fulfilled a promise I made to the members of the Sutherland Springs community after the deadliest shooting in Texas history.

On November 5, 2017, a deranged gunman opened fire in the First Baptist Church in Sutherland Springs, killing 26 people and rocking our entire State to its core.

The gunman had a criminal record, a record of violence and mental illness. He had been convicted of domestic violence while serving in the military and by law should not have been able to purchase or possess a firearm, but the National Instant Criminal Background Check System, known as NICS, did not have a record of his crimes because they had not been transmitted by the U.S. Air Force to the FBI. In the wake of that tragedy, it is hard to rid your mind of the what-ifs. What if his criminal record had been uploaded to the NICS database? What if he had not been able to purchase a gun? For the friends and family of those lost that day, those questions are almost too tough to ask because they know the answer: Their loved ones might still be alive today.

Sadly, there is nothing we can do to bring back the loved ones they lost that day, but I knew there was something we could do to prevent other families and communities from experiencing that sort of pain, grief, and loss. Less than 2 weeks after the tragedy, Senator MURPHY from Connecticut and I introduced the Fix NICS Act to prevent these systemic failures from happening again. This legislation penalizes Federal Agencies that fail to properly report relevant crimes and incentivizes States to improve their reporting.

These sorts of commonsense reforms gained broad bipartisan support. In fact, there were 77 cosponsors here in the Senate alone, including both the majority and minority leaders, something of a rarity in my experience. It also gained the support of a diverse group of national organizations, from the National Rifle Association to the National Coalition Against Domestic Violence, the Fraternal Order of Police, and the National Shooting Sports Foundation. When President Trump signed this bill 1 year ago, it marked the strongest update to the background check system in a decade.

I appreciate the support of my colleagues for this legislation. What we were able to demonstrate is that Congress can work in a bipartisan way to address a problem if we just put our minds to it. I appreciate the support of the Sutherland Springs community in the wake of the tragedy, something they are still feeling even today. I am confident that this legislation will help to save lives and make our communities safer.

I yield the floor.

The PRESIDING OFFICER. The Senator from Tennessee.

NEW MANHATTAN PROJECT FOR CLEAN ENERGY

Mr. ALEXANDER. Mr. President, I believe climate change is real. I believe that human emissions of greenhouse gases are a major cause of climate change, and I believe the Democratic plan for climate change, which the Senator from Texas just spoke about—the Green New Deal—is so far out in left field that not many are going to take it seriously.

So as one Republican, I am here today to propose this response to climate change, which is that the United States should launch a New Manhattan Project for Clean Energy, a 5-year project with 10 grand challenges that will use American research and technology to put our country and our world firmly on the path for cleaner, cheaper energy.

Meeting these grand challenges would create breakthroughs in advanced nuclear reactors, natural gas, carbon recapture, better batteries, greener buildings, electric vehicles, cheaper solar power, and fusion. To provide the tools to create these breakthroughs, the Federal Government should double its funding for energy research and keep the United States No. 1 in advanced computing. This strategy takes advantage of the United States' secret weapon—our extraordinary capacity for basic research and especially in our 17 National Laboratories. It will strengthen our economy. It will raise family incomes.

This strategy also recognizes that when it comes to climate change, China, India, and other developing countries are the problem. American innovation is the answer. According to the Global Carbon Project, over the last 13 years the United States has reduced production of greenhouse gases more than any other major country. Let me say that again. According to the Global Carbon Project, over the last 13 years the United States has reduced production of greenhouse gases more than any other major country. But over the last 5 years, China and its carbon emissions have risen. The U.S. reduction is largely thanks to conservation and switching from coal to natural gas in the production of electricity.

This is the way a California physicist explains it: Our mothers told us as children to clean our plates because children in India were starving. Now, cleaning our plates was a good thing for us to do, but it didn't do much for starving children in India. In the same way, reducing carbon emissions in the United States is a good thing to do, but it doesn't do much to address climate change because most of the increase in greenhouse gases is in developing countries. If we want to do something about climate change, we should use American research and technology to provide the rest of the world with tools to create low-cost energy that emits fewer greenhouse gases.

The purpose of the original Manhattan Project during World War II was to find a way to split the atom and build a bomb before Germany could. The New York Times described this as the ''most concentrated intellectual effort in history.'' Instead of ending a war, the goal of the New Manhattan Project will be to minimize the disruption on our lives and our economies caused by climate change, to clean the air, and to raise family incomes, both in our country and in the rest of the world, by creating large amounts of reliable, clean, inexpensive energy.

Can a New Manhattan Project accomplish such bold breakthroughs in just 5 years? Well, take a look at the last 5 years. Carbon emissions from energy consumption are down by 230 million metric tons. The number of electric vehicles has doubled and so has the median driving range per charge. The utility scale cost of solar power has been nearly cut in half. The number of homes has risen by 4 percent, but household energy usage has decreased by 10 percent. We lost and then we reclaimed the No. 1 spot in supercomputing. The cost of natural gas has been cut in half, and the percent of electricity provided by natural gas has increased from 27 percent to 35 percent. And that is all in the last 5 years.

I will not spend time in these remarks debunking the Green New Deal because so many others have so effectively already done that. Basically, the Green New Deal is an assault on cars, cows, and combustion. With nuclear power available, its strategy for fighting climate change with windmills makes as much sense as going to war in sailboats. As a bonus, and as the Senator from Texas outlined, it throws in free college, a guaranteed job with a government-set wage, and it would take away private health insurance on the job from 170 million Americans, and no one has any earthly idea what it will cost taxpayers.

You don't have to believe that humans cause climate change to believe in the New Manhattan Project for Clean Energy, and you don't have to be a Republican. Hopefully, the New Manhattan Project for Clean Energy can become a bipartisan proposal. Many of its 10 grand challenges have been proposed by the National Institute of Engineering and the National Academy of Sciences. At different times, Barack Obama, John McCain, Newt Gingrich, and Howard Dean have all called for a Manhattan Project for new energy sources.

These are the 10 grand challenges:

First is advanced nuclear. Ninety-eight nuclear reactors produce 60 percent of all carbon-free electricity in the United States. There has never been a death as a result of an accident at one of these reactors. The problem is that in competition with natural gas and coal, these reactors cost too much to build and some of them cost too much to operate. According to the Energy Information Administration, 11 reactors may shut down over the next 5 years. Building the Vogtle nuclear plant in Georgia—the only two new reactors being built in the United States—could cost as much as $27.5 billion. Building two natural gas plants to

create the same amount of electricity would cost less than $2 billion. We need to stop talking about advanced reactors and actually build something. Within the next 5 years, we need to build one or more advanced reactors to demonstrate the capabilities they may bring—lower costs, increased safety, and less nuclear waste.

Natural gas. During the 1980s, American enterprise and technology created a new, cheaper way to produce natural gas in the United States. This helped our country lead the world in reducing carbon emissions because natural gas has about half the carbon emissions as a typical coal plant. Continuing to develop new combustion technologies will make natural gas-fired electric generation more efficient and further reduce carbon emissions.

Next is carbon capture. This is really the holy grail of clean energy. Coal is cheap. There is a lot of it. Already we know how to capture sulfur, nitrogen, and mercury from coal plants to clean the air. We have seen that happen in Tennessee. If we can figure out a way also to capture carbon at a cheaper cost and find large-scale uses for its byproduct—for example, CO_2 to ethanol—coal could be used everywhere in the world. The Natural Resources Defense Council has argued that after conservation, coal with carbon capture is the best option for clean energy.

Next is better batteries. The all-electric Nissan Leaf that I bought in 2011 had a hard time getting me from the Capitol to Dulles airport and back. Its range was about 70 miles. Today, the Nissan Leaf can travel 226 miles on one charge. A Tesla Model S can travel 335 miles on one charge. The price of lithium-ion batteries should fall another 45 percent during the next 5 years. Better batteries can also one day allow utilities and their customers to store large amounts of electricity during nonpeak hours.

Greener buildings. Despite considerable recent progress, this is still the real low-hanging fruit. Residential and commercial buildings still consume 39 percent of U.S. energy.

The next grand challenge is electric vehicles. Ten years ago there were no mass-produced electric cars on United States highways. Today there are 1 million, and you read in the paper almost every day about a major automaker making a large investment to make millions more.

Cheaper solar. Solar power has grown by 1,500 percent since 2011, but it still accounts for only about 2 percent of U.S. electricity. The new goal for the Department of Energy's SunShot Initiative is to lower the cost of solar another 50 percent to 3 cents per kilowatt hour for utility scale solar.

Then there is fusion. This is the ultimate green energy dream—to make electricity on Earth the way the Sun makes it. Instead of splitting elements, combine them and make clean, almost limitless energy without waste. This is still a dream, but there can be meaningful progress in the next 5 years.

Advanced computing. China, Japan, the United States, and the European Union—all want to be first in advanced computing. The stakes are high because the winner has an advantage in such things as advanced manufacturing, simulating advanced reactors and weapons before they are built, finding terrorists, saving billions of Medicaid waste, and simulating the electric grid in a natural disaster.

The United States regained the No. 1 spot last year in advanced computing, thanks to sustained funding by Congress during both the Obama and Trump administrations, and we need to keep that position.

The final grand challenge is to double energy research funding. Advanced computing is the first tool the New Manhattan Project needs to meet its grand challenges. The second tool is money. It would take $6 billion annually to double funding for the Department of Energy's Office of Science and its 17 National Laboratories, which is where most of our Nation's basic energy research is done. By comparison, many estimate the cost of the Green New Deal in the trillions.

This is a bold agenda and, hopefully, a bipartisan agenda. It is an agenda that can, over the next 5 years, place Americans firmly on the path toward dealing with climate change and at the same time produce large amounts of reliable, clean energy that lifts family incomes in our country and around the world.

Mr. President, I ask unanimous consent that a 2012 op-ed in the New York Times, entitled ''The Conversion of a Climate-Change Skeptic,'' authored by Richard Muller, a professor of physics at the University of California, Berkeley, and, second, an address I made in Oak Ridge, TN, in 2008, which called for a New Manhattan Project for Clean Energy Independence, be printed in the RECORD following my remarks.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

[From the New York Times, July 28, 2012]

THE CONVERSION OF A CLIMATE-CHANGE SKEPTIC

(By Richard A. Muller)

Call me a converted skeptic. Three years ago I identified problems in previous climate studies that, in my mind, threw doubt on the very existence of global warming. Last year, following an intensive research effort involving a dozen scientists, I concluded that global warming was real and that the prior estimates of the rate of warming were correct. I'm now going a step further: Humans are almost entirely the cause.

My total turnaround, in such a short time, is the result of careful and objective analysis by the Berkeley Earth Surface Temperature project, which I founded with my daughter Elizabeth. Our results show that the average temperature of the earth's land has risen by two and a half degrees Fahrenheit over the past 250 years, including an increase of one and a half degrees over the most recent 50 years. Moreover, it appears likely that essentially all of this increase results from the human emission of greenhouse gases.

These findings are stronger than those of the Intergovernmental Panel on Climate Change, the United Nations group that defines the scientific and diplomatic consensus on global warming. In its 2007 report, the I.P.C.C. concluded only that most of the warming of the prior 50 years could be attributed to humans. It was possible, according to the I.P.C.C. consensus statement, that the warming before 1956 could be because of changes in solar activity, and that even a substantial part of the more recent warming could be natural.

Our Berkeley Earth approach used sophisticated statistical methods developed largely by our lead scientist, Robert Rohde, which allowed us to determine earth land temperature much further back in time. We carefully studied issues raised by skeptics: biases from urban heating (we duplicated our results using rural data alone), from data selection (prior groups selected fewer than 20 percent of the available temperature stations; we used virtually 100 percent), from poor station quality (we separately analyzed good stations and poor ones) and from human intervention and data adjustment (our work is completely automated and hands-off). In our papers we demonstrate that none of these potentially troublesome effects unduly biased our conclusions.

The historic temperature pattern we observed has abrupt dips that match the emissions of known explosive volcanic eruptions; the particulates from such events reflect sunlight, make for beautiful sunsets and cool the earth's surface for a few years. There are small, rapid variations attributable to El Niño and other ocean currents such as the Gulf Stream; because of such oscillations, the ''flattening'' of the recent temperature rise that some people claim is not, in our view, statistically significant. What has caused the gradual but systematic rise of two and a half degrees? We tried fitting the shape to simple math functions (exponentials, polynomials), to solar activity and even to rising functions like world population. By far the best match was to the record of atmospheric carbon dioxide, measured from atmospheric samples and air trapped in polar ice.

Just as important, our record is long enough that we could search for the fingerprint of solar variability, based on the historical record of sunspots. That fingerprint is absent. Although the I.P.C.C. allowed for the possibility that variations in sunlight could have ended the ''Little Ice Age,'' a period of cooling from the 14th century to about 1850, our data argues strongly that the temperature rise of the past 250 years cannot be attributed to solar changes. This conclusion is, in retrospect, not too surprising; we've learned from satellite measurements that solar activity changes the brightness of the sun very little.

How definite is the attribution to humans? The carbon dioxide curve gives a better match than anything else we've tried. Its magnitude is consistent with the calculated greenhouse effect—extra warming from trapped heat radiation. These facts don't prove causality and they shouldn't end skepticism, but they raise the bar: to be considered seriously, an alternative explanation must match the data at least as well as carbon dioxide does. Adding methane, a second greenhouse gas, to our analysis doesn't change the results. Moreover, our analysis does not depend on large, complex global climate models, the huge computer programs that are notorious for their hidden assumptions and adjustable parameters. Our result is based simply on the close agreement between the shape of the observed temperature rise and the known greenhouse gas increase.

It's a scientist's duty to be properly skeptical. I still find that much, if not most, of what is attributed to climate change is speculative, exaggerated or just plain wrong. I've

analyzed some of the most alarmist claims, and my skepticism about them hasn't changed.

Hurricane Katrina cannot be attributed to global warming. The number of hurricanes hitting the United States has been going down, not up; likewise for intense tornadoes. Polar bears aren't dying from receding ice, and the Himalayan glaciers aren't going to melt by 2035. And it's possible that we are currently no warmer than we were a thousand years ago, during the ''Medieval Warm Period'' or ''Medieval Optimum,'' an interval of warm conditions known from historical records and indirect evidence like tree rings. And the recent warm spell in the United States happens to be more than offset by cooling elsewhere in the world, so its link to ''global'' warming is weaker than tenuous.

The careful analysis by our team is laid out in five scientific papers now online at BerkeleyEarth.org. That site also shows our chart of temperature from 1753 to the present, with its clear fingerprint of volcanoes and carbon dioxide, but containing no component that matches solar activity. Four of our papers have undergone extensive scrutiny by the scientific community, and the newest, a paper with the analysis of the human component, is now posted, along with the data and computer programs used. Such transparency is the heart of the scientific method; if you find our conclusions implausible, tell us of any errors of data or analysis.

What about the future? As carbon dioxide emissions increase, the temperature should continue to rise. I expect the rate of warming to proceed at a steady pace, about one and a half degrees over land in the next 50 years, less if the oceans are included. But if China continues its rapid economic growth (it has averaged 10 percent per year over the last 20 years) and its vast use of coal (it typically adds one new gigawatt per month), then that same warming could take place in less than 20 years.

Science is that narrow realm of knowledge that, in principle, is universally accepted. I embarked on this analysis to answer questions that, to my mind, had not been answered. I hope that the Berkeley Earth analysis will help settle the scientific debate regarding global warming and its human causes. Then comes the difficult part: agreeing across the political and diplomatic spectrum about what can and should be done.

A New Manhattan Project for Clean Energy Independence

SEVEN ''GRAND CHALLENGES'' FOR THE NEXT FIVE YEARS: PLUG-IN ELECTRIC CARS AND TRUCKS, CARBON CAPTURE, SOLAR POWER, NUCLEAR WASTE, ADVANCED BIOFUELS, GREEN BUILDINGS, FUSION

MAY 9TH, 2008

History

In 1942, President Franklin D. Roosevelt asked Sen. Kenneth McKellar, the Tennessean who chaired the Appropriations Committee, to hide $2 billion in the appropriations bill for a secret project to win World War II.

Sen. McKellar replied, ''Mr. President, I have just one question: where in Tennessee do you want me to hide it?''

That place in Tennessee turned out to be Oak Ridge, one of three secret cities that became the principal sites for the Manhattan Project.

The purpose of the Manhattan Project was to find a way to split the atom and build a bomb before Germany could. Nearly 200,000 people worked secretly in 30 different sites in three countries. President Roosevelt's $2 billion appropriation would be $24 billion today.

According to New York Times science reporter William Laurence, ''Into [the bomb's] design went millions of man-hours of what is without doubt the most concentrated intellectual effort in history.''

The goal: victory over blackmail

I am in Oak Ridge today to propose that the United States launch a new Manhattan project: a 5-year project to put America firmly on the path to clean energy independence.

Instead of ending a war, the goal will 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 have the same urgent needs and therefore will adopt our ideas—for the rest of the world.

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 country for our energy needs.

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 and natural gas can blackmail the rest of the world.

Not a new idea

A new Manhattan Project is not a new idea—but it is a good idea and fits the goal of clean energy independence.

The Apollo Program to send men to the moon in the 1960s was a kind of Manhattan Project. Presidential candidates John McCain and Barack Obama have called for a Manhattan Project for new energy sources. So have former House Speaker Newt Gingrich, Democratic National Committee chairman Howard Dean, Sen. Susan Collins of Maine and Sen. Kit Bond of Missouri—among others.

And, throughout the two years of discussion that led to the passage in 2007 of the America COMPETES Act, several participants suggested that focusing on energy independence would force the kind of investments in the physical sciences and research that the United States needs to maintain its competitiveness.

A new overwhelming challenge

The overwhelming challenge in 1942 was the prospect that Germany would build the bomb and win the war before America did.

The overwhelming challenge today, according to National Academy of Sciences president Ralph Cicerone, in his address last week to the Academy's annual meeting, is to discover ways to satisfy the human demand for and use of energy in an environmentally satisfactory and affordable way so that we are not overly dependent on overseas sources.

Cicerone estimates that this year Americans will pay $500 billion overseas for oil—that's $1,600 for each one of us—some of it to nations that are hostile or even trying to kill us by bankrolling terrorists. Sending $500 billion abroad weakens our dollar. It is half our trade deficit. It is forcing gasoline prices toward $4 a gallon and crushing family budgets.

Then there are the environmental consequences. If worldwide energy usage 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 is plenty of coal to help achieve our energy independence, but there is no commercial way (yet) to capture and store the carbon from so much coal burning—and we have not finished the job of controlling sulfur, nitrogen, and mercury emissions.

The Manhattan Project model fits today

In addition to the need to meet an overwhelming challenge, other characteristics of the original Manhattan Project are suited to this new challenge:

It needs to proceed as fast as possible along several tracks to reach the goal. According to Don Gillespie, a young engineer at Los Alamos during World War II, the ''entire project was being conducted using a shotgun approach, trying all possible approaches simultaneously, without regard to cost, to speed toward a conclusion.''

It needs presidential focus and bipartisan support in Congress.

It needs the kind of centralized, gruff leadership that Gen. Leslie R. Groves of the Army Corps of Engineers gave the first Manhattan Project.

It needs to ''break the mold.'' To borrow the words of Dr. J. Robert Oppenheimer in a speech to Los Alamos scientists in November of 1945, the challenge of clean energy independence is ''too revolutionary to consider in the framework of old ideas.''

Most important, in the words of George Cowan as reported in the excellent book edited by Cynthia C. Kelly, ''. . . The Manhattan Project model starts with a small, diverse group of great minds.''

I said to the National Academies when we first asked for their help on the America COMPETES Act in 2005, ''In Washington, D.C., most ideas fail for lack of the idea.''

The America COMPETES model fits, too

There are some lessons, too, from America COMPETES.

Remember how it happened. Just three years ago—in May 2005—a bipartisan group of us asked the National Academies to tell Congress in priority order the 10 most important steps we could take to help America keep its brainpower advantage.

By October, the Academies had assembled a ''small diverse group of great minds'' chaired by Norm Augustine which presented to Congress and to the President 20 specific recommendations in a report called ''Rising Above the Gathering Storm.'' We considered proposals by other competitiveness commissions.

Then, in January 2006, President Bush outlined his American Competitiveness Initiative to double over 10 years basic research budgets for the physical sciences and engineering. The Republican and Democratic Senate leaders and 68 other senators sponsored the legislation. It became law by August 2007, with strong support from Speaker Pelosi and the President.

Not elected to take a vacation this year

Combining the model of the Manhattan Project with the process of the America COMPETES Act has already begun. The National Academies have underway an ''America's Energy Future'' project that will be completed in 2010. Ralph Cicerone has welcomed sitting down with a bipartisan group to discuss what concrete proposals we might offer earlier than that to the new president and the new Congress. Energy Secretary Sam Bodman and Ray Orbach, the Energy Department's Under Secretary for Science, have said the same.

The presidential candidates seem ready. There is bipartisan interest in Congress. Congressman Bart Gordon, Democratic Chairman of the Science Committee in the House of Representatives—and one of the original four signers of the 2005 request to the National Academies that led to the America COMPETES Act—is here today to offer his ideas. Congressman Zach Wamp, a senior member of the House Appropriations Committee who played a key role in the America COMPETES Act, is co-host for this meeting.

I have talked with Sens. Jeff Bingaman and Pete Domenici, the chairman and senior Republican on the Energy Committee who

played such a critical role in America COMPETES, and to Sen. Lisa Murkowski, who likely will succeed Sen. Domenici as the senior Republican on the Energy Committee.

Some say a presidential election year is no time for bipartisan action. I can't think of a better time. 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 our dependence on foreign oil. The people didn't elect us to take a vacation this year just because there is a presidential election.

So, how to proceed?

A few grand challenges—Sen. Bingaman's first reaction to the idea of a new Manhattan Project was that instead we need several mini-Manhattan Projects. He suggested as an example the ''14 Grand Challenges for Engineering in the 21st Century'' laid out by former MIT President Chuck Vest, the president of the National Institute of Engineering—three of which involve energy. I agree with Sen. Bingaman and Chuck Vest.

Congress doesn't do ''comprehensive'' well, as was demonstrated by the collapse of the comprehensive immigration bill. Step-by-step solutions or different tracks toward one goal are easier to digest and have fewer surprises. And, of course, the original Manhattan Project itself proceeded along several tracks toward one goal.

Here are my criteria for choosing several grand challenges:

Grand consequences, too—The United States uses 25 percent of all the energy in the world. Interesting solutions for small problems producing small results should be a part of some other project.

Real scientific breakthroughs—This is not about drilling offshore for oil or natural gas in an environmentally clean way or building a new generation of nuclear power plants, both of which we already know how to do—and, in my opinion, should be doing.

Five years—Grand challenges should put the United States within five years firmly on a path to clean energy independence so that goal can be achieved within a generation.

Family Budget—Solutions need to fit the family budget, and costs of different solutions need to be compared.

Consensus—The Augustine panel that drafted the ''Gathering Storm'' report wisely avoided some germane topics, such as excessive litigation, upon which they could not agree, figuring that Congress might not be able to agree either.

Seven grand challenges:

Here is where I invite your help. Rather than having members of Congress proclaim these challenges, or asking scientists alone to suggest them, I believe there needs to be preliminary discussion—including about whether the criteria are correct. Then, Congress can pose to scientists questions about the steps to take to achieve the grand challenges.

To begin the discussion, I suggest asking what steps Congress and the federal government should take during the next five years toward these seven grand challenges so that the United States would be firmly on the path toward clean energy independence within a generation:

1. Make plug-in electric cars and trucks commonplace. In the 1960s, H. Ross Perot noticed that when banks in Texas locked their doors at 5 p.m., they also turned off their new computers. Perot bought the idle nighttime bank computer capacity and made a deal with states to manage Medicare and Medicaid data. Banks made money, states saved money, and Perot made a billion dollars.

Idle nighttime bank computer capacity in the 1960s reminds me of idle nighttime power plant capacity in 2008. This is why:

The Tennessee Valley Authority has 7,000–8,000 megawatts—the equivalent of seven or eight nuclear power plants or 15 coal plants—of unused electric capacity most nights.

Beginning in 2010 Nissan, Toyota, General Motors and Ford will sell electric cars that can be plugged into wall sockets. FedEx is already using hybrid delivery trucks.

TVA could offer ''smart meters'' that would allow its 8.7 million customers to plug in their vehicles to ''fill up'' at night for only a few dollars, in exchange for the customer paying more for electricity between 4 p.m. and 10 p.m. when the grid is busy.

Sixty 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 is so much idle electric capacity in power plants at night that over 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 plug. The cars are coming. All we need is the cord.

Too good to be true? Haven't U.S. presidents back to Nixon promised revolutionary vehicles? Yes, but times have changed. Batteries are better. Gas is $4. We are angry about sending so many dollars overseas, worried about climate change and clean air. And, consumers have already bought one million hybrid vehicles and are waiting in line to buy more—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 a drop of gasoline. Oak Ridge is evaluating these opportunities.

Still, there are obstacles. Expensive batteries make the additional cost per electric car $8,000–$11,000. Smart metering is not widespread. There will be increased pollution from the operation of coal plants at night. We know how to get rid of those sulfur, nitrogen, and mercury pollutants (and should do it), but haven't yet found a way to get rid of the carbon produced by widespread use in coal burning power plants. Which brings us to the second grand challenge:

2. Make carbon capture and storage a reality for coal-burning power plants. This was one of the National Institute of Engineering's grand challenges. And there may be solutions other than underground storage, such as using algae to capture carbon. Interestingly, the Natural Resources Defense Council argues that, after conservation, coal with carbon capture is the best option for clean energy independence because it provides for the growing power needs of the U.S. and will be easily adopted by other countries.

3. Make solar power cost competitive with power from fossil fuels. This is a second of the National Institute's grand challenges. Solar power, despite 50 years of trying, produces one one-hundredth of one percent of America's electricity. The cost of putting solar panels on homes averages $25,000–$30,000 and the electricity produced, for the most part, can't be stored. Now, there is new photovoltaic research as well as promising solar thermal power plants, which capture the sunlight using mirrors, turn heat into steam, and store it underground until the customer needs it.

4. Safely reprocess and store nuclear waste. Nuclear plants produce 20 percent of America's electricity, but 70 percent of America's clean electricity—that is, electricity that does not pollute the air with mercury, nitrogen, sulfur, or carbon. The most important breakthrough needed during the next five years to build more nuclear power plants is solving the problem of what to do with nuclear waste. A political stalemate has stopped nuclear waste from going to Yucca Mountain in Nevada, and $15 billion collected from ratepayers for that purpose is sitting in a bank. Recycling waste could reduce its mass by 90 percent, creating less stuff to store temporarily while long-term storage is resolved.

5. Make advanced biofuels cost-competitive with gasoline. The backlash toward ethanol made from corn because of its effect on food prices is a reminder to beware of the great law of unintended consequences when issuing grand challenges. Ethanol from cellulosic materials shows great promise, but there are a limited number of cars capable of using alternative fuels and of places for drivers to buy it. Turning coal into liquid fuel is an established technology, but expensive and a producer of much carbon.

6. 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. Many of the technologies needed to do this are known. Figuring out how to accelerate their use in a decentralized society is most of this grand challenge.

7. Provide energy from fusion. The idea of recreating on Earth the way the sun creates energy and using it for commercial power is the third grand challenge suggested by the National Institute of Engineering. The promise of sustaining a controlled fusion reaction for commercial power generation is so fantastic that the five-year goal should be to do everything possible to reach the long-term goal. The failure of Congress to approve the President's budget request for U.S. participation in the International Thermonuclear Experimental Reactor—the ITER Project—is embarrassing.

Anything is possible

This country of ours is a remarkable place.

Even during an economic slowdown, we will produce this year about 30 percent of all the wealth in the world for the 5 percent of us who live in the United States.

Despite ''the gathering storm'' of concern about American competitiveness, no other country approaches our brainpower advantage—the collection of research universities, national laboratories and private-sector companies we have.

And this is still the only country where people say with a straight face that anything is possible—and really believe it.

These are precisely the ingredients that America needs during the next five years to place ourselves firmly on a path to clean energy 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 our planet safer and healthier—and to lead the world to do the same.

Mr. ALEXANDER. I yield the floor.

I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The legislative clerk proceeded to call the roll.

Mr. MCCONNELL. Madam President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER (Ms. ERNST). Without objection, it is so ordered.

RECOGNITION OF THE MAJORITY LEADER

The PRESIDING OFFICER. The Republican leader is recognized.

MUELLER REPORT

Mr. MCCONNELL. Madam President, yesterday, Attorney General Barr