THE BROOKINGS INSTITUTION

OPPORTUNITY 08:

ENERGY CHALLENGES FOR THE NEXT PRESIDENT

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Introduction:

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P R O C E E D I N G S

MR. ANTHOLIS: Welcome to Brookings and to our opportunity 08 Series for those of you who are new to an Opportunity 08 event. Opportunity 08 is Brookings' effort started in 2007 and will extend through the end of the election this year to put forward ideas that the next President should take seriously, if not act on. And one of the top issues that we've – we've addressed issues across the range of public policy issues that we do here at Brookings from domestic and state and local issues to national and international ones.

And one of our priorities has been energy security and climate change and we're thrilled today to pull together another event that

regard and our keynote speech in that event, in today's event is from Senator Lamar Alexander.

Senator Alexander as most of you know chairs the Senate Republican Conference and therefore is a key player in the Senate leadership on the Republican side and he serves on committees overseeing education, clean air, highways, science, appropriation, and the Tennessee valley Authority. Almost all of which if not all are critical in addressing this complex set of challenges. He is the only Tennessean ever popularly elected both Governor and U.S. Senator.

I'll say a few more remarks about Senator Alexander and then we'll have a panel discussion following his comments. He'll take some questions and answers and then we'll do a panel discussion with Brookings experts who have written for the Opportunity 08 Project.

As most of you also know, Senator Alexander has been the U.S. Education Secretary, President of the University of Tennessee and professor at Harvard's Kennedy School of Government. He chaired the National Governor's Association and President Reagan's Commission on the Americans Outdoors. And being an American Outdoor he walked almost a thousand miles or over a thousand miles across Tennessee in his now famous red and black plaid shirt and a useful model for those looking to conserve energy and address global warming. He then once

elected he helped Tennessee become the third largest auto producer and for those that might wonder whether that's contributed to this problem, he is a leader and as he'll talk today has been a leader in calling for advanced technologies to address this set of issues.

He's the first Tennessean elected to consecutive four year terms as Governor. And he started Tennessee's Governor School for Outstanding Students among his many accomplishments. The Senator today will be talking about energy security in the broadest context and his remarks today are part of an effort that's he's worked on in a bipartisan way, true to the Brookings' spirit of not just high quality but also independence and impact. So with that I want to introduce Senator Lamar Alexander.

SENATOR ALEXANDER: Thank you very much. I'm delighted to be invited to Brookings to discuss energy independence. I want to congratulate for the work that Brookings has been doing, the large number of people here. I had breakfast with David Sandalow the other day because I had been reading his book which I think is very useful on this subject. And I'm looking forward in an unSenatorial-syle to staying around and listening and learning to what some of the rest of you have to say after you get through with me here this morning. So thank you for the invitation.

In 1942 President Franklin Roosevelt invited a bipartisan group to the White House for a secret briefing. After it was over he asked the Chairman of the Appropriations Committee of Tennessee and named Kenneth McKellar if he could hide $2 billion in the budget for a secret project to win the war. Senator McKellar said that should be no problem Mr. President, but I just have one question, where in Tennessee do you want me to hide it?

That place turned out to be Oak Ridge, which was one of three secret cities along with Hanford and Los Alamos that led to the Manhattan Project. The purpose of the Manhattan Project was to find a way to split the atom and build a bomb before Germany did so the United State could win World War II. Nearly 200,000 people worked secretly in 30 sites in three countries. President Roosevelt's $2 billion Appropriation hidden in the Appropriations Bill by Senator McKellar would be about $24 billion in today's dollars.

New York Times science reporter William Lawrence said into the bomb's design went millions of man-hours of what is without doubt the most concentrated intellectual effort in history. Last Friday I addressed a group of about 200 scientists and managers at the Oak Ridge National Laboratory and I proposed that the United States should launch a new Manhattan Project. A five-year project to put America firmly on the path to

clean energy independence; instead of ending a war the goal would be clean energy independence so that we can deal with rising gasoline prices, electricity prices, clean air, climate change, and national security for our country first and because other countries in the world have the same urgent needs and therefore will adopt our ideas for the rest of world.

Now by independence I do not mean that the United States would never buy oil from Mexico or Canada or Saudi Arabia. By independence I do mean that the United States could never be held hostage by any other country for our oil supplies. In 1942 many were afraid that the first country to build an atomic bomb could blackmail the rest of the world. Today countries that supply oil can blackmail the rest of the world.

Some people have trouble with the word independence when we talk about energy independence. I think they need to consult a dictionary. Independence doesn't mean that you go out on some desert islands and never talk to anybody. Independence in the dictionary sense means you're not controlled by someone else. So in my discussions with the scientists in Oak Ridge on Friday, they already comfortable with the idea of clean energy and independence and when I talk with people in Tennessee and other places, they're comfortable with the idea, too of not being held hostage. So I think the three world goal, Clean Energy

Independence, is the right goal. It focuses on the environment, that's clean. On energy, that's our subject. And independence, which is the objective here.

A new Manhattan Project is not a new idea, but it's a good idea and it fits the goal of clean energy independence. The Apollo Project to send a man to the moon was a kind of Manhattan Project.

Presidential candidates John McCain and Barack Obama and many other have called for a new Manhattan Project on energy. They just haven't said exactly how to do that. What I'd like to do today and with the address I made in Oak Ridge on Friday is to begin to flesh in what a new Manhattan Project would look like. Newt Gingrich, Howard Dean, Senator Collins, Senator Bond, many have had the idea of a new Manhattan Project; it's time to get busy with what we mean by that. And through the two years of discussions that many of us had with the America Competes Act -- it passed in 2005 which is the blueprint that Congress passed to maintain America's competitiveness in the world -- many suggested during those discussions that we should focus that on energy independence because a focus on energy independence would actually force the kind of investments that we need to maintain our competitiveness in the United States.

The overwhelming challenge in 1942 was that Germany

would build a bomb before we did. The overwhelming challenge today, according to the National Academy of Sciences President Ralph Cicerone in his address two weeks ago to the Academy's annual meeting is to discover ways to satisfy the human demand for and use of energy in an environmentally satisfactory way and an affordable way so that we're not overly dependent on overseas sources.

Most of us know the statistics Cicerone repeated them in his address. We pay $500 billion overseas for oil, that's $1600 for each one of us. Some of it to nations that are hostile to us, some of them that are funding terrorists that are trying to kill us. It's half our trade deficit. It's forcing gasoline prices to $4 a gallon. It's crushing family budgets. And then there are the environmental consequences. If worldwide energy use continues to grow as it has, humans will inject as much CO2 into the air from fossil fuel burning between 2000 and 2030 as they did between 1850 and 2000. There's plenty of coal to help achieve energy independence but there is no commercial way, yet, to capture and store so much carbon from so much coal burning. And we haven't finished the job of controlling sulfur, nitrogen, and mercury emissions.

There are several reasons why I believe the original Manhattan Project model fits the idea of a Manhattan Project for clean energy independence. The original Manhattan Project had to proceed as

fast as possible along several tracks to reach its goal. According to a young engineer at Los Alamos the entire project was being conducted using a shotgun approach. Trying all possible approaches simultaneously without regard to cost to speed to a conclusion. It needs Presidential focus and it needs a bipartisan support in Congress. It needs the kind of centralized gruff leadership that General Lesley Groves of the Army Corps of Engineers gave the first Manhattan Project.

The first Manhattan Project mobilized the brightest scientist of several countries, it drafted some of the major corporations in America like Tennessee Eastman, Union Carbide, others and it was run by the Army that's one reason it succeeded. It needs to break the mold as Dr. Oppenheimer told Los Alamos in 1945 about their work then. Clean energy independence is too revolutionary to consider in the framework of old ideas and both that project and the new one needs to start with a small diverse group of great minds.

There are some lessons, too from the America Competes legislation that I mentioned a little earlier. Remember how it happened. Just three years ago in May 2005 a bipartisan group of us from Congress asked the National Academies to tell the Congress the ten things we need to do to keep our brain power advantage so we could keep our jobs from going overseas. I remember saying to the Academies at that time, most

ideas in Washington, D.C. fail for lack of the idea and if they would just give us the ten things we needed to do that consensus would make it possible for us to succeed. By October, Norm Augustine a member of the National Institute of Engineering had assembled a small group of great minds including Nobel laureates, university presidents. They gave us 20 things to do. And then the Congress worked on it for two years in our usual messy way, but we ended up with legislation that was sponsored by the Republican leader and the Democratic leader. Through a change of political parties, it still was sponsored by the Republican and Democratic leader. Seventy senators co-sponsored and it put us on a path of double funding for the Physical Sciences over the next ten years and do a number of other things.

Some say that an election year is not a good time to try to move in a bipartisan way on such a big project. I can't think of a better time. I mean voters expect Presidential candidates and candidates for Congress to come up with solutions for $4 gasoline, clean air, and climate change, and the National Security implications of all that. John McCain, for example is dedicating this week to such discussion. The people didn't elect us to take a vacation just because there's a Presidential election in November. So we've already tried to combine the idea of the Manhattan Project with the model that we used with America Competes.

I'm spending a little bit of time on process here, that may not be as interesting to people outside Washington but those who know Washington know that process is often policy and it's very important. So I visited with Senator Jeff Bingaman and Senator Domenici and Lisa Murkowski or the senior members of the Energy Committee in the Senate and they are the ones who Senator Bingaman and Domenici worked, made a major effort in the America Competes Act keeping it bipartisan. With me in Oak Ridge on Friday were Congressman Bart Gordon, the Democratic Chairman of the House Science Committee who is also very involved in America Competes and Zack Wamp, a senior appropriator.

So we are off to that kind of a start and my goal is that we could find a way to take the ideas that I'm outlining here and that others have outlined and come to a consensus about it in about the same period of time that we did three years ago with America Competes. That would mean that by October there would be a consensus of ideas, and a group of us in support of the ideas and the new President and the new Congress could go to work.

The National Academies had its own study going on. You at Brookings have been doing a lot of work as well, but the important thing is to get it together, otherwise you know what will happen: Each of us in Congress, more than 500, will say, well, my uncle's got a great idea up in

his attic, let's put $400,000 behind it, and we'll all be going off in a hundred directions and we will still be paying $4 for gasoline, we'll still have a problem with clean air and climate change, and we'll still have a lot of national security problems because we're being held hostage, in effect, by other countries who have the oil.

So how to proceed. When I talked to Senator Bingaman about the idea of a new Manhattan Project, he thought for a moment. He said, "Maybe, maybe this is a little different. Maybe we need many Manhattan projects," and he suggested the recent speech by Chuck Vest, the former M.I.T. president who's head of the National Institute of Engineering, who suggested 14 grand challenges for the 21st century for engineering, three of which had to do with energy.

I think that Senator Bingaman and Chuck Vest are right. Congress doesn't do comprehensive well. We proved that with the Comprehensive Immigration Bill. Step-by-step solutions or different tracks toward a single goal are easier to digress, have fewer surprises, they often cost less, and, of course, the original Manhattan Project proceeded along several tracks toward one goal.

So here are my criteria for choosing the tracks that we should follow: 1) grand consequences; 2) the United States uses 25 percent of all the energy in the world, so interesting solutions for small

problems with small consequences ought to be part of some other project, real scientific breakthroughs.

There are a lot of things we already know how to do. I mean we know how to drill 50 miles off shore in an environmentally clean way for oil and gas. We know how to build new nuclear power plants. We know how to increase fuel efficiency by 40 percent by 2020, which we just did in Congress.

And I think we should be doing all of those things. But the challenges that I'm going to suggest aren't any of the things that we already know how to do. They would be real scientific breakthroughs that we could make or make substantial progress on in the next five years.

Five years? Why five years? Because we need to get moving. I know we can't be energy-independent in five years, but we can be firmly on the path toward energy independence in five years, and we ought to pick and choose among those opportunities that put us there sooner rather than later.

Family budget is a criteria. Our solutions need to fit the family budget. We can come up with grand ideas that double the price of gasoline and double the price of electricity, run all our jobs overseas and put more of us on the welfare line. That's not a big success. The family

budget has to be front and center as we compare options and as we consider cost and consensus.

The Augustine Group working on America Competes left off some very germane topics like excessive litigation because they knew they probably couldn't agree and the Congress couldn't either So they picked 20 things they could agree about and they thought we could, and as a result we were able to agree on most of them.

So here's where I'd like to ask your help, that at Brookings and the National Academies or others who may be working on this, rather than have members of Congress come up with out favorite idea or even ask scientists to set policy yourselves, I think we ought to have a discussion for a few weeks about what ought to be the grand challenges that we focus on for the next five years, and I want to quickly offer seven for consideration, seven grand challenges that the Congress and the Federal Government should take over the next five years so that we will be firmly on a path toward clean energy independence:

One: Make plug-in electric cars and trucks commonplace. Most of you probably remember H. Ross Perot. Most of you have probably forgotten how he made his money. He was in Dallas in the 1960s and he noticed that the banks were, when they shut their doors at 5 o'clock, were also turning off their big new computers.

So Perot went to the banks and said, "May I buy your idle computer time at night?" And the bank said yes. Then he went to states like Tennessee -- this is before I was governor -- and said, "May I manage your Medicaid data?"

And they said yes. And so the banks made a little more money, and the state saved a little money, and Perot made a billion dollars.

Now, what does that have to do with energy independence? The idle nighttime bank computer capacity in the 1960s reminds me of the idle nighttime power plant capacity in the 21st century. This is why: The Tennessee Valley Authority where I'm from, produces about three percent of all the electricity in America. It has seven or eight thousand megawatts.

That's seven or eight nuclear power plants' worth of unused electric capacity most nights that, if we were to make an inventory of the Tennessee Valley and make a list of our largest unused asset, it would probably be seven or eight thousand nuclear power plants' worth of unused electrical capacity at night. That's an enormously valuable asset.

Second: Beginning in 2010 Nissan, Toyota, General Motors, and Ford will sell electric cars that can be plugged into wall sockets. Fed Ex based in Memphis is already using electric hybrid delivery trucks. TVA could offer -- other utilities are -- smart meters that would allow its nine million customers to plug in their vehicles at night to fill up "on electricity"

for only a few dollars in exchange for the customer agreeing to pay more for electricity used between 4 o'clock and 10 o'clock when the grid is especially busy.

Add to that that 60 percent of Americans drive less than 30 miles each day, those Americans could drive a plug-in electric car or truck without using a drop of gasoline. By some estimates there's so much electric capacity in power plants at night that over time -- and this would take a long time -- we could replace three-fourths of our light vehicles with plug-ins. That could reduce our overseas oil bill from $500 billion to $250 billion and do it all without building one new power plant.

In other words, we have the plugs, the cars are coming. All we need is the cord. Is this too good to be true? Haven't United States presidents back to Nixon all promised a revolutionary car? Well, times have changed. Gas is $4, we're mad about sending $500 billion overseas and the consequences that flow from that every year. We're worried about climate change, we're worried about clean air, and we already have one million hybrid cars that consumers have bought and are waiting in line to buy even without the plug-in.

Down the road is the prospect of a hydrogen fuel cell hybrid vehicle with two engines neither of which uses any gasoline. There are obstacles, true. Expensive batteries is a big one. Maybe they'll add,

David Sandalow says, eight to eleven thousand dollars per car, but I rode on the airplane today from Knoxville sitting next to the Director of the Materials Laboratory at Oak Ridge, who was at my speech on Friday. He says within five years with the appropriate amount of research we ought to have 150-watt-hour per kilogram battery that would produce 80 miles on a single electric charge.

Carlos Ghosn has said Nissan plans by 2012 to sell cars that do that without a hybrid battery on electric charge.

Smart metering is not widespread. There will be increased pollution from coal plants at night, that's true, but we know how to get rid of the sulfur, nitrogen, mercury from coal plants, and we should do it anyway. So that may be an area where the Federal Government needs to help, and that leads us to the next grand challenge, one of those from the National Institute of Engineering, and that is to make carbon capture and storage a reality for coal-burning power plants.

There may be other solutions than capturing and putting underground the carbon from coal plants, but, interestingly, the National Resources Defense Council, which is a pretty tough environmental group, has argued to me that after conservation a coal solution is the better solution for clean energy independence because it provides for the growing power needs of the United States, and if we adopt a way of

creating electricity from coal that doesn't produce nitrogen, sulfur, mercury, or carbon in any significant quantities, then the rest of the world will do it as well.

The third suggestion challenge, make solar power cost competitive with power from fossil fuels. This is the second of the National Institute of Engineering's grand challenges. Solar power despite 50 years of trying produces 1/100th of one percent of our electricity. The cost of solar panels averages $25-to-$30,000, and the electricity produced for the most part can't be stored back to the battery issue.

Now there's more promising research, and at least one utility has contracted to build a solar thermal power plant which captures the sunlight using mirrors, turn heat into steam, and stores it underground until the customer needs it. If that turns out to be commercially useful, that will be a major breakthrough.

Four. Safely reprocess and store nuclear waste. Nuclear plants provide 20 percent of America's electricity but 70 percent of our clean electricity: That is no carbon, no sulfur, no nitrogen, no sulfur [sic.] The most important breakthrough needed so that we can build more new nuclear power plants is to find a way to deal with the nuclear waste. A political stalemate has stopped nuclear waste from going to Yucca Mountain in Nevada. We got $15 billion already collected from ratepayers

just sitting in a bank that was supposed to be for that purpose. Recycling could reduce the waste by 90 percent creating less stuff to store, but finding a way to deal with this is important.

The Oak Ridge scientists told me on Friday that a reasonable goal for nuclear power would be to add five or six new plants a year over the next 40 years. That would get up to close to 200 more power plants, but would only get us to about 30 percent of all the electricity that our big economy needs. I think it's very important in discussing clean energy independence that we realize we're not on some desert island, and a single solar panel and a windmill are not going to cut it for the needs of this country. We need large amounts of clean energy. That's one way to do it.

Five. Make advanced biofuels cost competitive with gasoline. There's a big backlash right now toward ethanol from corn because of its effect on food prices, and that reminds us of the great law of unintended consequences when issuing all these grand challenges. But ethanol from cellulosic materials, which could be described as things we grow that we don't eat, show great promise and within the next five years could make a bit difference. So the focus on advanced biofuels would be on crops we don't eat instead of crops we do eat.

Two more grand challenges. Make new buildings green buildings. Japan believes it may miss its 2012 Kyoto goals for greenhouse gas reductions primarily because of energy wasted by inefficient buildings. We know most of the technologies to do this. Figuring out how to accelerate their use in a decentralized society is most of this grand challenge.

Someone asked me Friday, "Well, why do you limit it just to new buildings?" Well, we don't have to limit it to new buildings but retroactive is always harder to do, and it seemed to me that if we just found a way to make new buildings green buildings, that would be a significant accomplishment.

And then, finally, provide energy from fusion. Arguably, this doesn't belong on a list that has anything to do with the next five years. This is the idea of recreating on earth the way the sun creates energy and using it for commercial power. It's the third grand challenge of the National Institutes of Engineering, and it's probably a long way away, but the promise of sustaining a controlled fusion reaction for commercial power generation is so fantastic that our five-year goal should be to do everything we can do in five years to reach the long-term goal. And the Congress' failure to approve the President's request for the United States'

continued participation in the international project to do this is embarrassing.

This country of ours is a remarkable place. Even during this economic slowdown, this year we will produce about 30 percent of all the wealth in the world for just the five percent who live here, five percent of all the people in the world who live in the United States. Despite the gathering storm, of concern about America's competitiveness, no other country approaches our brainpower advantage.

The collection of great research universities, we don't just have some of them, we have almost all of them: the collection of great laboratories like Oak Ridge and Los Alamos and others, and the great private sector companies, all of which were brought together in the original Manhattan Project and could be brought together through the right kind of leadership in this one.

These are precisely the ingredients that America needs during the next five years to place ourselves firmly on the path to clean energy independence, and to achieve that independence within a generation, and in doing so to make our jobs more secure, to help balance the family budget, to make our air cleaner and out planet safer and healthier, and to lead the world to do the same.

Thank you.

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