly expensive, dirty sources of energy to clean sources of energy, it has benefits across the board not just for human health, also for economic growth and opportunity.

We do a lot of work here at the Center for American Progress, too, looking at ways in which addressing climate change and global warming, using science-based facts to alleviate issues related to poverty as well. If we design the policies to implement this low-carbon energy transformation correctly, we can not only grow our economy, but also provide pathways out of poverty for people who have been left behind in the high-carbon energy economy. And that's not just here in the United States, but that's also globally.

So to build upon the point that you just made with respects to international development and global development, one of the main aspects with respect to looking at international negotiations and international agreements about how best to deal with global warming is looking at how developed nations like the U.S., especially if we increasingly invest in research and development of new low-carbon technologies, can help transfer these technologies to developing countries, help alleviate energy, poverty and low-carbon waste and really galvanize this transformation globally.

I just wanted to comment on one other thing because I know we want to get to the discussion with the audience. In terms of the politicization of science, that actually – I finished my Ph.D. in 2004 and one of the reasons I came to Washington is because of the Bush administration's politicization of science. And unfortunately, even though as you've said, more and more Americans do realize that global warming really is a big issue, that's not the case still for politicians. There's still a very big bipartisan divide and there was a *National Journal* poll that was released this morning which polled actual members of Congress and it seems hard to believe, but still 73 percent of Republican members of Congress think that global warming is not proven beyond a doubt as being something that we need to address, and 30 percent of Democrats feel that way.

So there're still a lot of education that needs to happen, a lot of work on really communicating science to policymakers and then building upon that with real science-based policymaking.

MS. CHARO: I want to take just a moment – only because you can't stop me – to make one comment about something that I think is threading through this, and it follows on to what Kit concluded with and what Dr. Lane concluded with, and it's this dilemma about the notion of having policy based on truth and fact because there is actually a problem with the ownership of truth, especially as between the culture of science and the culture of politics. Scientists talk in terms of hypotheses and probabilities, and politics and law tends to move on the assumption that the case is X and we now need to base a policy on it. And the trouble is it's not clear exactly who gets to own that.

But in light of the inherent uncertainty of science, I think we've seen it used to delay things, which is the case of global warming. We've also seen it used to justify absolute falsehoods in the case of the Terry Schiavo controversy and a number of things having to do with reproductive health. And then nationally we've also seen it just blurring the very definition of science and the kind of continued attempts to introduce creationism and so-called intelligent design into the school systems. So somewhere in this conversation, I think, threads through the question of how it is that scientists can actually begin to once again take some degree of responsibility for defining truth for the sake of the political community.

With that, I'd like to open it up to the audience – and, sure, Rick, you get the first question.

Q: Rick Lempert. I'm about to be an emeritus professor at University of Michigan Law School. Like so many here, I think really liked Dr. Lane's speech, but perhaps unlike them I noticed one thing I would call a sin of omission, which I think is important to call attention to. And this is when he generously said that he was not supporting – not only support for the physical sciences, but also for the biomedical sciences. What I wanted to hear was also for the social and behavioral sciences. It's really interesting to me that I've heard four panelists – five people actually speak, poverty, climate change, energy, innovation, problems with study groups at NIH, and now contests over truth – every one of these areas is areas in which social scientists do research, in which knowledge from social science is absolutely necessary to progress and which social science has been historically and woefully underfunded. We don't get for all the social sciences what NIH gets for, you know, one of its institutes.

I spent a lot of time at NSF in that area. I think if – in this case people involved in *Science Progress* in this movement want to advocate for science-based policy and science-based progress, they have to include in their ambit – just make it a habit – to think and to speak of the social and behavioral sciences are the sciences that must be listened to and must be funded if we're going to make any advances.

MS. CHARO: Rick, I'm going to take that more as a challenge than a question. But, Tom, you've worked to try and organized students across disciplines to work on

innovative solutions. Perhaps you've got instincts about the way social science was integrated in those efforts.

MR. KALIL: Well, actually I wanted to sort of take his challenge on head-on, which is I think that – I think one of things that the social science community needs to do is to identify some specific areas where social science can really make a significant contribution. And let me give you a couple of examples that I think are kind of crying out for additional social science.

If you look at the field of education, less than 0.1 percent of the nation's expenditures in K-12 expenditures go to research and development. So there is very little cumulative increase in our understanding about what educational interventions actually improve academic performance, and only a handful of randomized control trials that would allow us to have a rigorous assessment about different interventions. So that's one example.

If you're looking at healthcare expenditures, it seems to me that a lot of the big wins in reducing healthcare costs are going to come from people leading healthier lifestyles. So it's not these \$30 million proton therapy systems that hospitals are now racing to build, it's getting people to lead healthier lifestyles and clearly the behavioral and social sciences should have something to say about what programs actually lead to improvements in wellness.

So I think that if the social science community could just say not just give us more money, but to say here are five to ten important problems that policymakers care about where additional research in social and behavioral sciences, I think that would be part of making the case for that.

MS. CHARO: Actually, Rick, if I may, just because there might be some other people and our time is so terribly short, but people are going to be up here afterwards. You could follow up and torment them then.

In the back?

Q: Howard Bernstein, independent. In terms of science and ethical scientific exploration, isn't it important that science be done under the rubric of our national values? And one of those important pieces of founding documents in the Declaration that we're all created equal, endowed with life, liberty, pursuit of happiness and how that should impact how we think about scientific research, particularly, for instance, embryonic stem cell research – not opposed to stem cell research in general or adult stem cell research or research that doesn't, you know, where you don't have to address issues of are you destroying nascent human life, but particularly embryonic stem cell research and DNA testing. I mean, I think there is important DNA and genetic science that can go on, but the potential for moral problems if used in the wrong way and if –

MS. CHARO: If I may, because I think we've got somebody here who's just the right person to talk this with you. Kathy, you've worked on the regulation of biomedical innovation for a long time and you called for more attention to regulation, so maybe you

can respond to the question about how one incorporates national values into that regulatory process.

DR. HUDSON: Okay, so we're just going to dodge the stem cell question which you are most expert to address.

So, you know, Americans' values shift over time and the policies that we have in place to sort of govern how, for example, researchers deal with research participants are now very, very old. So in the olden days, it was about how scientists could protect subjects from harm. It wasn't about a partnership, it wasn't about how we worked together to do science, it wasn't about what rights other than not being harmed that the participants had. It was about a paternalistic system in which the researcher had to protect the research subject from harm.

I think we need to really relook at sort of the research – human subject research paradigm in light of new values that we – and we can use social science research to look at what people feel is important. People want information when they participate in research and yet most research studies, especially large population studies, don't give information back to research participants.

So there's a whole area here where I think we sort of got stuck after we did the common rule and we wrote the regs – you know, we were sort of done with that and we have very outdated system in place now governing research. And it is social science research that's going to give us the answer to what do Americans really value and then how do you put that into play in policymaking in real time.

And back to you on stem cells. (Laughter.)

MS. CHARO: Well, I'm only serving as moderator. So first I'd like to ask if there's anybody else in the audience who wanted to talk with our panelists. Yes?

Q: (Unintelligible) – I have a business that provides consults on the ethical – (unintelligible) – to research and I'm not sure if this is a question directed more to you, Kathy, than anybody else. But I'd introduced my question with a little anecdote. It actually goes back to summer of 1944 when Gen. Eisenhower was asked when D-Day was delayed, you know, should we continue to inspect the troops on a daily basis? His response was very simple. The uninspected deteriorate.

So my question is this: what in your view of inspections – this would be regulatory agencies like the FDA – of research involving human subjects impedes the innovations or advances in biomedical research?

DR. HUDSON: And by inspections? I'm not –

Q: Regulatory agencies get out there and look at IRBs and look at investigators and the hint has been that some of that is so officious that it impedes any real advances in research. What are your views about that?

DR. HUDSON: So there have been a number of cases where research institutions or research at institutions have been shut down because paperwork wasn't filed correctly by the IRBs, et cetera, et cetera, and so there is a sort of, you know, over-attentiveness to T-crossing and I-dotting.

There's also this other interesting dilemma we have in human subject research context where we originally put – we had a decentralized system for oversight of research ethics because there is sort of – because there is different regional values. I'm not quite so sure that's true anymore. And on IRBs, you have one lay member and everybody else is associated with the research university. So how are you really getting those regional values instilled?

What happens especially in large multi-center studies is that you have to go through this IRB and this IRB and this IRB and this IRB, and they all have different points of view, not because one's in Georgia and one's in New York and one's in California, but because it just happens to be a different gathering of people. That slows down research. And then you superimpose on it overzealous regulators and you waste money, you slow down efficiency, and you slow down progress.

MS. CHARO: Yes?

Q: (In progress) – a question. I actually want to add to the discussion about social behavioral research that, in fact, I think we need to look beyond just biomedical research and really reach out to some of the physical sciences. For example, I'm working at the National Nanotechnology Coordination Office, where social and behavioral research is informing a lot of our work. There's a large body of research when you start looking at risk perception, risk decision-making, and it's really long-established. So I think part of the struggle that I hear in the room is how do we become more involved and more informed about other disciplines we're unfamiliar with? So I guess I'd like to hear more from the panelists and some suggestions.

MS. CHARO: Drew and Kit, I think this is right up your alleys.

DR. BADEN: I'll let you do it.

MS. CHARO: Put you on the spot.

DR. BATTEN: Well, I think you're absolutely right that interdisciplinary research absolutely must inform policy decisions moving forward. In terms of the different issues that we've raised on the panel so far, we do actually within CAP work quite interdisciplinarily. We've got folks who are working on education, on poverty, on healthcare, on obviously energy and climate change issues, on international security issues, energy security issues, energy poverty, and genocide, et cetera. So we have a whole variety of expertise that we can draw upon and frequently do meet in the microcosm that is the Center for American Progress to try and do a lot of interdisciplinary work.

I know from my experience during graduate school that it is difficult unless you're specifically involved in an interdisciplinary grant, which I was lucky enough to be involved with. I worked as an interdisciplinary graduate research education and training IGERT (ph) fellow, which actually brought me here to Washington, D.C., to do an internship during graduate school on policy work related directly to my dissertation research. So I agree with you. I think that programs like the NSF-IGERT can help with that, but I think that we need more of them and more of them, more cross-disciplinary than even just the IGERT was.

MR. KALIL: And it's worth noting that NSF is willing to – able to fund 20 of those a year and they've got 400 proposals for IGERT. So that just tells you some sense for what the demand is for programs like this and how, given current resource constraints, how few of those NSF has been able to support.

DR. BATTEN: May I say something?

MS. CHARO: Please.

DR. BATTEN: I'm now four years out and I know from the amount of e-mail traffic that I get from NSF tracking my every career move that I know that they're really looking to do more of this and want to see what the impacts are. So I take that as a good sign.

MS. CHARO: Kevin?

Q: Hi, I'm Kevin Finneran with *Issues in Science and Technology*. And there are a number of questions that I think for a progressive group are easy to answer. You know, recognizing that climate change is a danger, recognizing that embryonic stem cell research should go forward and so on. There are also a group of questions that I think are trickier. John Podesta did a piece for us on how we do demonstration projects in energy research in a way that's really effective. It's not a kind of ideological question. Neal and Tom Kalil wrote for us about the nanotechnology initiative and how do we proceed with developing new technology. And how we perceive doesn't really break down simply across ideological lines. There are not enlightened people and know-nothings.

So I wonder what are the other questions that to you are troubling? I mean, assuming that the Democrats are going to sweep everything. What are the questions that remain unanswered and are still going to be – require a lot of effort for us to figure out what to do and how to act on?

MS. CHARO: Who wants to tackle that first?

DR. BADEN: I think first things first and if you really want this research to have an impact, then we have to do something to fix up the decaying – we have a decaying infrastructure everywhere in this country. People say that we're \$1 trillion behind. But in the research infrastructure, we're behind and the kind of buildings that most universities have for this are at least 20 years old and the only universities who can really afford to keep up are the private universities who are spending their endowment, which

they have to spend. But the public universities are getting left behind and three-quarters of all students are in the public universities.

So the research infrastructure is a non-trivial thing, and a 20-year-old lab is most likely obsolete and not capable of being ad hoc fixed up to support these kinds of things. And, you know, it's one thing to have new technology – you know, a couple of really smart people working on new technology, but if they don't have the lab to do it, they're going to go where the lab is and that's a – for instance, a physicist or an engineer, the single most important thing that person – imagine a young person who's just interviewed at a university or a lab for a job and the single most important thing for them is where they do their work.

Yeah, they're interested in the salary and the colleagues and things like that, but they're thinking about getting their work done and making an impact and if they don't have a lab to do their work, they're going to go where that lab is. And we're seeing the rest of the world catching up. It's not just Western Europe. It's Asia, Russia. They're taking people away from the U.S. now and it is happening. And this is not just anecdotal. It's really happening.

So without having the proper infrastructure to support this kind of research – and then, of course, you need the funding and you need the funding to support the young or the starting-up, new individual (PIs ?) you're not going to see this happen. We're just going to fall behind. And yeah, maybe, you know, we'll – statistically we'll have a certain fraction of scientists who will make a certain fraction of the discoveries, but we won't be in the driver's seat like we've been for the last 50 years.

MR. KALIL: So the things that I worry about are, number one, the continued pressure on non-defense discretionary spending. So whoever the next president is, if you look at growing interest payments, growing expenditures on entitlements, the fact that we still have Iraq and Afghanistan to worry about means that the ability of any president to make investments is certainly going to be constrained by a lot of those factors. So that's one thing that I worry about.

You know, as – in the energy area, as we start to move farther downstream and not only do basic research, but demonstration and deployment, I think we have to be mindful of some of the lessons of history and look at some of the things that were not all that successful during the late 1970s. And just as there are market failures, there are also government failures – not enough information captured by particular interest groups.

So I think the question is: how does the government intervene in a way that takes maximal advantage of market forces and not intervene in a way that is susceptible to capture by a particular company or a particular industry?

DR. BATTEN: In terms of the energy challenge and global warming challenge that we face, all of these points are extremely important. I just wanted to also add in addition to technological innovation, we've lost a lot of time with this government not paying a lot of attention in terms of what the impacts of global warming are right here in

the United States and focusing its attention on how best to adapt to the impacts that we've already locked into our future.

So focusing – even getting back to your point on infrastructure, it's not just educational infrastructure, laboratory infrastructure, but also with respect to the infrastructure that powers our nation, our electricity systems, our transportation systems, all these things in addition to how natural systems and ecosystems services are going to be responding to global warming. These are all things that we need research on to better understand and prepare for.

MS. CHARO: I've been given the sign that unfortunately despite other questions, we're going to need to close up, but I can't resist with Kevin, just one very brief comment. You're asking where it is that progressives don't yet know where to go, and there is, I think again a kind of overarching problem with progressives dealing with a conflict between scientific research and civil liberties issues and applications that we find really quite offensive.

We find periodically calls to criminalize areas of science because of fear that they'll be used for eugenic purposes. We worry that biotechnology can be used not only to develop gene therapy, but biological weapons. And there are periodical calls to criminalize areas of science.

I think the progressives really haven't yet grappled completely with whether or not we want to admit to an actual right to do science and focus just on dealing with the troublesome applications, or whether we're going to yield to the call to actually shut down areas of science in the name of values or national security.

I want to thank the members of the panel. I want to reiterate for the audience that after the conclusion of the program, there'll be time to talk with them informally. And I'd like to invite Jon up here to introduce our closing speaker.

(Applause.)

DR. MORENO: So obviously we've scratched the surface of the scratches on the surface, but we intend to have many more *Science Progress* events. We don't think these issues are going to go away and I want to thank especially – but you can go away, you know – (laughter) – but we – Alta was admirably restrained in the moderator role.

I do want to say about the stem cell issue, something Alta and I work on a lot, that actually if you look at surveys of Americans on that issue with respect to American values, you'll find that the vast majority of Americans support embryonic stem cell research and they support work in genetics.

Kathy Hudson's group has done a lot of survey work in this area. What people want is they want accountability, they want the assurance that science is doing their work with integrity. And I think that as progressives we subscribe to both the view that science should go forward, but it needs to go forward by showing the public that it's being done

on a trustworthy way, that evidence is being taken seriously, and that people are being listened to. I think that really people want to be listened to about these issues.

So speaking of being listened to, I think that our next and final and speaker has educated more people about science and the ethics of science in his 15-year career at the *Washington Post* than all the professors in the room have or will collectively. Those of us who have been working in science, science policy, and ethics have spent many hours sitting by the phone after an event has taken place hoping that – will Rick Weiss call me for a comment, please? (Laughs.)

So one of the great transitions in my professional life and personal life is now I get to go down the hall and talk to Rick Weiss. And, as I told Rick, when he was still talking to us about coming to American Progress, for some time at least when he calls people from American Progress, they'll still think he's Rick Weiss of the *Washington Post*. So I'm sure he'll be completely candid about it. So it is just a terrific pleasure for this coming-out party for Rick to introduce him. He is going to be a tremendous asset to not only *Science Progress*, but across the board with his skills in doing investigations and organizing data and in communicating with the lay public. He's going to be a tremendous asset to American Progress, and it's a pleasure to invite him for his maiden voyage, to give his closing remarks.

Rick?

(Applause.)

MR. RICK WEISS: Thank you, Jonathan. I have to acknowledge up front that my plan when I was thinking about this yesterday was to riff a little bit on how much chutzpah *Science Progress* has for having its launch on a Friday 13th. (Laughter.) You know, given the fact that so much of the country – one in ten Americans, according to the Gallup Poll – thinks that this is a jinxed day, and we all have a good laugh about it and move on. And then, of course, all the electricity went off – (laughter) – throughout Washington for the whole morning and we were thinking this thing is finished.

And a lot of people in this group here were looking at me sort of crossed-eyed because they had known what I was going to be up to. I want you to know in my sort of – just because of a leftover habits of my reportorial days, I called the press spokesman at Pepco – (laughter) – late this morning, Bob Dobkin, and I wanted to ask him, you know, what are the facts? Does this happen more on Friday 13ths or not? And he assured me – we went through some of the data – it does not. Friday 13ths happen anywhere from one to three times per year, for those of you who don't know. Blackouts like this happen virtually every day somewhere. The last big one in Georgetown here a few years ago, 160,000 or so people out. It was not a Friday 13th. The biggest one in Europe was on Tuesday 28th. The biggest one in U.S. history was – okay, it was actually it turns out a Saturday 14th, a little close. (Laughter.)

But anyway, I just don't want anyone to get hung up on that false association. And I am really proud to see that *Science Progress* has no fear about this sort of stuff and it does seem symbolically appropriate to taunt the date and do the launch today. I tried to

imagine what it would be like if we lived in a world where there was no superstition or where at least facts or rational thinking of the sort that you'll find in this issue and on the website were the trump superstition on a day-to-day basis.

You know, imagine a world where there was not the superstition where people think that educating about safe sex is going to lead to rampant promiscuity, for example, or a world where the superstition didn't exist that access to the morning-after pill is going to lead women to choose abortion as a means of routine birth control, or the superstition that needle exchange programs aren't going to encourage people to become heroin addicts because now they can do without worrying about infection. The superstition that the earth is 6,000 years old, for example, and that life as we see it today has been like this since the beginning of time, the superstition that Saddam Hussein had weapons of mass destruction. (Laughter.)

I mean, imagine what the world would be like if sort of reason and evidence were really the currency of the day. One of the reasons I'm so happy to be here is that this is a place that has a real commitment to getting that kind of information out and I think we all would agree that there's no question that this sort of education is needed.

A few frightening statistics: half of Americans don't know how long it takes for the earth to circle the sun. Presented with the statement "humans and other living things have existed in their present form since the beginning of time," 42 percent of Americans say, yes, that's true. Virtually every U.S. newspaper has an astrology column today; very few have science columns anymore. It's a shrinking number. It used to be 100 in the late '80s – 100 newspapers – it's down to the high 20s now. The *Washington Post* just killed its science page a month or so ago and shrunk it to a half a page. I'm told that that may itself disappear very soon.

And it's not just Americans who are wallowing in scientific ignorance. There was a poll in Europe back in 1996 that asked the following question. True or false: the difference between a conventional tomato and a genetically-engineered tomato is that the genetically-engineered tomato has genes? (Laughter.) Okay? So 40 percent said true – 1996. Four years later, the question was asked in a poll again. This time 46 percent said true. Trend lines are bad.

Now, I know that CAP is not a science educational institution per se, but it is a place that has been thinking a lot about the problems that are facing this country and I think one of the recurring themes we've heard today is that whether you're talking about healthcare, energy, environment, food security, climate change, science obviously has a huge role to play in our resolution of all of these problems and it's great that CAP is, I think, increasingly recognizing that and looking for inclusion of the scientific component of the solutions to these problems.

And I thought I'd mention just on a personal note one of the things that really makes me especially happy about working at a place like this now that I've made the leap and mention to you one of the great frustrations I had back in my days of newspapering, especially a very political paper like the *Washington Post* where I was part of this very small and sort of – well, I won't say undervalued, but discriminated against or – we were

an odd minority, we science reporters there. The way we kept calling for evidence and everyone else was just quoting whatever a politician said because that was the news because they said it – (laughter) – really? But that’s baloney. Well, that doesn’t apply for this part of the paper.

You know, but in a newspaper, for so many sections of the paper there was just this assumption that if you’re reading that part of the paper, you already knew something about it and there wasn’t an obligation on the part of the reporters in these other sections beyond the science section or the science articles to really explain your terms and talk and define what you’re talking about. Business stories would just have all these business terms thrown in and the assumption is if you don’t get business, then you shouldn’t be reading this section, and if you – it’s just meant for people who are into business.

And, of course, the biggest violator of this rule of actually communicating with your readers was the sports section. It used to just drive me nuts the kind of stuff that was in the sports section. I’ve saved my favorite examples. I’ll read a couple for you. Imagine – I don’t know just reading this cold and trying to figure out what this story is about. These are actual quotes. “Quarterback Reggie Ball took a shotgun snap, bounced in the pocket and unleashed a missile down the center of the field where Johnson had split safeties Jamaal Jackson and Byron Gillespie on a post.” (Laughter.) That wouldn’t get past my editor on a science story.

Or this one. “Followed by hundreds of mud-spattered spectators, Sorenstam started on a back nine, reeled off 13 straight pars, added two birdies and two bogies in her final five holes and posted an even par 71.” I mean, imagine you’re not a golfer aficionado, and setting aside the question of what bogies and birdies and par are, how can the number of par 71 be called even? (Laughter.) You know, but for me, when I would write my science stories, the minute I throw in a word like “amino acid,” all the editors are jumping all over me. Well, you can’t use a word like that. You’ve got to define your terms. And by the time you’re finished defining everything, there’s no room left for the news.

Anyway, this is all to say that one of the things I really like about the products I see coming out of this place, including American Progress is that it’s very democratic in its requirement that you really talk plain English, make some down-to-earth, practical recommendations and make it understandable to everyone, including members of Congress and other policymakers who could benefit from the kind of wisdom coming out. The public that needs to understand these issues better.

And maybe the other benefit besides the fact that it’s actually getting good information out to people who need to hear it is that gradually I think this sort of work, this sort of effort to get good information out, especially with regard to science and *Science Progress* is that it starts to reignite something that I think has really become almost dead in this country, which is just – and a beautiful thing: curiosity. You know, the desire to know. The recognition that it’s fun and pleasurable to learn new things – not only that it’s practical, but that there’s all these interesting stuff going on in the world that we can leverage to our benefit and also just appreciate for its beauty and to learn how to start asking the right questions so that we can start solving all the problems that face us. And

asking the right questions is so important. I know it's important in journalism. I think it's also true obviously in policymaking.

And I thought to just end this I'd tell you one of my favorite little jokes that focuses on a topic of asking the right question. And it has to do with a monk in a monastery – it's a Buddhist monastery who goes up to the abbot and says – you know, they're all supposed to be meditating all the time and achieving enlightenment – and he asks the abbot: is it okay if I smoke a cigarette while I'm meditating? And the abbot says, no, you shouldn't smoke a cigarette while you're meditating because you should be meditating. And he goes back to his cushion to start meditating. He looks around and he sees another monk nearby smoking a cigarette while he's meditating. And he goes up to him and says, I just heard from the abbot we're not supposed to be doing that. And he says, really? The abbot told me it was okay. And he said, really? Well, what did – and the one who's smoking says, what did you ask him? Well, I asked him if it's okay I smoked while I meditate. That's your question? You asked – that's your problem, you asked the wrong question. I asked him if it's okay if I meditate while I'm smoking. He said, yeah, sure. You should be meditating as much as you can. (Laughter, applause.)

So if we keep asking the right questions, maybe we'll finally get the right answers and may we all start implementing them as soon as possible. Thanks. Thanks very much.

(Applause.)

DR. MORENO: So we hope we've left you breathless – not to allude to smoking again – for more science, more science policy, more science progress. I want to specifically say that the events team – Marlene, Suzie, Tyler, others, the interns – really worked hard on this event and actually it was the events group that thought of the idea of having a sort of mini-science fair in the beginning, therefore making their lives a lot harder. So I want to express our gratitude to you, to everybody who works behind the scenes to make this possible at American Progress. To our wonderful keynoter, Dr. Lane, thank you for flying up from Texas for this, getting your visa stamped from Texas for this; our panel; and Rick Weiss.

We will look forward to continue this conversation with you for a long time to come. And thank you for coming out today and thanks to the electricity for coming back on. Thank you.

(Applause.)

(END)