

**THE AMERICAN ENERGY INITIATIVE, PART 9:
H.R. 909, A ROADMAP FOR AMERICA'S ENERGY
FUTURE**

HEARING
BEFORE THE
SUBCOMMITTEE ON ENERGY AND POWER
OF THE
COMMITTEE ON ENERGY AND
COMMERCE
HOUSE OF REPRESENTATIVES
ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

JUNE 3, 2011

Serial No. 112-57



Printed for the use of the Committee on Energy and Commerce
energycommerce.house.gov

U.S. GOVERNMENT PRINTING OFFICE

72-153 PDF

WASHINGTON : 2012

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512-1800; DC area (202) 512-1800
Fax: (202) 512-2104 Mail: Stop IDCC, Washington, DC 20402-0001

COMMITTEE ON ENERGY AND COMMERCE

FRED UPTON, Michigan

Chairman

JOE BARTON, Texas	HENRY A. WAXMAN, California
<i>Chairman Emeritus</i>	<i>Ranking Member</i>
CLIFF STEARNS, Florida	JOHN D. DINGELL, Michigan
ED WHITFIELD, Kentucky	<i>Chairman Emeritus</i>
JOHN SHIMKUS, Illinois	EDWARD J. MARKEY, Massachusetts
JOSEPH R. PITTS, Pennsylvania	EDOLPHUS TOWNS, New York
MARY BONO MACK, California	FRANK PALLONE, Jr., New Jersey
GREG WALDEN, Oregon	BOBBY L. RUSH, Illinois
LEE TERRY, Nebraska	ANNA G. ESHOO, California
MIKE ROGERS, Michigan	ELIOT L. ENGEL, New York
SUE WILKINS MYRICK, North Carolina	GENE GREEN, Texas
<i>Vice Chair</i>	DIANA DeGETTE, Colorado
JOHN SULLIVAN, Oklahoma	LOIS CAPPS, California
TIM MURPHY, Pennsylvania	MICHAEL F. DOYLE, Pennsylvania
MICHAEL C. BURGESS, Texas	JANICE D. SCHAKOWSKY, Illinois
MARSHA BLACKBURN, Tennessee	CHARLES A. GONZALEZ, Texas
BRIAN P. BILBRAY, California	JAY INSLEE, Washington
CHARLES F. BASS, New Hampshire	TAMMY BALDWIN, Wisconsin
PHIL GINGREY, Georgia	MIKE ROSS, Arkansas
STEVE SCALISE, Louisiana	ANTHONY D. WEINER, New York
ROBERT E. LATTA, Ohio	JIM MATHESON, Utah
CATHY McMORRIS RODGERS, Washington	G.K. BUTTERFIELD, North Carolina
GREGG HARPER, Mississippi	JOHN BARROW, Georgia
LEONARD LANCE, New Jersey	DORIS O. MATSUI, California
BILL CASSIDY, Louisiana	DONNA M. CHRISTENSEN, Virgin Islands
BRETT GUTHRIE, Kentucky	
PETE OLSON, Texas	
DAVID B. MCKINLEY, West Virginia	
CORY GARDNER, Colorado	
MIKE POMPEO, Kansas	
ADAM KINZINGER, Illinois	
H. MORGAN GRIFFITH, Virginia	

SUBCOMMITTEE ON ENERGY AND POWER

ED WHITFIELD, Kentucky

Chairman

JOHN SULLIVAN, Oklahoma	BOBBY L. RUSH, Illinois
<i>Vice Chairman</i>	<i>Ranking Member</i>
JOHN SHIMKUS, Illinois	JAY INSLEE, Washington
GREG WALDEN, Oregon	JIM MATHESON, Utah
LEE TERRY, Nebraska	JOHN D. DINGELL, Michigan
MICHAEL C. BURGESS, Texas	EDWARD J. MARKEY, Massachusetts
BRIAN P. BILBRAY, California	ELIOT L. ENGEL, New York
STEVE SCALISE, Louisiana	GENE GREEN, Texas
CATHY McMORRIS RODGERS, Washington	LOIS CAPPS, California
PETE OLSON, Texas	MICHAEL F. DOYLE, Pennsylvania
DAVID B. MCKINLEY, West Virginia	CHARLES A. GONZALEZ, Texas
CORY GARDNER, Colorado	HENRY A. WAXMAN, California (<i>ex officio</i>)
MIKE POMPEO, Kansas	
H. MORGAN GRIFFITH, Virginia	
JOE BARTON, Texas	
FRED UPTON, Michigan (<i>ex officio</i>)	

C O N T E N T S

	Page
Hon. Ed Whitfield, a Representative in Congress from the Commonwealth of Kentucky, opening statement	1
Prepared statement	3
Hon. Henry A. Waxman, a Representative in Congress from the State of California, opening statement	5
Hon. Fred Upton, a Representative in Congress from the State of Michigan, prepared statement	139
Hon. Joe Barton, a Representative in Congress from the State of Texas, prepared statement	140
Hon. Michael C. Burgess, a Representative in Congress from the State of Texas, prepared statement	141

WITNESSES

Hon. Devin Nunes, a Representative in Congress from the State of California Prepared statement	6 9
David Sandalow, Assistant Secretary for Policy and International Affairs, Department of Energy	17
Prepared statement	20
Thomas Hicks, Deputy Assistant Secretary of the Navy (Energy)	33
Prepared statement	35
Answers to submitted questions	228
Neil Auerbach, Managing Partner, Hudson Clean Energy	54
Prepared statement	57
Jack Spencer, Research Fellow, Nuclear Energy, The Heritage Foundation	71
Prepared statement	73
James T. Bartis, Senior Policy Researcher, Rand Corporation	109
Prepared statement	112

SUBMITTED MATERIAL

H.R. 909, A Bill to expand domestic fossil fuel production, develop more nuclear power, and expand renewable electricity, and for other purposes.	144
--	-----

**THE AMERICAN ENERGY INITIATIVE, PART 9:
H.R. 909, A ROADMAP FOR AMERICA'S EN-
ERGY FUTURE**

FRIDAY, JUNE 3, 2011

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

The subcommittee met, pursuant to call, at 9:05 a.m., in room 2322 of the Rayburn House Office Building, Hon. Ed Whitfield (chairman of the subcommittee) presiding.

Present: Representatives Whitfield, Walden, Terry, Bilbray, Scalise, McMorris Rodgers, Olson, McKinley, Gardner, Pompeo, Inslee, Green, Gonzalez, and Waxman (ex officio).

Staff present: Charlotte Baker, Press Secretary; Patrick Currier, Counsel, Energy and Power; Garrett Golding, Professional Staff Member, Energy and Power; Cory Hicks, Policy Coordinator, Energy and Power; Ben Lieberman, Counsel, Energy and Power; Dave McCarthy, Chief Counsel, Environment/Economy; Carly McWilliams, Legislative Clerk; Mary Neumayr, Counsel, Oversight/Energy; Tiffany Benjamin, Democratic Investigative Counsel; Jackie Cohen, Democratic Counsel; Greg Dotson, Democratic Energy and Environment Staff Director; and Caitlin Haberman, Democratic Policy Analyst; Alexandra Teitz, Democratic Senior Counsel, Environment and Energy.

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

Mr. WHITFIELD. Call the hearing to order this morning, and today is the ninth day in our American Energy Initiative hearing, and today we are going to be discussing a more comprehensive plan to explore ways to produce the necessary energy for the American people.

As you know, when we talk about energy, we talk about electricity as one part of it and transportation and fuel for transportation as the other part of it. We also know that we have a vast amount of natural resources within the borders of the United States of America, and many of us believe that we have not been able to fully explore and produce from those natural resources. And there are many impediments out there to it. We also understand that natural resources here in America alone will not meet all of our demands for the future.

We also recognize that not only must we use fossil fuels, but we have to use renewables, and we need to explore opportunities and more green ways to produce energy for the American people, but we also need to be realistic that by 2035, the amount of electricity, for example, needed in America is going to increase by about 50 percent, and we have to be realistic on recognizing the cost of green energy, how much can it realistically provide, and what will the cost of electricity be for the American people because we find ourselves in a global marketplace in which we are competing with other countries around the world, and our electricity prices and transportation prices have to be competitive if we are going to be sure that businesses expand in the U.S., locate in the U.S., and we create jobs in the U.S.

So I look forward to today's hearing. We have three panels today. On the first panel we have Devin Nunes, a member of Congress from California, who has done extensive work on the energy needs of America and has actually developed legislation to address some of those problems and issues. So I look forward—we look forward to his testimony, and at this time I would like to recognize the gentleman from California for his opening statement. Mr. Waxman.

[The prepared statement of Mr. Whitfield follows:]

**Statement of the Honorable Ed Whitfield
Chairman, Subcommittee on Energy and Power
Committee on Energy and Commerce
June 3, 2011**

**Hearing on “The American Energy Initiative –
A Roadmap for America’s Energy Future.”**

****As Prepared for Delivery****

Today is the 9th day in our American Energy Initiative hearing. The goal of this initiative is to address the nation’s energy challenges, and we believe that the best way to do so is to expand the supply of affordable domestic energy. Unfortunately, much of this energy is either explicitly off-limits, or saddled with excessive regulatory red tape that restricts its potential. Both conventional and alternative energy sources are not being effectively utilized.

Today, we will discuss a comprehensive plan to break this logjam and enhance both the amount and the variety of domestic energy production. It is called “A Roadmap for America’s Energy Future.”

A November 2010 Congressional Research Service report concluded that America has more fossil fuel resources than any other nation on earth. In fact, when you add up the energy content of American coal, oil, and natural gas, it is more than China and Iran combined. The problem is not that the domestic conventional energy isn’t there or that it is running out, it is that too much of it has been locked away.

The Roadmap expands and streamlines the process of energy production in the federally-controlled Outer Continental Shelf. It also opens up Alaska’s Arctic National Wildlife Refuge, America’s single most promising onshore site where an estimated 10 billion barrels lies beneath several thousand acres at the edge of this nearly 20 million acre refuge.

The Roadmap also seeks to encourage the use of our vast reserves of coal to make transportation fuels. It does this by facilitating the construction of the nation’s first coal-to-liquids plant. It also removes the regulatory impediments to the development of oil shale on federal lands in Colorado, Utah, and Wyoming. In addition, the bill eliminates one key regulatory roadblock to these non-conventional sources of petroleum as well as imports of oil sands from Canada - section 526 of the Energy Independence and Security Act of 2007.

America pioneered nuclear power, but over the last thirty years we have been hesitant to expand the use of it. The Roadmap contains provisions for jumpstarting the process of adding new nuclear generation, and does so with an eye towards encouraging state-of-the-art technologies that represent major advancements over plants built decades ago. It also provides for something the federal government currently fails to allow – a solution to long term storage of nuclear waste.

In sum, addressing the nation's many energy challenges will require bold ideas and new thinking across a wide range of domestic energy sources, and I am glad Representative Nunes brought these ideas forward.

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

Mr. WAXMAN. Thank you very much, and Mr. Chairman, today we are holding a hearing on a bill that is titled, "Roadmap for America's Energy Future." Our Nation faces major energy challenges and we need to have a serious conversation about the American energy future. But I am sad to say the legislation we are examining today proposes no innovative solutions to our Nation's energy needs. It doubles down on oil, and it doubles down on old, ineffective policies.

We have seen this roadmap before. This is a recycled version of a plan developed by the secretive Bush-Cheney Energy Task Force and pushed through Congress by Republicans while they were in office. The Bush administration and Congressional Republicans spent 8 years following this roadmap. They pushed oil and gas drilling, onshore and offshore. They expedited permits and weakened environmental protections. They opposed efforts to increase fuel economy. They called for nuclear fuel reprocessing. They tried to greenwash proposals for drilling in the Arctic National Wildlife Refuge by implying congressional appropriators could use royalty revenues to support renewable energy. They pushed the dirtiest alternative and unconventional fuels, coal-to-liquids, oil shale, and tar sands.

And where did they get this—and where did this roadmap lead us? Energy prices soared, and carbon pollution increased. And we have become even more dependent on foreign oil. In the last year of the Bush administration the Energy Information Administration projected that our dependence on oil and oil imports would continue to rise year after year.

Today, we are sending nearly \$1 billion per day overseas for foreign oil. We use 25 percent of the world's oil, but we only have 2 percent of the world's oil reserves. We've worked to increase our domestic crude oil production by nearly 300,000 barrels per day. And yet gas prices remain high.

Increasing oil production is not going to solve our energy needs. Even if we doubled our oil production, oil prices would still be set by world markets and leave us vulnerable to price shocks.

H.R. 909's roadmap doesn't lead to the future. It leads to the past. The technology to turn coal into liquid fuel has been around since World War II. Its problem is as it has always been: huge amounts of carbon pollution that will drive uncontrolled climate change.

American entrepreneurs and inventors are using technology to unlock real energy solutions: energy sources that are clean, safe, and affordable, and grow our economy. In testimony provided to the committee for today's hearing, we will hear that the wind and solar industries will create over 200,000 new jobs. But H.R. 909 would abandon our clean energy future to China. For many reasons it is unlikely to help renewable energy, because of flaws in its reverse auction mechanism.

The bill does nothing on efficiency, which is the cheapest and most reliable new source of supply. It promotes the form of nuclear energy that risks putting nuclear bomb grade material into the

hands of terrorists. It does nothing to develop carbon capture and storage, the technology that coal needs to remain a competitor in a carbon-constrained world.

In 2001, Vice President Cheney said, "Conservation may be a side of personal virtue, but it is not a sufficient basis for a sound, comprehensive energy policy." Ten years later the Republican budget defunds the federal investment in energy conservation and innovation. The rest of the world has been racing ahead over the last decade. It is too bad the Republicans' energy policies have not.

We have seen this roadmap before, and we know where it leads us.

Thank you, Mr. Chairman.

Mr. WHITFIELD. Thank you. At this time I would like to recognize Congressman Devin Nunes for his opening statement regarding his legislation, and Congressman, we are delighted you have come before the subcommittee, and we look forward to your testimony, and thank you for being here.

STATEMENT OF HON. DEVIN NUNES, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. NUNES. I do appreciate that, Mr. Chairman and Ranking Member, for allowing me to testify here today. It is an honor to be before the Energy and Commerce Committee. In fact, I have never been before the Energy and Commerce Committee before, so it really is an honor and a privilege for me to be here today.

Our Nation has been blessed with great abundance of natural resources. Consider these astounding facts. ANWR potentially contains 10 billion barrels of oil, the Outer Continental Shelf is estimated to hold 85 billion barrels of oil and 420 trillion cubic feet of natural gas, and over two trillion barrels of oil are held in oil shale deposits, more than are contained in all of the countries in the Middle East combined. Additionally, our Nation has nearly 250 billion tons of recoverable coal reserves, which is the estimated equivalent of 800 billion barrels of oil and constitutes more than three times Saudi Arabia's proven oil reserves.

Unbelievably, our government has chosen not to utilize these resources fully, despite the repeated promises to achieve energy independence by both Democrats and Republican administrations and Congresses alike. But continued inaction is unacceptable with stubbornly high unemployment, lackluster economic growth, widespread unrest in the Middle East, and the prospect of escalating gas prices punishing American families. Nothing done by our government in the past 4 decades has actually helped to achieve the goal of energy independence, or for that matter, kept energy prices affordable for American families and businesses. The reverse is true. We are more dependent on foreign oil today than ever before and far more economically vulnerable than at any point in our Nation's history.

If we summon the political will to enact this legislation before the committee, H.R. 909, would reverse this course, immediately lower energy prices, and finally deliver on the unfulfilled promises of recent decades.

The energy roadmap is not a radical alternative to current energy policy. That is, while we can all agree that we need a com-

prehensive approach, this approach must be market-based and gradual if we are to achieve true energy independence. I predict that any other approach will ultimately be rejected by the American people.

The energy roadmap would lift restrictions on development and extraction of resources in ANWR and OCS. This could create up to two million jobs and maybe just the construction of these jobs would create another 100,000 construction jobs.

The roadmap recognizes that dependence on any one fuel source is dangerous and short-sighted. It also recognizes that the American people have made it clear that they do see the merit in federal resources to develop and transition to alternative energy sources and to reduce carbon emissions when economically and technologically feasible.

The status quo does not provide adequate support to the development of alternative energy. It is not necessarily a question of resources as much as it is a question of the appropriate structure to deliver support for the development of renewable energy. For example, while many renewable energy companies support the current production tax credit, they are frustrated with its lack of predictability and that it can get caught up in the legislative process and lapse.

Accordingly, H.R. 909 would provide the financial resources and structure necessary to transition our economy to renewable and advanced energy alternatives. It would do this by depositing the new federal lease and royalty revenues, estimated to be over \$500 billion in the next 30 years, into a trust fund. These dollars would then be made available to renewable energy producers through a reverse auction. This market-based mechanism would ensure that the cheapest and most efficient technology thrives while simultaneously opening the alternative energy market to greater innovation and competition.

Importantly, the roadmap would not end the credit. Rather, it would give an alternative to energy entrepreneurs to choose to receive the credit or to forego it to receive support through the reverse auction. Moreover, the support provided under the energy roadmap for the development of renewable energy would not be subject to the federal budget or the legislative process. Put simply, it provides the best mechanism to develop, produce, and transition to alternative energy.

Another component of the roadmap would establish or would mandate that 200 reactors be—permits be granted by 2040. This bill would provide new, streamlined regulations and a system to manage the waste that will drive private sector investments in these facilities, which today are stalled as a result of red tape, lawsuits, and parochial concerns. Nuclear power in my estimation is essential to achieving an abundant and affordable supply of electricity to fuel our Nation's economy.

H.R. 909 would enhance our national security by removing barriers to expand our Nation's secure coal supplies to fill the tanks of the American military vehicles and jets. In fact, the bill's near-term goal is to produce at least 300,000 barrels of CTL, coal to liquid. Such supply would equal the amount of fuel consumed daily by the U.S. military for domestic operations.

The American people are looking to us for leadership. They know intuitively that we are running out of time, and they are worried about the future of our country and for their—and our country's future for their children. They have given us the opportunity to offer solutions to this and other big problems. My fellow colleagues, it is time for us to act, and I really do appreciate, Mr. Chairman, Ranking Member, for having the opportunity to testify here today. [The prepared statement of Mr. Nunes follows:]

The Honorable Devin Nunes
U.S. Representative (CA-21)
1013 LHOB
Washington, DC 20515
202-225-2523

“Hearing on the American Energy Initiative”
June 3, 2011

Mr. Chairman, Members of the Committee, thank you for inviting me to testify today.

Our nation has been blessed with a great abundance of natural resources. Consider these astounding facts. The Coastal Plain of ANWR potentially contains 10 billion barrels of recoverable oil; the Outer Continental Shelf (OCS) is estimated to hold nearly 85 billion barrels of oil and 420 trillion cubic feet of natural gas; and over two trillion barrels of oil are held in oil shale deposits – more than are contained in all of the countries in the Middle East combined. Additionally, our nation has nearly 250 billion tons of recoverable coal reserves, which is the estimated equivalent of 800 billion barrels of oil and constitutes more than three times Saudi Arabia’s proven oil reserves of 260 billion barrels.

Unbelievably, our government has chosen not to utilize these resources fully, despite repeated promises to achieve “energy independence” by Democrat and Republican Administrations and Congresses alike. But continued inaction is unacceptable with stubbornly high unemployment, lackluster economic growth, widespread unrest in the Middle East, and the prospect of escalating gas prices punishing American families. Nothing done by our government in the past four decades has actually helped to achieve the goal of energy independence; or for that matter, kept energy prices affordable for American families and businesses. The reverse is true; we are more dependent on foreign oil today than ever before and far more economically vulnerable than at any point in our nation’s history.

If we summon the political will to enact it, the legislation before the committee today, A Roadmap for America's Energy Future (H.R. 909), would reverse this course, immediately lower energy prices, and finally deliver on all of the unfulfilled promises of recent decades.

The Energy Roadmap is not a radical alternative to current energy policy. That is, while we can all agree that we need a comprehensive approach, this approach must be market-based and gradual, if we are to achieve true energy independence. I predict that any other approach will ultimately be rejected by the American people.

The Energy Roadmap would first lift restrictions on the development and extraction of resources in ANWR and the OCS. Removing these restrictions could produce up to 1 million barrels of oil per day from ANWR and leasing all federal waters in the lower 48 would provide another 900,000 barrels per day of oil and 1.073 trillion cubic feet of gas per year. This would create from 1.45 million to nearly 2 million jobs. Likewise, removing restrictions on the development of our oil shale resources could eventually result in the production of 10 million barrels of oil per day and create 100,000 new jobs.

The Energy Roadmap recognizes that dependence on any one fuel source is dangerous and short-sighted. It also recognizes that the American people have made it clear that they do see merit in the use of federal resources to develop and transition to alternative energy sources and to reduce greenhouse gas emissions when economically and technologically feasible.

The *status quo* does not provide adequate support to the development of alternative energy. It is not necessarily a question of resources as much as it is a question of the appropriate structure to deliver support for the development of renewable energy. For example, while many renewable energy companies support the current production tax credit, they are frustrated with its lack of predictability and that it can get caught up in the legislative process and lapse.

Accordingly, the Energy Roadmap would provide the financial resources and structure necessary to transition our economy to renewable and advanced energy alternatives. It would do this by depositing the new federal lease and royalty revenues – estimated to be \$500 billion over the next 30 years – into a renewable energy trust fund. Those dollars would then be made available to renewable energy producers through a reverse auction. This market-based mechanism would ensure that the cheapest and most efficient technology thrives while simultaneously opening the alternative energy market to greater innovation and competition.

Importantly, the Energy Roadmap would not end the production tax credit. Rather, it would give alternative energy entrepreneurs the ability to choose to receive the production tax credit or to forego it in order to receive support through the reverse auction. Moreover, the support provided under the Energy Roadmap for the development of renewable energy would not be subject to the vagaries of the federal budget or legislative process. Put simply, it provides the best mechanism to develop, produce, and transition to alternative energy.

Another component of the Energy Roadmap would establish a mandate to site 200 nuclear reactors by 2040. The bill would provide new, streamlined regulations and a system to manage waste that will drive private sector investments in these facilities, which today are stalled as a result of red tape, lawsuits, and parochial concerns. Nuclear power is essential to achieving an abundant and affordable supply of electricity to fuel our nation's economy and we can no longer afford to ignore its benefits.

The Energy Roadmap would also enhance our national security by removing barriers to expanding the uses of our nation's secure coal supplies to fill the tanks of American military vehicles and jets. In fact, the bill's near-term goal is to produce at least 300,000 barrels of liquid

transportation fuels per day by 2020 using Coal-to-Liquid (CTL) technology. Such a supply would equal the amount of fuel consumed daily by the U.S. military for domestic operations.

The American people are looking to us for leadership. They know intuitively that we are running out of time and they are worried about the futures of our country and their children. They have given us the opportunity to offer solutions to this and other big problems. My fellow colleagues, it is time for us to act. Thank you for the opportunity to testify on one of the most important issues of our time.

Mr. WHITFIELD. Well, thank you, Mr. Nunes, for that testimony, and I will recognize myself for a period of questions and then will recognize Mr. Waxman for the same purpose.

In your testimony you talked a little bit about a reverse auction for a fund to encourage more development of renewable fuels. Would you elaborate a little bit on the way this reverse auction would work?

Mr. NUNES. Absolutely, Mr. Chairman. I believe that despite the ranking member's testimony at the beginning, I think this is something that is new, is innovative, and it would change the way that alternative energy is deployed. Basically to put it simply you take the royalty revenues, which some people estimate to be \$500 billion over 30 years, it could be higher, it could be lower, but a significant amount of money. And what you do is essentially that money is there, and it acts as a reverse auction. So the lowest bidder wins.

So if I could maybe give you an example. Say that someone, one person has windmills that they want to put up in California, and someone has a windmill farm that they want to put up in Nevada. And if one company says that they need \$100 to get their project off the ground, in California let us say it is \$100, but in Nevada that company for the same size project only needs \$90, they would submit those bids, and it is per megawatt, and the Nevada company would win.

So you would—basically it gets to the cheapest way to deploy renewable energy, and this has been I think met with—in the Silicone Valley and the entrepreneurial community in California, this has been well received throughout the companies that want to see changes to the way these technologies are deployed.

Mr. WHITFIELD. Now, is there an example of where this type of reverse auction has been implemented in other places and has been proven that it works very well?

Mr. NUNES. Yes. Matter of fact, good question, Mr. Chairman. I was quite embarrassed to learn that when I developed this legislation I thought that I had developed something new. In fact, this is being used in Brazil, and to my knowledge, although I have not talked—I do coach the Brazilian Caucus, which is even more of an embarrassment that I didn't know that this was there, but from my understanding it is working very well.

Mr. WHITFIELD. And they use it for the same purpose, for the development of renewables?

Mr. NUNES. Yes, and I think it would be, it would probably for this committee, it would be worth your time maybe to look into that if you have another hearing.

Mr. WHITFIELD. We have heard a lot recently, particularly from our friends on the other side of the aisle, about removing production tax credits and other things from the oil industry, and without getting into a discussion about that proposal per se, I would like to just broaden it, and do you think it would be reasonable or would it be helpful if we are going to have a debate about removing tax credits from the oil industry, should—in your view, should we have a debate about just removing incentives from all energy production?

Mr. NUNES. In fact, Mr. Chairman, we have been—Chairman Camp of the Ways and Means Committee, we have been conducting

a series of hearings of tax reform, and we have had many different companies from both foreign nationals and small businesses basically all say the same thing, that they would like to see the tax rate reduced and would basically forego all of these types of little production tax credits and different tax credits that are out there.

And so I think President Obama—, you were at the meeting the other day, he indicated that this is something that he would like to do also, so I think simplifying of the tax code, getting rid of all these credits would be something worthwhile, and that is what the Ways and Means Committee is working on.

Mr. WHITFIELD. You are working on that right now?

Mr. NUNES. Yes.

Mr. WHITFIELD. Now, in your proposal you talk about licensing 200 new nuclear plants in a relatively short time. I forgot if you said 2040, or whenever it was, but recognizing that we have this significant issue of how do we dispose of this waste because the administration has basically stopped Yucca Mountain after the expenditure of \$15 billion and after judgments against the Federal Government of \$15 billion and after taxpayers and energy users have paid the fee for this, how do you propose that we would get rid of this waste?

Mr. NUNES. Well, one of the—what I tried to achieve in drafting this legislation was that tried to create a scenario where the Congress forces an administration to act one way or the other on Yucca Mountain and reprocessing and a whole host of issues, because as you know, it seems like every President, no matter if it is Republican or Democrat is—they are all for nuclear power yet nothing ever happens, and I think that our country, I think the most significant innovation in the last 100 years from my perspective is the development of nuclear power.

And I think we have been set back in this country over the last 4 decades because we really have not invested in new nuclear technology, and we are in real danger of falling behind China, who, you know, some folks estimate that they are on their way to build over 200 nuclear reactors. We don't really know, but I think they are building several dozen right now that are being built or in the process of it.

So to not—so what this bill does is it basically forces the administration to say, yes or no, and it develops a timeframe so that we would either know that Yucca Mountain will be used or it will not be used, but we need to get to the bottom of that and get it, well, either stop it or start it.

Mr. WHITFIELD. Well, thank you, Mr. Nunes.

At this time I will recognize Mr. Waxman for his 5-minute question period.

Mr. WAXMAN. Thank you very much for your testimony, and I think I might have been a little too harsh in my opening statement. I do want to consider your idea because I have long believed that we need to have market mechanisms to try to drive the results that we want. I don't think we can decide the winners and losers. We ought to say what we want to achieve and help the entrepreneurs in this country, unleash them and let them go forward and profit when they accomplish the goals we want. That is what we try to do, not to everybody's satisfaction in the cap-and-trade

bill because we said if you can figure out new technology and ways to reduce the carbon emissions, it will be to your economic benefit. You will be able to have a clear profit for it.

You seem to be doing that in a very different way, but nevertheless, you are trying to accomplish something that I find attractive, and I want to understand this more from you and from other witnesses later on.

Mr. NUNES. Absolutely.

Mr. WAXMAN. As I understand it, in order to be eligible for the reverse auction a renewable energy project must have a power purchase agreement in place, and the price in that contract is essentially the bid in this reverse auction. It would seem that because the prices will already be set in the contract, generators will not be able to change their bids as the auction proceeds, and the price-driving mechanism of a traditional reverse auction will not be available.

I assume the intent of the provision to drive down the price of renewable energy. Isn't that what you are trying to do?

Mr. NUNES. That is correct.

Mr. WAXMAN. And do you anticipate generators breaking or renegotiating power purchase agreements in order to lower their bids?

Mr. NUNES. Well, one of the things, Mr. Chairman, that—and I do appreciate your comments as it relates to the reverse auction, this is—it was a very difficult provision to draft, and we have spent several years doing it. You may remember that there in EPAC, whatever year that was, '05, there was something similar for renewable fuels that was put in.

However, and the President actually has I think \$150 million in his budget for that proposal, but the way that the law was drafted and then how the regulations were written basically there has never been any money put into it, and there doesn't seem to be any interest from the renewable fuel community to utilize it.

So what we attempted to do here was to keep it as clear and basic as possible so that you would have a clean way to run this auction. So, I mean, this is actually probably an expertise of yours on this committee, but we actually modeled it after the—originally when—before I knew that other people had tried this, we modeled it after the spectrum sales, the way that you auction off spectrum sales. So that was kind of our goal and then asking, when the regs would come out to basically have kind of three different levels so that you could have one level for technological development and research, you would have kind of a mid-sized level so that maybe small businesses and folks could utilize the program, and then you would have another pot at the highest level for the big energy companies to go out and build, you know, big wind farms or big solar farms.

That is the attempt of the legislation. I would, you know, I think one of the options here is in this bill some of the oil provisions have moved through the House already, and I think there is an opportunity for this committee to maybe take this reverse auction and move it by itself, spend some time, you know, to make sure that it would work, you know, in a bipartisan way and maybe, you know, get this bill marked up and get it out to the floor, just the

reverse auction provision. I would be very supportive of something like that.

Mr. WAXMAN. Do you have a concern that if the choice between a reverse auction and a production tax credit, that the production tax credit is more certain, and the groups, the businesses involved will decide to forgo the reverse auction and stick with the tax credit?

Mr. NUNES. I think that there is a—the uncertainty now in the production tax credit business is leading to a more complicated deployment of renewable energy, renewable power. I think there is some people that can use these credits, some people can't, and I think—and because I think what is 2012, they lapse anyway, and if you just look down the road, I mean, when you have Republicans and Democrats agreeing that we need to get out of this tax credit business to some degree, I just don't think it is—I think this program, having a trust fund in place where you take royalty revenue from oil and gas, is a way that would give some real certainty.

Mr. WAXMAN. My time has expired, but let me thank you for your hard work on this legislation. You are a highly respected member of our California delegation and in the House, and I want to look at this more carefully because I do think we need a bipartisan approach, and I like the idea of something that will drive the markets rather than dictate the markets.

Mr. NUNES. Well, Mr. Chair or Mr. Ranking Member, I would be willing to come and sit down with you and walk you through this or your staff.

Mr. WAXMAN. I don't walk through things when I am sitting down, but I would be glad to—

Mr. WHITFIELD. Well, in keeping with the procedures of our committee, Congressman Nunes, the chairman and ranking member are the only ones that would be asking you questions today, but our staff has looked at your legislation, and you have some really innovative approaches like the reverse auction, and we are going to continue to look at that and at some point work with other committees and try to move something to address some of the problems that you are trying to address in your legislation.

So thank you for your time and for your involvement in this important issue.

Mr. NUNES. I really appreciate it.

Mr. WHITFIELD. Appreciate that.

Mr. NUNES. Thanks for the opportunity, Mr. Chairman.

Mr. WHITFIELD. At this time I would like to call up the second panel of witnesses. On the second panel we have Mr. David Sandalow, who is the Assistant Secretary for Policy and International Affairs at the U.S. Department of Energy, and we also have Mr. Thomas Hicks, who is the Deputy Assistant Secretary of the Navy, and we would like to welcome both of you to this hearing. We appreciate your taking time to be with us and offering us your expertise and knowledge, and with that, Mr. Sandalow, I would like to recognize you for 5 minutes for your opening statement.

**STATEMENTS OF DAVID SANDALOW, ASSISTANT SECRETARY
FOR POLICY AND INTERNATIONAL AFFAIRS, DEPARTMENT
OF ENERGY; AND THOMAS HICKS, DEPUTY ASSISTANT SEC-
RETARY OF THE NAVY (ENERGY)**

STATEMENT OF DAVID SANDALOW

Mr. SANDALOW. Thank you to members of the subcommittee. Thank you for the opportunity to be here today to discuss H.R. 909, the Roadmap for America's Energy Future.

The administration agrees with many of the goals of this bill. For example, the administration believes that facilitating the efficient responsible development of our oil and gas resources is a necessary component of energy security. We are working to expand cleaner sources of energy, including renewables like wind, solar, and geothermal, nuclear power, as well as clean coal and natural gas on public lands.

However, the administration has serious concerns with many provisions in this legislation. For example, a number of the changes in Title I would make amendments to Interior's Offshore Energy Program, undercutting safety and environmental reforms adopted in the wake of the Deepwater Horizon oil spill, and it would open the coastal plain of the Arctic National Wildlife Refuge to oil and gas drilling. Department of the Interior and other involved agencies may have additional views on this legislation.

H.R. 909 touches on programs implemented by a number of administration's agencies, and I will not comment in detail about programs outside of the Department of Energy's purview. In the remainder of my time I would like to discuss the administration's energy agenda and address several specific provisions from H.R. 909.

In the State of the Union address President Obama laid out a plan for the United States to win the future by out-innovating, out-educating, and out-building the rest of the world while at the same time addressing the deficit. Many countries are moving aggressively to develop and deploy the clean energy technologies that the world will demand in the coming years and decades. As the President said, this is our generation's Sputnik moment.

We must rev up the great American innovation machine to win the clean energy race and secure our future prosperity. To that end, President Obama has called for increased investments in clean energy research, development, and deployment.

In addition, he has proposed generating 80 percent of America's electricity from clean energy sources by 2035. A clean energy standard will provide a clear, long-term signal to industry to bring capital off the sidelines and into the clean energy sector. It will grow the domestic market for clean sources of energy, creating jobs, driving innovation, and enhancing national security.

And by drawing on a wide range of energy sources, including renewables, nuclear, clean coal, and natural gas, it will give utilities the flexibility they need to meet our clean energy goals while protecting consumers in every region of the country.

The Department of Energy's goal is to strengthen the Nation's economy, enhance our security, and protect the environment by investing in key priority, including supporting groundbreaking basic research, leading in the development and deployment of clean and

efficient energy technologies to reduce our dependence on oil, and strengthening national security by reducing nuclear dangers, maintaining a safe and secure and effective nuclear deterrent and cleaning up our cold war legacy.

As the President said in his State of the Union address, investing in clean energy will strengthen our security, protect our planet, and create thousands of new jobs here at home. We are doing this through programs to make, for example, homes and buildings more energy efficient with a new Better Buildings Initiative. We are also developing new sources of wind, solar, and geothermal supporting the modernization of the electric grid and carbon capture and sequestration technologies. We are supporting reducing our dependence on oil by developing the next generation of biofuels and promoting electric vehicle research and deployment supporting the President's goal of putting one million electric vehicles on the road by 2015.

Mr. Chairman, I drove to work today in a plug-in hybrid vehicle. At night I plug that car into an outlet in my garage. I often get 80 miles per gallon as I drive through the streets of Washington, DC, and I am pleased to say that today I drove to this hearing from the Department of Energy garage in one of the new plug-in electric vehicles in the Department of Energy's fleet. So I think building on the investment that we are making in this country in electric vehicles we can bring down our dependence on oil. That is going to require further investment in lithium ion batteries, and Mr. Chairman, someday I hope that one of my grandchildren will look at one of my children who are now teenagers and say, what, you mean you couldn't plug in cars back when you were young.

At the Department of Energy we are also focused on moving clean energy technologies from the lab to the marketplace. Over the past 2 years our loan programs have supported more than \$30 billion in loans, loan guarantees, and conditional commitments. I want to emphasize, too, that nuclear energy has an important role to play in our energy portfolio. To jumpstart the domestic nuclear industry the President's budget requests up to \$36 billion in loan guarantee authority. It also invests in the R&D for advanced nuclear technologies, including small modular reactors. H.R. 909 takes a different approach to expanding nuclear power production.

H.R. 909 creates a reverse auction mechanism to fund renewable energy projects just discussed in the last panel. We share Representative Nunes's view that reverse auctions are a useful tool for promoting renewable energy. From our experience with reverse auctions it is important to protect the taxpayers by requiring adequate assurance from bidders that they will perform. We look forward to working with the committee on a provision that accomplishes our shared goal of promoting American renewable energy and protecting taxpayers.

To spur innovation, the administration has prioritized investments in basic and applied research. These are discussed in more detail in my statement, which I have submitted for the record.

Mr. Chairman, in conclusion I want to thank the committee for inviting me to testify on issues associated with H.R. 909 that relate to the DOE's mission. I appreciate the opportunity to discuss the President's roadmap for a clean and secure energy future.

[The prepared statement of Mr. Sandalow follows:]

**Statement of Assistant Secretary David Sandalow
U.S. Department of Energy
Before the
Subcommittee on Energy and Power
Committee on Energy and Commerce
U. S. House of Representatives**

June 3, 2011

Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee, thank you for the opportunity to appear before you today at this hearing on H.R. 909, A Roadmap for America's Energy Future.

The Administration agrees with many of the goals of the sponsors. For example, the Administration believes that facilitating the efficient, responsible development of our oil and gas resources is a necessary component of energy security. And we are working to expand cleaner sources of energy, including renewables like wind, solar, and geothermal, nuclear power, as well as clean coal and natural gas on public lands.

H.R. 909 touches on programs implemented by a number of Administration's agencies, and I cannot comment in detail about programs outside of the Department of Energy's purview. As a general matter, however, the Administration has serious concerns with many of the provisions in this legislation, and has recently opposed legislation similar to components of H.R. 909. For example, a number of the changes in Title I would make amendments to Interior's offshore energy program, undercutting safety and environmental reforms adopted in the wake of the Deepwater Horizon oil spill, and open the Coastal Plain of the Arctic National Wildlife Refuge to oil and gas leasing. Department of the Interior and other involved agencies may have additional views on this legislation.

in the remainder of my testimony, I would like to discuss the Administration's energy agenda, and address several specific provisions from H.R. 909.

In his State of the Union address, President Obama laid out a plan for the United States to win the future by out-innovating, out-educating and out-building the rest of the world, while at the same time addressing the deficit.

Many countries are moving aggressively to develop and deploy the clean energy technologies that the world will demand in the coming years and decades. As the President said, this is our generation's "Sputnik moment."

We must rev up the great American innovation machine to win the clean energy race and secure our future prosperity. To that end, President Obama has called for increased investments in clean energy research, development and deployment. In addition, he has proposed a bold but achievable goal of generating 80 percent of America's electricity from clean sources by 2035.

A Clean Energy Standard will provide a clear, long-term signal to industry to bring capital off the sidelines and into the clean energy sector. It will grow the domestic market for clean sources of energy – creating jobs, driving innovation and enhancing national security. And by drawing on a

wide range of energy sources including renewables, nuclear, clean coal and natural gas, it will give utilities the flexibility they need to meet our clean energy goal while protecting consumers in every region of the country.

The Department of Energy's goal is to strengthen the nation's economy, enhance our security and protect the environment by investing in the following priorities:

- Supporting groundbreaking basic science, research and innovation to solve our energy challenges and ensure that the United States remains at the forefront of science and technology;
- Leading in the development and deployment of clean and efficient energy technologies to reduce our dependence on oil, accelerate the transition to a clean energy economy and promote economic competitiveness; and
- Strengthening national security by reducing nuclear dangers, maintaining a safe, secure and effective nuclear deterrent and cleaning up our Cold War nuclear legacy.

While we are investing in areas that are critical to our future, we are also rooting out programs that aren't needed and making hard choices to tighten our belt. Additionally, we are improving our management and operations so we function more efficiently and effectively.

Leading in the Global Clean Energy Economy

As the President said in his State of the Union address, investing in clean energy will strengthen our security, protect our planet, and create many thousands of new jobs here at home. A few examples of the Administration's efforts are discussed below.

Through programs to make homes and buildings more energy efficient, including a new "Better Buildings Initiative" to make commercial buildings 20 percent more efficient over the next decade, we will save money for families and businesses by saving energy. That is money that can be re-invested back into the economy. In addition, the Administration supports the research, development and deployment of renewable sources of energy like wind, solar and geothermal. It supports the modernization of the electric grid and the advancement of carbon capture and sequestration technologies. And it supports reducing our dependence on oil by developing the next generation of biofuels and accelerating electric vehicle research and deployment to support the President's goal of putting one million electric vehicles on the road by 2015. This includes a competitive program to encourage communities to invest in electric vehicle infrastructure.

The Administration is committed to promoting safe and responsible domestic oil and gas production as part of a broad energy strategy that will protect consumers and reduce our dependence on foreign oil. Safety and environmental reforms that the Administration implemented in response to the Deepwater Horizon oil spill are critical to achieving those objectives. Fifty-five new shallow water permits have been issued since the Administration's stronger safety standards were put in place on June 8, 2010, and deepwater permit applications are also being processed in a timely manner. Since the end of February, when industry first demonstrated to safety regulators the capability to contain an oil spill, fifteen deepwater wells have been permitted. However, we can all agree there is still work to be done. Department of Interior Secretary Salazar recently testified on other pending oil and gas legislation before the Senate Energy and Natural Resources Committee and delineated the Administration's three primary objectives:

- Remove outdated disincentives to the prompt development of oil and gas leases;
- Provide the tools for the Federal Government to oversee offshore oil and gas development activities on a timely and effective basis; and
- Ensure a fair return for American taxpayers and accountability for safety violations and oil spills.

A focus on the environmental impacts of offshore oil and gas operations are priorities of the Administration. In addition, consistent with the framework presented by the *Blueprint for a Secure Energy Future*, we must concurrently work to secure our energy future by ensuring the potential for renewable energy development on our public lands and waters is realized.

Mr. Chairman, I drove to work today in a plug-in hybrid vehicle. At night, I plug that car into a regular electric outlet in my garage and often get 80 miles per gallon in city driving. The electricity I use to drive costs the equivalent of roughly 75 cents per gallon. The U.S. Department of Energy is investing in research to bring down the cost of lithium ion batteries. Someday one of my grandchildren may look at one of my children and say “you mean you couldn’t plug in cars when you were young?”

We’re also focused on moving clean energy technologies from the lab to the marketplace. Over the past two years, the Department’s loan programs have supported more than \$30 billion in loans, loan guarantees, and conditional commitments to guarantee loans for 28 clean energy and enhanced automotive fuel efficiency projects across the country, which the companies estimate will create or save more than 61,000 jobs. These deployment efforts build on the substantial investment made in the clean energy sector by the Recovery Act, and are supplemented by tax incentives that have also played an important role in bringing clean energy projects to market, such as the 48C manufacturing tax credits and the 1603 cash grants in lieu of investment tax credits, which the 2012 budget also expands.

Nuclear energy also has an important role to play in our energy portfolio. To jumpstart the domestic nuclear industry, the President’s budget requests up to \$36 billion in loan guarantee authority. It also invests in the research and development of advanced nuclear technologies, including small modular reactors. H.R. 909 takes a different approach to expanding nuclear power production. The legislation directs the Nuclear Regulatory Commission to issue operating permits for 200 new commercial nuclear reactors.

H.R. 909 creates a “reverse auction” mechanism to fund renewable energy projects. As required by section 942 of the Energy Policy Act of 2005, in July 2010 the Department of Energy issued a Notice of Program Intent to request documents for pre-certification. The purpose is to help defray the cost of cellulosic biofuel production and serve as an important incentive and financial benefit to show the investment community they have a cash flow to reduce risk. Incentives such as the reverse auction are critical to financing “first-of-a-kind” or “pioneer” plants. As part of the Fiscal Year 2012 Budget request, the Department has proposed an expansion of this reverse auction authority to include both cellulosic ethanol and other advance biofuels as defined in EISA 2007. DOE detailed analysis demonstrated that the Department needs to create a strong market signal for cellulosic ethanol and other advanced biofuels to solidify investment towards commercialization and meet the RFS targets.

As part of the Department's technical review of the reverse option mechanism proposed in H.R. 909 the Department identified a limited scope of projects that this mechanism would fund even within the renewable category, much less outside it. Further, as described previously, the Department's experience with a reverse auction for biofuels recognized the need for structuring auctions in a way that recognizes investor risk. It is unclear if the reverse auction mechanism envisioned in H.R. 909 creates the necessary incentives for emerging renewable technologies. The Administration's Clean Energy Standard approach recognizes the importance of incentivizing the deployment of cleaner types of traditional energy sources as economies of scale for the widespread deployment of renewable energy can be realized.

Outside of a number of technical issues we have identified in the reverse auction mechanism in H.R. 909, it raises a number of policy issues related how a reverse auction mechanism as described in this legislation would complement or compete against existing programs. We share Rep. Nunnes' view that reverse auctions are a useful tool for promoting renewable energy. From our experience with reverse auctions, it's important to protect the taxpayers by requiring adequate assurance from bidders that they'll perform. We look forward to working with the Committee on a provision that accomplishes our shared goal of promoting American renewable energy and protecting taxpayers.

Supporting Groundbreaking Science

To spur innovation, the Administration has prioritized investments in basic and applied research and keeps us on the path to doubling funding for key science agencies, including the Department's Office of Science. As Norm Augustine, former Chairman of Lockheed Martin and former Under Secretary of the Army, has said, under-funding R&D in a time of austerity is like removing the engine of an aircraft to reduce its weight.

That is why our budget request increases support for the Department's comprehensive research strategy to accelerate energy breakthroughs.

Through the Office of Science, we're expanding our investment in basic energy sciences, advanced scientific computing and biological and environmental sciences – all key areas for our future economic competitiveness. In addition, Energy Efficiency and Renewable Energy (EERE) programs provide a vital link between advances in basic research and Administration efforts to commercially deploy clean energy technologies by supporting applied research, technology development and demonstrations of promising clean energy technologies.

The Administration also supports increased investment in the Advanced Research Projects Agency-Energy, also known as ARPA-E. This investment will allow ARPA-E to continue the promising early-stage research projects that aim to deliver game-changing clean energy technologies. ARPA-E's projects are generating excitement both in the Department and in the private sector. For example, through a combined total of \$24 million from ARPA-E, six companies have been able to advance their research efforts and show the potential viability of their cutting-edge technologies. This extremely valuable early support enabled those companies to achieve R&D milestones that, in turn, have attracted more than \$100 million in private sector funds to the projects. This is precisely the innovation leverage that is needed to win the future.

Another key piece of our research effort is the Energy Innovation Hubs. Through the Hubs, we are bringing together our nation's top scientists and engineers to achieve similar game-changing energy goals, but where a concentrated effort over a longer time horizon is needed to establish innovation leadership. The Department has established three Energy Innovation Hubs in the areas of energy efficient buildings, modeling and simulation for nuclear reactors and fuels from sunlight. We are proposing to continue to support the three existing Hubs and to establish three new Hubs in the areas of batteries and energy storage (which will be funded beginning in FY 2011) smart grid technologies and systems, and critical materials. The Energy Innovation Hubs were modeled after the Department of Energy's BioEnergy Institutes, which have established an outstanding three-year track record.

Finally, the Department continues to support the Energy Frontier Research Centers, which are mostly university-led teams working to solve specific scientific problems that are blocking clean energy development.

The Energy Innovation Hubs, ARPA-E, and EFRCs represent three complementary approaches to advance groundbreaking discovery. We don't know where the big energy breakthroughs are going to come from. To reach our energy goals, we must take a portfolio approach to R&D: pursuing several research strategies that have proven to be successful in the past. But I want to be clear – this is not a “kitchen sink” approach. This work is being coordinated and prioritized, with a 360-degree view of how these pieces fit together. Taken together, these initiatives will help America lead in science and technology innovation.

H.R. 909 does not include any provisions related to research and development programs that empower America to lead in science and technology innovation.

In conclusion, I want to thank the Committee for inviting me to testify on issues associated with H.R. 909 that relate to the Department of Energy's mission. I appreciate the opportunity to reiterate the President's roadmap for a Clean Energy Future that includes increased generation, increased efficiencies, and a priority on maintaining our global competitiveness by important investments in research and development.

THESE COMMENTS ARE PROVIDED IN RESPONSE TO A REQUEST FOR TECHNICAL COMMENTS AND DO NOT NECESSARILY REPRESENT THE POSITION OF THE DEPARTMENT OF ENERGY OR THE ADMINISTRATION.

SEC. 301. REVERSE AUCTION MECHANISM FOR RENEWABLE ENERGY GENERATION.

(a) In General- The Secretary shall establish a reverse auction program to award funds from the American-Made Energy Trust Fund to eligible entities to generate an amount of electric energy.

(b) Reverse Auction Authority-

(1) IN GENERAL- The Secretary shall establish within the Department of Energy a Reverse Auction Authority to conduct reverse auctions under this section.

(2) DIRECTOR- The Secretary shall appoint a Director to serve as head of the Authority.

(c) Reverse Auctions-

(1) FREQUENCY- Subject to amounts available in the American-Made Energy Trust Fund (including any amounts not obligated in the previous calendar year), the Director shall conduct a minimum of 2 reverse auctions per calendar year in each geographic region established under paragraph (2).

(2) REGIONS- The Secretary shall establish geographic regions that are contiguous with the Census Divisions established by the U.S. Census Bureau, and the Electric Power Markets identified by the Federal Energy Regulatory Commission, and shall ensure that funds awarded under this section are awarded for qualified renewable energy facilities located across those regions.

(3) BIDS- In any reverse auction under this section, bids shall describe the amount of electric energy to be generated per year by the qualified renewable energy facility and the price per megawatt hour of electric energy that will be generated by such facility.

(4) DEPOSIT-

(A) IN GENERAL- At the time of entering a bid in a reverse auction under this section, an eligible entity shall provide to the Director a deposit of, as determined by the Director, an appropriate amount per kilowatt hour of electricity to be generated per year by the qualified renewable energy facility for which the eligible entity is entering the bid.

(B) REFUND- The Director shall refund a deposit provided under subparagraph (A)-

(i) for an eligible entity that is not selected for an award of funds as a result of the bid for which the deposit was made, at the time the Director notifies the eligible entity selected for an award of such selection; and

(ii) for an eligible entity selected for an award of funds as a result of the bid for which the deposit was made, except as provided in subparagraph (C), at the time the facility for which the eligible entity entered the bid begins operation.

(C) FORFEIT- If a facility for which funds are awarded is not in operation by the deadline for operation under subsection (d)(3), the eligible entity shall forfeit the deposit provided under subparagraph (A).

(5) RESERVE PRICE-

(A) IN GENERAL- Before conducting a reverse auction under this section, the Director shall set a reserve price which shall be a ~~minimum~~ maximum bid above which no bid may win the auction.

(B) CONFIDENTIALITY- The Director shall ensure that a reserve price set under this paragraph remains confidential until 5 years after the date of the auction to which the reserve price applies.

Comment [AE1]:

While this auction will incent renewables development it, by default, excludes an entire class of technologies. Emerging renewables, such as marine hydrokinetic devices, are not yet cost competitive with mature technologies. A (temporary or market driven) carve out or bonus mechanism would be necessary for these technologies to receive any slice of the reverse auction.

Comment [SC2]: Usage of the 10 Electric Power Markets identified by the FERC is possible, but there are several adverse issues which should be considered: the borders of each of the Electric Power Market shift over time based upon the decisions of local electric utilities; they are not always geographically contiguous; they have highly complicated interdigitated borders which are unconstrained by most state boundaries; they do not include Alaska and Hawaii; and individual Markets can sometimes overlap each other. Organizing the proposed policy upon the nine U.S. Census Bureau Divisions would provide much the same regional balance as the present version does, would be simpler for applicants to understand, and would be less complicated for the U.S. DOE to implement. EERE recommends that the program be implemented using U.S. Census Bureau Divisions instead of Electric Power Market.

Comment [E3]: This should be production cost based.

Comment [DOE4]: "Price per megawatt hour" is ambiguous, and could be interpreted as a power purchase agreement price rather than the \$/MWh amount that the bidder is presumably seeking through the auction.

In addition, this section does not state what type of awards will be made through the reverse auction - is it a reverse auction for a cash production incentive or for a cash grant? ... [1]

Comment [PWOC5]: Prices have previously been stated as being paid in megawatt hours.

Comment [E6]: This requirement may be overly restrictive since the utility or non-utility generator is taking all the financial risk. If the qualified facility cannot get financing due to the economic climate, they would not receive their award and the Director can select the new qualified facility.

Comment [E7]: Same comment as E6.

Comment [E8]: We recommend this be based on dependable capacity of a facility, not nameplate rating, and based on avoided cost.

Comment [SC9]: The legislative intent of this bill appears to create a reverse auction to incentivize the least costly sources of renewable energy. As written, this would create a price floor, limiting potential renewable energy cost declines. Conversely, a price ceiling would constrain pr... [2]

THESE COMMENTS ARE PROVIDED IN RESPONSE TO A REQUEST FOR TECHNICAL COMMENTS AND DO NOT NECESSARILY REPRESENT THE POSITION OF THE DEPARTMENT OF ENERGY OR THE ADMINISTRATION.

(6) SELECTION OF ELIGIBLE ENTITIES-

(A) IN GENERAL- In determining eligible entities to which to award funds in any reverse auction under this section, the Director shall take into consideration--

- (i) bids that incorporate the lowest bid price per megawatt hour of electric energy; and
- (ii) existing subsidies and other support received by an eligible entity for the qualified renewable energy facility.

(B) MAXIMUM PERCENTAGES- The Director shall ensure that, measured on a 5-year rolling average, of funds awarded under this section--

- (i) not more than 60 percent are awarded for one type of renewable energy source; and
- (ii) not more than 90 percent are awarded for any combination of 2 types of renewable energy sources.

(7) CATEGORIES OF GENERATING CAPACITY-

(A) ALLOCATION- Subject to subparagraph (B), in each reverse auction conducted under this section, funds shall be allocated as follows:

- (i) 25 percent of the funds shall be awarded for the generation of electric energy by qualified renewable energy facilities that have a small generating capacity.
- (ii) 25 percent of the funds shall be awarded for the generation of electric energy by qualified renewable energy facilities that have a mid-sized generating capacity.
- (iii) 50 percent of the funds shall be awarded for the generation of electric energy by qualified renewable energy facilities that have a large generating capacity.

(B) INSUFFICIENT FUNDS- If the Secretary determines that the amount of funds available in any calendar year in the American-Made Energy Trust Fund (including any amounts not obligated in the previous calendar year) are insufficient to provide adequate funding for each allocation, described in clauses (i), (ii), and (iii) of subparagraph (A), the Secretary may reduce or eliminate any allocation requirement under such subparagraph.

(C) DETERMINATION BY SECRETARY- With respect to the generating capacity of a qualified renewable energy facility, the Secretary shall determine what qualifies as a small, mid-sized, and large generating capacity for purposes of this paragraph.

(8) STANDARD AMOUNTS OF ELECTRIC ENERGY- In each reverse auction under this section, the Director shall determine standard amounts of electric energy that eligible entities may bid on as well as the time allotted to generate such an amount of electric energy.

(9) CONFIDENTIALITY- Information regarding the bid price of an eligible entity selected for an award of funds pursuant to a reverse auction under this section shall remain confidential until the initial award of funds to such eligible entity is made.

(10) INFORMATION REGARDING AUCTIONS- Before conducting each reverse auction under this section, the Director shall make publicly available information regarding such reverse auction, including--

Comment [DOE10]: It seems like this section is really about selecting the winning bidders, not determining eligibility.

Comment [DOE11]: This seems to specify a production incentive -- suggest clarification.

Comment [E12]: Recommend that this be production cost without profit and cost of money.

Comment [DOE13]: Suggest defining "existing subsidies and other support", i.e. federal, state, or other support. For "other support", some examples for consideration include high-priced (above market) utility mechanisms, such as feed-in tariffs, power purchase agreements caused by a state policy like an RPS, REC payments, net metering. Also, presumably only subsidies and other support received up to the time of the reverse auction need be disclosed -- consider subsidies received at a later date.

Comment [PWOC14]: suggest clarification. Both conventional hydropower and marine hydrokinetics receive less direct subsidization than other technologies--both receive only half value of the production tax credit and marine hydrokinetics are not yet eligible for accelerated depreciation benefits. The effect of subsidy inclusion on auction prices may penalize water power technologies.

Comment [E15]: Recommend tying this to the Purchase Power Agreement, if applicable or the avoided cost of power from fossil sources inc. ... [4]

Comment [DOE16]: Is there an intended length for this Sec. 301 program? It is not clear how this rolling average can be implemented in years 1-4, given that the am ... [3]

Comment [SC17]: "Type" is not defined. Although it is likely this was intended to be interpreted broadly (e.g. solar energy vs. wind energy), at present it could also be interpreted ... [5]

Comment [DOE18]: This sounds, again, like a production incentive, which is not what is likely intended. For comments in Sec. 301(c), consider clarifying nomenclature.

Comment [DOE19]: The meaning of this condition is unclear. The allocations are all specified as percentages of the total funding available in a given auction, so it is difficult to imagine what ... [6]

Comment [E20]: We note that, for financing purposes, the capacity of any facility must be specified and will be validated during start-up and commissioning.

Comment [DOE21]: We interpret this provision as establishing the contract term (e.g. \$3.5MWh per sq. ft.) on an auction-by-auction basis. If so, consider including some amount ... [2]

Comment [DOE22]: Releasing this information immediately after the initial award would largely undermine the earlier provision that keeps the reserve price confidential for a ft. ... [9]

THESE COMMENTS ARE PROVIDED IN RESPONSE TO A REQUEST FOR TECHNICAL COMMENTS AND DO NOT NECESSARILY REPRESENT THE POSITION OF THE DEPARTMENT OF ENERGY OR THE ADMINISTRATION.

- (A) standard amounts of electric energy described in paragraph (78) to be auctioned; and
(B) allocations described in paragraph (67) for such auction.
- (d) Award of Funds-
- (1) CONTRACTS FOR GENERATION-
- (A) IN GENERAL- In order to receive an award of funds pursuant to a reverse auction under this section, an eligible entity selected for such award of funds shall enter into a contract with the Director delineating the terms of the award of funds.
- (B) CONTRACT TERMS- The Director shall include in a contract entered into under this paragraph the following:
- (i) The number of megawatt-hours per year on which the contract is based.
- (ii) A provision allowing for credits to be awarded for the production of energy in excess of the amount specified in the contract pursuant to clause (i), which may be carried over, for not more than 2 consecutive years, for use in years in which the production of energy is less than that required under the contract pursuant to clause (i).
- (iii) Any other provisions the Director determines appropriate.
- (C) TERMINATION- In addition to any other terms regarding termination included in a contract under subparagraph (B), the Director may terminate a contract under this paragraph if the eligible entity fails to generate the number of megawatt-hours of electric energy per year required under subparagraph (B)(i) for a period of 4 consecutive years taking into account production which may reasonably be expected to have occurred were it not for any curtailment of production directed by an electric grid operator.
- (2) LIMITATION ON DISBURSAL- The Director may disburse funds to an eligible entity only for the amount of electric energy generated under the contract entered into under paragraph (3) up to the amount specified pursuant to paragraph (1)(B)(i) for each year in which the contract is in effect.
- (3) OPERATION REQUIREMENT-
- (A) IN GENERAL- Except as provided in subparagraph (B), the Director shall make an award of funds to an eligible entity contingent on the qualified renewable energy facility being in operation not later than 18 months after the eligible entity is selected for an award of funds under this section.
- (B) EXTENSION- The Director may grant an eligible entity a one-time 6-month extension of the deadline for operation under subparagraph (A) with respect to a qualified renewable energy facility if the eligible entity demonstrates, to the satisfaction of the Director, that operation of such facility is delayed due to regulatory constraints beyond the control of such eligible entity. Extensions under this subparagraph may not be granted for delays due to lack of financing or delayed equipment delivery.
- (e) Penalties- The Secretary shall determine penalties for violations of this section, which may include fines or bans from participating in reverse auctions under this section.
- (f) Treatment of Funds- Amounts awarded to an eligible entity under subsection (d) shall not be includible in gross income for purposes of the Internal Revenue Code of 1986.
- (g) Denial of Double Benefit-

Comment [DOE23]: Consider mentioning "time" (length of contract) here, as in paragraph (8). Also, this language seems to indicate that a specified amount of funding is available, and the associated amount of energy will depend on the winning bidders; in this case, not clear what it would mean to specify in advance a standard amount of energy.

Comment [DOE24]: It appears that the Director will need to indicate how much remaining funding is available for each technology type - or, if all the funding for wind has already been exhausted.

Comment [PWOC25]: Megawatts appears to be used incorrectly here. This should be megawatt hours (MWhs). MWhs should be auctioned in a jointly cleared capacity reverse auction. Different energy generation technologies produce different amounts of energy over the course of a year depending upon local environmental and technical characteristics. A contract based upon megawatts instead of megawatt-hours would not take these issues into account.

Comment [PWOC26]: Given the inter-year fluctuations in overall generation for variable renewables (water, wind, solar) the incorporation of a borrowing mechanism (with a similar two year window) in addition to the banking/carry over provision would be advantageous and further smooth revenue fluctuations for renewable developers. Paragraph (C) should still apply.

Comment [DOE27]: It seems like the dollar amount (or dollar amount) of the award should be a standard contract.

Comment [PWOC28]: See comment 21.

Comment [AHG29]: It is common practice for grid operators to proactively "curtail" electricity generation when electric supply is greater than demand, specific sections of the grid are at a

Comment [DOE30]: Consider making this a moving average as well, to prevent extremely poor years and one "as above"

Comment [DOE31]: For how many years will the contracts be offered?

Comment [DOE32]: What about projects that are already operational at the time of the auction - are they eligible to participate?

Comment [PWOC33]: For larger, capital intensive projects, such as a new hydropower facility, 18 month lead time brings with it a

Comment [PWOC34]: Allowing the Director more discretion in terms of the number and length of extensions would allow this clause to

Comment [E35]: Based on what happened in 2008 and 2009, this could be too tight. Many cogent facilities were canceled due to lack of financing.

Comment [DOE36]: Alternatively, could simply withhold the deposit described earlier until the contract has terminated and all contract terms

THESE COMMENTS ARE PROVIDED IN RESPONSE TO A REQUEST FOR TECHNICAL COMMENTS AND DO NOT NECESSARILY REPRESENT THE POSITION OF THE DEPARTMENT OF ENERGY OR THE ADMINISTRATION.

- (1) **BASIS**- For purposes of the Internal Revenue Code of 1986, the basis of a renewable energy facility for which funds are awarded to an eligible entity under this section shall be reduced by the amount of such award.
- (2) **TREATMENT AS QUALIFIED FACILITY**- A renewable energy facility for which funds are awarded to an eligible entity under this section shall not be treated as a qualified facility for purposes of section 45 of the Internal Revenue Code of 1986 (26 U.S.C. 45).
- (3) **TREATMENT AS ENERGY PROPERTY**-
- (A) **IN GENERAL**- A renewable energy facility for which funds are awarded to an eligible entity under this section shall not be treated as an energy property for purposes of section 48 of the Internal Revenue Code of 1986 (26 U.S.C. 48).
- (B) **LIMITATION ON AWARD OF FUNDS**- The Director may not award funds under this section for a renewable energy facility for which a credit under section 48 of the Internal Revenue Code of 1986 (26 U.S.C. 48) has been determined.
- (4) **PARTICIPATION IN FEDERAL LOAN GUARANTEE PROGRAMS**- An eligible entity to which funds are awarded under this section for a qualified renewable energy facility may not, for the purposes of such facility, participate in a Federal loan guarantee program.
- (5) **COORDINATION WITH OTHER FEDERAL SUBSIDIES**-
- (A) **CONTRACT AMOUNT**- A contract for generation under subsection (d)(1) shall be for the amount of the winning bid for the specified amount of electric energy minus the amount of any other Federal subsidy received by the eligible entity for the construction, development, or operation of the qualified renewable energy facility before funds are awarded under subsection (d).
- (B) **REGULATIONS**- Notwithstanding subsection (h), not later than one year after the date of enactment of this Act, the Secretary shall promulgate regulations to carry out this paragraph.
- (h) **Deadline for Regulations**- Not later than 180 days after the date of enactment of this Act, the Secretary shall promulgate regulations to carry out this section.
- (i) **Definitions**- In this section:
- (1) **AMERICAN-MADE ENERGY TRUST FUND**- The term 'American-Made Energy Trust Fund' means the trust fund established in section 9512 of the Internal Revenue Code of 1986 (as added by title II).
- (2) **AUTHORITY**- The term 'Authority' means the Reverse Auction Authority established under subsection (b).
- (3) **DIRECTOR**- The term 'Director' means the Director of the Authority.
- (4) **ELIGIBLE ENTITY**- The term 'eligible entity' means an owner or operator of a qualified renewable energy facility that, with respect to such facility--
- (A) is not participating in a Federal loan guarantee program; and
- (B) has a power-purchase agreement in place at the time of the reverse auction.
- (5) **OPERATION**- The term 'operation', with respect to a renewable energy facility, means that--
- (A) such facility is generating electric energy; and
- (B) such electricity is being transmitted onto the electric power grid or distributed to end users.

Comment [DOE37]: This basis reduction is consistent with the fact that the awards will not be considered taxable income, but the question arises as to how to reduce the facility's basis if we're talking about a multi-year cash production incentive whose terms are not known with precision at the time of the award (due to variable nature of renewable resources)? Even ignoring the uncertainty over the future amount of the award, what discount rate would be used to "present value" the multi-year award for purposes of basis reduction? This needs to be considered. Might simply be easier to tax the incentive and leave the basis unchanged.

Comment [SC38]: At present it is ambiguous if subsection (g)(3) of the bill would prevent a solar facility from utilizing the proposed policy while being depreciated as a 5-year property. Solar energy facilities are classified as a 5-year property under the Modified Accelerated Cost Recovery System (MACRS) by 26 U.S.C. § 168 (e)(3)(B)(vii). That portion of § 168 uses a cross-reference to part of the definition of "Energy Property" in 26 U.S.C. § 48 (a)(3)(A), which in defining the Investment Tax Credit (ITC) in Subsection (g)(3)(A) of The proposed bill, states: "A renewable energy facility for which funds are awarded to an eligible entity" [17]

Comment [DOE39]: Consider including a similar paragraph for the section 43 pit (i.e., any project that has already received pit's is ineligible to receive awards under this auction program?)

Comment [DOE40]: Does this section contradict paragraphs (2)(4) above, which seem to eliminate the possibility of receiving the pit, fee, and loan guarantees if awarded funds through an auction? If not, how does one interpret a federal grant amount (for example) from what is reasonably a multi-year? [18]

Comment [SC41]: The term "subsidy" is used in subsection (c)(6)(A)(i) while the term "Federal subsidy" is used in subsection (g)(5). Neither term is defined.

Comment [SC42]: Requiring a PPA, as subsections (d)(4)(B) and (d)(3)(C) do, may prevent entities seeking to own a renewable energy system behind the retail electric meter or electric utilities from participating in the proposed policy.

Comment [DOE43]: A developer may find it hard to negotiate a workable PPA price if it does not know whether it will be successful in the reverse auction. The amount of revenue required through a PPA is a function of how heavily a project is subsidized, so without knowing the subsidy, it will be hard to determine a workable PPA price.

Comment [SC44]: Subsections (i)(3)(B) and (d)(3)(A) may unintentionally preclude facilities located behind a retail electric meter or that are only able to send electricity to a distribution grid (as opposed to a transmission grid) from utilizing the proposed policy. It should be highlighted th [19]

"THESE COMMENTS ARE PROVIDED IN RESPONSE TO A REQUEST FOR TECHNICAL COMMENTS AND DO NOT NECESSARILY REPRESENT THE POSITION OF THE DEPARTMENT OF ENERGY OR THE ADMINISTRATION."

- (B) such facility is transmitting electric energy onto the electric power grid; and
(C) electric energy generated by such facility is being sold to one or more electric utilities.

(6) SECRETARY- The term 'Secretary' means the Secretary of Energy.

(7) RENEWABLE ENERGY- The term 'renewable energy' has the meaning given such term in section 203(b) of the Energy Policy Act of 2005 (42 U.S.C. 15852(b)).

(8) RENEWABLE ENERGY FACILITY- The term 'renewable energy facility' means a facility--

- (A) for the generation of electric energy and the transmission or distribution of such electric energy onto the electric power grid; and
(B) that generates such electric energy from a renewable energy source.

(9) QUALIFIED RENEWABLE ENERGY FACILITY- The term 'qualified renewable energy facility' means a renewable energy facility for which the owner or operator demonstrates, to the satisfaction of the Director, the following:

- (A) Competence of the owner or operator with respect to the generation of electric energy from the renewable energy source used by such facility.
(B) Evidence that the renewable energy generating technology used by such facility can be used on a commercial scale.
(C) Any additional criteria the Secretary determines appropriate.

[Overall comment: historically, auctions/tenders have sometimes led to overly aggressive bidding (in order to win the incentive) that, in practice, cannot be later satisfied, leading to high rates of contract failure. Consider security mechanisms to discourage unrealistic bidding.]

Comment [SC45]: EPACT05 § 203(b) does not include new electrical generation capacity at dams which previously had no electrical generation capability in the definition of "Renewable Energy."

Comment [SC46]: Subsections (D)(5)(B) and (D)(6)(A) may unintentionally preclude facilities located behind a retail electric meter or that are only able to send electricity to a distribution grid (as opposed to a transmission grid) from utilizing the proposed policy. It should be highlighted that the latter case may preclude virtually any facility in Hawaii or Alaska from utilizing the proposed policy.

Comment [DOE47]: Off-takers need not be limited to utilities -- power could be sold directly to end-users or installed on the customer side of the meter and used to meet onsite load -- i.e., no "sale" occurs.

Page 1: [1] Comment [DOE4]	DOE	5/4/2011 9:17:00 AM
----------------------------	-----	---------------------

"Price per megawatt hour" is ambiguous, and could be interpreted as a power purchase agreement price rather than the \$/MWh amount that the bidder is presumably seeking through the auction.

In addition, this section does not state what type of awards will be made through the reverse auction – is it a reverse auction for a cash production incentive or for a cash grant? Much of the language focuses on energy per year, making it seem like a production incentive, but other elements (like basis reduction) are problematic with a production incentive.

Page 1: [2] Comment [SC9]	Stephen Capanna	5/4/2011 9:51:00 AM
---------------------------	-----------------	---------------------

The legislative intent of this bill appears to create a reverse auction to incentivize the least costly sources of renewable energy. As written, this would create a price floor, limiting potential renewable energy cost declines. Conversely, a price ceiling would constrain potential program costs without limiting potential renewable energy cost declines.

Page 2: [3] Comment [DOE16]	DOE	5/4/2011 9:54:00 AM
-----------------------------	-----	---------------------

Is there an intended length for this Sec. 301 program?

It is not clear how this rolling average can be implemented in years 1-4, given that the amount of funding available and the bid composition of future year bids is unknowable.

Page 2: [4] Comment [E15]	EE	5/4/2011 9:24:00 AM
---------------------------	----	---------------------

Recommend tying this to the Purchase Power Agreement if applicable or the avoided cost of power from fossil sources instead of a 5 year period since peak power is less capital intensive than intermediate or base-load.

Page 2: [5] Comment [SC17]	Stephen Capanna	5/4/2011 9:54:00 AM
----------------------------	-----------------	---------------------

"Type" is not defined. Although it is likely this was intended to be interpreted broadly (e.g. solar energy vs. wind energy), at present it could also be interpreted quite narrowly (e.g. CSP vs. PV). Including a definition of "type" in this context could help avoid litigation over differing interpretation of this provision that would delay the policy's implementation.

Page 2: [6] Comment [DOE19]	DOE	4/29/2011 3:16:00 PM
-----------------------------	-----	----------------------

The meaning of this condition is unclear. The allocations are all specified as percentages of the total funding available in a given auction, so it is difficult to imagine what kind of situation would result in insufficient funding for a given allocation. Instead, consider the possibility where there are insufficient *bids* for each allocation – e.g., the total amount of "small" projects under the reserve price aren't enough to use up 25% of the funds.

Page 2: [7] Comment [DOE21]	DOE	5/4/2011 10:02:00 AM
-----------------------------	-----	----------------------

We interpret this provision as establishing the contract term (e.g. \$/MWh per xx yrs) on an auction-by-auction basis. If so, consider including some mention of contract term. Also, if bidders will be nominating different contract terms, then it seems like that should also be weighed in evaluating bids, in addition to contract price. E.g., if you have two wind projects of the same size and vintage, and both bid \$10/MWh, but one specifies 5

years of payments and the other specifies 10 years of payments, it seems like you'd want to pick the one with the shorter contract term.

Page 2: [8] Comment [DOE22] DOE 5/4/2011 10:02:00 AM

Releasing this information immediately after the initial reward would largely undermine the earlier provision that keeps the reserve price confidential for a full 5 years. E.g., if you know that the highest price bidder was \$100/MWh, then you know that the reserve price was above that level.

Page 3: [9] Comment [PWOC26] Patrick W. O'Connor 4/29/2011 1:34:00 PM

Given the inter-year fluctuations in overall generation for variable renewables (water, wind, solar) the incorporation of a borrowing mechanism (with a similar two year window) in addition to the banking/carry over provision would be advantageous and further smooth revenue fluctuations for renewable developers. Paragraph (C) should still apply regardless of credits borrow against future production.

Page 3: [10] Comment [DOE27] DOE 5/4/2011 9:43:00 AM

It seems like the dollar amount (or \$/mwh amount) of the award should be a standard contract term, as should the number of years the contract will be in place.

Page 3: [11] Comment [AHG29] Adam H. Goldstein 5/4/2011 10:01:00 AM

It is common practice for grid operators to proactively "curtail" electricity generation when electric supply is greater than demand, specific sections of the grid are at risk of becoming overloaded, or if the grid's stability and safety are threatened in some other way. As one example, a solar energy facility that is directed to completely curtail production might shut down even though there is abundant energy available from the Sun. Many issues affecting the frequency and length of a grid operator's decision to curtail a facility's production are outside of the control of the facility's owner or operator.

When the Director is considering revocation of a contract under subsection (d)(1)(C) he or she could be directed to take into account what, if any, production may reasonably be expected to have occurred were it not for a curtailment order from the grid operator. Without this direction it is possible that financial institutions will consider subsection (d)(1)(c) to be a significant source of risk, possibly making projects "unbankable," an industry term for projects with a perceived risk that is too great to allow financing from a bank.

Page 3: [12] Comment [DOE30] DOE 5/4/2011 10:02:00 AM

Consider making this a moving average as well, to prevent 3 extremely poor years and one "as advertised" year (which would be acceptable under the current "4 consecutive years" requirement).

Page 3: [13] Comment [PWOC33] Patrick W. O'Connor 4/29/2011 1:34:00 PM

For larger, capital intensive projects, such as a new hydropower facility, 18 month lead time brings with it a high element of risk. Restricting a qualified facility to one which has received a permit and begun construction, while extending the window, would be beneficial.

Page 3: [14] Comment [PWOC34] Patrick W. O'Connor 4/29/2011 1:34:00 PM

Allowing the Director more discretion in terms of the number and length of extensions would allow this clause to accommodate other issues, such as construction setbacks or natural disaster.

Page 3: [15] Comment [E35]	EE	5/4/2011 10:02:00 AM
----------------------------	----	----------------------

Based on what happened in 2008 and 2009, this could be too rigid. Many cogen facilities were canceled due to lack of financing, unless this is directed to large central generating facilities.

Page 3: [16] Comment [DOE36]	DOE	4/29/2011 3:21:00 PM
------------------------------	-----	----------------------

Alternatively, could simply withhold the deposit described earlier until the contract has terminated and all contract terms have been fulfilled (rather than refunding it once the project becomes operational).

Page 4: [17] Comment [SC38]	Stephen Capanna	5/4/2011 9:47:00 AM
-----------------------------	-----------------	---------------------

At present it is ambiguous if subsection (g)(3) of the bill would prevent a solar facility from utilizing the proposed policy while being depreciated as a "5-year property."

- i. Solar energy facilities are classified as a 5-year property under the Modified Accelerated Cost Recovery System (MACRS) by 26 U.S.C. § 168 (e)(3)(B)(vi)(I).
 - ii. That portion of § 168 uses a cross-references to part of the definition of "Energy Property" in 26 U.S.C § 48 (a)(3)(A), which is defining the Investment Tax Credit (ITC).
 - iii. Subsection (g)(3)(A) of the proposed bill states, "A renewable energy facility for which funds are awarded to an eligible entity under this section shall not be treated as an energy property for purposes of section 48 of the Internal Revenue Code of 1986 (26 U.S.C. 48)."
 - iv. The legislative intent is clearly to prevent facilities from using both the ITC and the proposed policy; however it is unclear if the legislative intent was to prevent solar facilities from utilizing the proposed policy and a 5-year MACRS depreciation schedule.
 - v. It is possible that if eligible facilities cannot be "Energy Property" for the purposes of 26 U.S.C § 48 then they also cannot be a 5-year property for the purposes of 26 U.S.C. § 168.
- This ambiguity could be removed with a clear provision regarding how Subsection (g)(3) should be interpreted in relation to 26 U.S.C. § 168, and solar energy facilities could be allowed to utilize the proposed policy while being depreciated as a 5-year property under MACRS.

Page 4: [18] Comment [DOE40]	DOE	5/4/2011 9:47:00 AM
------------------------------	-----	---------------------

Does this section contradict paragraphs (2)-(4) above, which seem to eliminate the possibility of receiving the ptc, itc, and loan guarantees if awarded funds through an auction? If not, how does one subtract a federal grant amount (for example) from what is presumably a multi-year production incentive awarded under this program? Again, discount rate issues may need to be considered. Also, this section seems to care only about other federal subsidies – does this also hold for paragraph (c)(6)(ii) earlier, or are state subsidies also an issue?

Page 4: [19] Comment [SC44]	Stephen Capanna	5/4/2011 9:51:00 AM
-----------------------------	-----------------	---------------------

Subsections (i)(5)(B) and (i)(8)(A) may unintentionally preclude facilities located behind a retail electric meter or that are only able to send electricity to a distribution grid (as opposed to a transmission grid) from utilizing the proposed policy. It should be highlighted that the latter case may preclude virtually any facility in Hawaii or Alaska from utilizing the proposed policy.

Mr. WHITFIELD. Thank you, Mr. Sandalow.

At this time, Mr. Hicks, you are recognized for a 5-minute opening statement.

STATEMENT OF THOMAS HICKS

Mr. HICKS. Thank you, Chairman Whitfield and distinguished members, members of the subcommittee, thank you for the opportunity to appear before you today at this hearing on H.R. 909. While neither the administration nor the Department of Defense has a formal position on this legislation, I am here to share with you the perspective of the Department of the Navy.

As the Deputy Assistant Secretary of Navy on Energy, I have been actively involved in assessing the policy, economic, technological, and environmental costs and benefits associated with the use of fossil fuels and alternative fuels. I and many members of my staff and colleagues have personally met with dozens of industry representatives of U.S.-based organizations from a wide range of interests including alternative fuel companies, large oil companies, venture capital, private equity, and industry associations. We have also met with government experts from DOE, the Department of Defense, Department—U.S. Department of Agriculture, NASA, EPA, and others. So the perspective provided here today is drawn on these discussions and on contemporary studies and analysis on the topic of alternative fuels.

Changing the way the United States uses, produces, and acquires energy is one of the central policy challenges that confront the Nation. It is something that Secretary Mabus cares deeply about, and it is something that the Navy and Marine Corps, under his leadership, has been aggressively working towards for the last 2 years.

As a military and as a country, we rely far too much on fossil fuels, far too much on foreign sources of oil. This dependency degrades our national security and negatively impacts our economy. Our dependency on fossil fuels makes us more susceptible to price shocks, supply shocks, natural and man-made disasters, and, as we have recently seen, political unrest in countries halfway around the world.

The challenges we face today are not just about what types of fuels we use or where and how those fuels are produced. Clearly we must be more efficient in the fuels that we use. The best barrel of oil is the barrel of oil we do not use. The challenge we face in the Navy today is the 280 ships we have today, the 3,700 aircraft are largely the ones we are going to have tomorrow and into the future, so focusing on new sources of fuel, drop-in replacement fuel is critical.

For ships being more efficient means we can increase the days between refueling, improving both its security and combat capability. Better fuel economy for our aircraft means we can extend the range of our strike missions, enabling us to base them farther away from combat areas. Being more efficient and more independent and more diverse in our sources of fuel improves our combat capability both strategically and tactically.

The Department of the Navy's interest in this topic of alternative fuels is fundamentally about improving our national security and our long-term energy security. The more we replace for in sources

of oil with more diverse, domestically-produced alternative fuels the better we are as a military and the better we are as a Nation. How one successfully accomplishes that objective is where the debate lies, and it is a topic that the Department of the Navy has a perspective.

It has recently suggested before this committee that the best near-term approach to meet the Department of Defense fuel needs is essentially a coal-derived or a mixture of coal-derived and biomass Fischer-Tropsch fuels. Fischer-Tropsch is a thermo-chemical conversion process invented and developed in pre-World War II Germany to convert resources such as coal, natural gas, and biomass to fuel oil. In this country given the enormous quantities of biomass required and its relative limited availability at the scales required to run a Fischer-Tropsch or an FT plant, biomass as a long-term feedstock that is typically not considered. More often than not, coal is viewed as the primary, if not exclusive, feedstock, and as a result, in addition to requiring large, new sources of coal, it requires enormous quantities of water, \$5 to \$10 billion in capital per plant to provide a fuel result that is more than twice as carbon intensive as petroleum.

From the Navy's perspective, there simply are too many questions to suggest that this is the best near-term solution. In our ongoing dialogue with industry, venture capital, and the equity communities, one thing is clear. America's advanced biofuel industry knows no geopolitical boundaries, and unlike the proposed near-term solution, the feedstocks and refineries needed to produce advanced biofuels to power the fleet or our aircraft can literally be produced in every State, all 50 States.

The U.S.-based companies comprising this industry that are currently producing or will soon be producing fuels across the spectrum from the tens of thousands of gallons to the tens of millions of gallons. These are companies new and old, some are small businesses, and some are now publicly traded. These companies represent the type of innovation and spirit needed to meet the energy demands of the future. In conclusion, a robust advanced drop-in biofuels market is an essential element of our national energy security. Energy security for the Nation requires unrestricted, uninterrupted access to affordable energy sources to power our economy and our military. Traditional fossil-fuel based petroleum derived from crude oil has an increasingly challenging market and supply constraints. Chief among these is limited, unevenly distributed, and concentrated global sources of supply. Advanced biofuels that use domestic, renewable feedstock provide a secure alternative that reduces the risks associated with petroleum dependence.

Just in closing, I would like to personally thank the committee for addressing the important topic of alternative fuels and for providing the Department of the Navy the opportunity to offer its perspective. Thank you.

[The prepared statement of Mr. Hicks follows:]

NOT FOR PUBLICATION UNTIL
RELEASED BY THE
SUBCOMMITTEE

STATEMENT OF

MR. TOM HICKS

DEPUTY ASSISTANT SECRETARY OF NAVY FOR ENERGY

BEFORE THE

HOUSE SUBCOMMITTEE

ON ENERGY AND POWER

03 JUNE 2011

NOT FOR PUBLICATION UNTIL
RELEASED BY THE
HOUSE SUBCOMMITTEE ON
ENERGY AND POWER

Mr. Chairman and distinguished Members, thank you for extending me the invitation to provide a Department of Navy perspective on alternative fuels. As the Deputy Assistant Secretary of Navy on Energy, I have been actively involved in assessing the policy, economic, technological, and environmental costs and benefits associated with the use of fossil fuels and alternative fuels.

I understand that this Committee is holding these hearings in consideration of HR 909 but I must confess I have not yet had the opportunity to thoroughly review HR 909. Today I would simply like to provide the Department of the Navy perspective on the viability of DoD constructing and operating a coal-to-liquid facility. In short, Department of the Navy does not believe that coal-to-liquid facilities, constructed and operated by Department of Defense is a sound policy objective.

The Need for Change

Changing the way the United States uses, produces, and acquires energy is one of the central policy challenges that confront this nation. It is something that Secretary Mabus cares deeply about and it is something that the Navy and Marine Corps, under his leadership, has been aggressively working towards for the last two years.

As a military and as a country, we rely heavily on fossil fuels and heavily on foreign sources of oil. This dependency degrades our national security, hurts our economy, and ultimately affects our planet. Our dependency on fossil fuels makes us more susceptible to price shocks, supply shocks, natural and man-made disasters, and, as we have recently seen, political unrest in far away countries.

Americans clearly understand the economic linkage at work and the effects upon our economy. But the rising price of oil also dramatically impacts the military. For every \$1 rise in a barrel of oil, the US Navy and Marine Corps pay more than \$30 million. We don't have that money to spare. Every extra dollar we spend on fuel is a dollar we don't spend on operational requirements or on training and equipping our Sailors and Marines for the jobs they need to do.

But the challenges we face are not just about what types of fuels we use, or where and how those fuels are produced. Clearly, we must be more efficient in the fuels we use. The best barrel of oil is the barrel of oil we do not use. The challenge we face is that the 280+ ships and 3,700 aircraft in service today are largely the ones we will have tomorrow and into the future, so focusing on new sources of fuel, drop-in replacement fuel is critical. It is also critical that we look to make the ships and aircraft that we do have more efficient. And we are doing just that. We are seeing promising results in applying hull coatings, propeller coatings, stern flaps, and digital controls to our surface ships. A hybrid electric drive installed onboard the USS Makin Island has resulted in savings of more than \$2 million on its maiden journey to its homeport in San Diego which will save up to \$250 million over the life of this vessel. We are exploring how to make the engines on our aircraft more efficient, looking to upgrade our simulators to provide equal or better training environments to reduce fuel usage. And we're looking at incentivized energy

conservation programs both for our ships and our aircraft to further embed energy efficiency into our culture.

Making our ships and aircraft more efficient improves their fuel economy. For ships this means that we can increase the days between refueling – underway replenishments – improving both its security and combat capability. Better fuel economy for our aircraft means we can extend the range of our strike missions enabling us to base them farther away from combat areas. Being more efficient and more independent, more diverse in our sources of fuel improves our combat capability both strategically and tactically.

The Department of the Navy’s interest in this topic of alternative fuels is fundamentally about improving our national security and our long-term energy security. Doing so, we can lead the Department of the Navy, the Department of Defense, and the U.S. government in changing the way we use, produce, and procure energy. There is a commonly-held view that the more we replace foreign sources of oil with more diverse, domestically produced alternative fuels the better we are as a military and the better we are as a nation. How one successfully accomplishes that objective is where the debate lies and is a topic that the Department of the Navy has a specific perspective.

“Best Near-term Solution”

Several weeks ago and perhaps later today as I understand, the Subcommittee on Energy and Power received testimony suggesting that the best near-term approach to meet the Department of Defense fuel needs is a coal-derived or a mixture of coal-derived and biomass Fischer-Tropsch fuels.

Fischer-Tropsch is a thermo-chemical conversion process invented and developed in pre-World War II Germany to convert resources such as coal, natural gas, and biomass to fuel oil. Given the enormous quantities of biomass required and its relative limited availability at the scales required to operate Fischer-Tropsch plants, biomass as a long-term feedstock is typically not considered practical. More often than not, coal is viewed as the primary, if not exclusive, feedstock. As a result, in addition to requiring large, new sources of coal, it requires enormous quantities of water, \$5 to \$10 billion in capital per plant to provide a fuel result that has more than twice the carbon emissions of petroleum.

From the Navy’s perspective, there is a better way. In its ongoing dialogue with industry, associations, and government one thing is clear: America’s advanced biofuel industry knows no geopolitical boundaries. Unlike the proposed “near term” solution discussed above, the feedstocks and the refineries needed to produce advanced biofuels to power the Fleet or our aircraft can literally be made in all fifty states. The camelina grown in Florida and Montana, the algae grown in New Mexico, Hawaii or Pennsylvania, for example, can be turned into fuels blended in existing infrastructure in the Gulf or on the East or West coast to power the Fleet.

The U.S.-based companies comprising the advanced biofuels industry that are currently producing or will soon be producing fuels across a spectrum from the tens of thousands of gallons to the tens of millions of gallons per year. These are companies new and old, small and large. These are companies using algae, biomass, yellow grease, jatropha, switchgrass, corn stover, and rotational crops like camelina. Some are or once were small businesses and some are now publicly traded.

We've seen such rapid technological developments in our recent history across a broad range of technologies leading cutting-edge industry leaders to assert that the data suggests biofuels can scale to the quantity needed without impact food availability. These companies represent the type of innovation and spirit needed to meet the energy demands of the future. This industry, America's advanced biofuel industry, generally holds itself to a higher standard as well. Not satisfied with simply having carbon emissions on par with petroleum, many of the companies are producing fuels having 50 percent lower carbon emissions. And, more often than not, they are producing fuels that do not compete for food, that do not overly burden water supplies, that do not generate enormous amounts of waste, and that minimize direct and indirect land use changes.

Conclusion

A robust advanced drop-in biofuels market is an essential element of our national energy security. Energy security for the Nation requires unrestricted, uninterrupted access to affordable energy sources to power our economy and our military. Traditional fossil-fuel based petroleum derived from crude oil has increasingly challenging market and supply constraints. Chief among these is limited, unevenly distributed, and concentrated global sources of supply. Advanced biofuels that use a domestic, renewable feedstock provide a secure alternative that reduces the risks associated with petroleum dependence.

Diversification to advanced biofuels is essential to sustain the U.S. military's mission capabilities.. Accordingly, the Department of the Navy has adopted a goal of, by 2020, replacing one-half of conventional petroleum based fuel use with domestically sustainable fuel alternatives.

Only a handful of production facilities for renewable jet fuel and diesel will operate in the foreseeable future. Military and civilian end users of fuel have clear strategic incentives to adopt renewable drop-in fuels, but widespread adoption will be possible only when those fuels become cost-competitive.

As Secretary Mabus has said the Navy has always been a leader in adopting new technologies to power our ships over the past 235 years. We went from sail to coal in the 1800's, coal to oil in the early 1900's, and added nuclear power in the 1950's. And at each step of the way there were those who said the Navy's approach was a mistake, that it was too risky or too costly, that we were trading a known global infrastructure for one that was not big enough to meet the needs of the Fleet. And in every single instance those folks were wrong. The energy revolutions made us

a better Navy and a better country. The impacts to our national security, energy security, and our war fighting capability are clear.

Adding domestically produced, advanced biofuels to power the Fleet and being more efficient in how we use that energy is merely just one more revolution, one more innovation. And it precisely the kind of uniquely American spirit behind these innovations that will lead us into a new century.

In closing, I would like to personally thank the Committee for addressing the important topic of alternative fuels and for providing the Department of the Navy the opportunity to offer its perspective.

Mr. WHITFIELD. Thanks, Mr. Hicks. We appreciate your testimony as well.

I will recognize myself for 5 minutes of questions.

Mr. Sandalow, you are Assistant Secretary for Policy and International Affairs at DOE, and you know as well as any of us that we are utilizing about 20 million barrels of oil a day here in the U.S. for all of our needs, most of it transportation. And since 19—my first memory was 1976, on this subject when Jimmy Carter was President, and the big push was made, we have got to be less dependent on foreign oil.

Now, this administration in my personal view is overselling the electric cars and some of these renewable energy mechanisms, not that we don't need them but I don't realistically think that they are going to be able to meet all of our increased energy demands any time soon.

But you have probably studied this even more than I have since you are head of policy. What is your realistic appraisal on our ability to significantly reduce the amount of oil that we are buying from the Middle East and other countries, and what kind of time-frame from your analysis do you think is realistic?

Mr. SANDALOW. I think the ability of this country to meet any great challenge is extraordinary, Mr. Chairman, and I believe that if we set our minds to it that we can reduce our dependence on oil, reduce our dependence on imported oil, and we can do it by following a number of different pathways. I do believe that electric vehicles have tremendous potential, and by the way, not just to reduce our dependence on oil but also to create jobs in this country.

Mr. WHITFIELD. Let me just make one comment on electric cars. The other day I saw a 1917 issue of the New York Times, and the front page was, electric cars are the cars of the future. That was 1917, and so I just point that out, that I would like for you to go on with your explanation and talk about some timelines as well.

Mr. SANDALOW. Yes. Thank you, Mr. Chairman. Fortunately, today we have new battery technologies like lithium ion batteries that weren't in existence in 1917, that are transformational that I think are really going to make a difference in this sector.

But I fundamentally agree with the point you made about it is not just electric vehicles. I mean, we also need to pursue a number of other technical pathways. Biofuels have already been discussed, and biofuels have tremendous potential to reduce our dependence on imported oil and by also creating jobs here in the United States. And we need to do that with new advanced biofuels, we need to build the infrastructure to make that work, and we need to pursue natural gas as a transportation fuel. We have tremendous resources of natural gas here in this country expanding dramatically.

We need to improve efficiency. That will matter tremendously in terms of it, and then finally we need to expand production of domestic oil as well, and we need to do it in an environmentally responsible way. That can make a big difference.

So if we pursue all of these pathways, Mr. Chairman, I am absolutely confident that we can get off of imported oil in a significant way.

Mr. WHITFIELD. Thank you. Many of us had a lot of frustrations up here about some of the money, the way it was spent on the

Stimulus Package and others, and specifically I want to ask you about this one. The first company that DOE chose to give a federal loan guarantee was Solyndra, which is a solar manufacturer. It received \$535 million in 2009. Since then the information we have is that the company has imploded. Its initial public offering failed, auditors have raised questions about whether the company will survive, and it has closed one of its facilities and laid off 180 workers.

Could you tell me what your information is on this company?

Mr. SANDALOW. Yes. I don't have specific information on that project to relate here today, Mr. Chairman. I would be happy to follow up for the record on that, but I would say more broadly this loan guarantee program has created tens of thousands of jobs and helped put America in a competitive footing in some of these renewable energy technologies.

Mr. WHITFIELD. Well, I mean, some of them may have created tens of thousands, but that one—they have already laid off 180, and I might also say that First Wind Holdings had sort of the same experience. So, I mean, I think all of us are encouraging people to develop alternative fuels, but to be spending this kind of money on failed projects is just irresponsible in my view.

And then I want to ask this question also. We hear a lot about wind power, and everyone I talk to does not think wind power is a realistic, major producer of energy anytime soon, and I want to know have you all conducted any studies with any groups on the amount of land that is necessary to produce any meaningful amount of electricity from wind? I mean, I am genuinely concerned about the amount of land that it takes to produce any meaningful amount of energy from wind.

Mr. SANDALOW. Mr. Chairman, I would say the wind power is already producing significant amounts of energy and growing in this country. It has been one of the major sources of new energy in this country for the past couple of years.

In—there was a study done actually in the prior administration which pointed to the potential for wind power in this country at the range of 20 percent and more in the decades ahead.

Mr. WHITFIELD. To be without incentives. Right now there is a \$24 per kilowatt hour incentive for wind power.

Mr. SANDALOW. But the cost is coming down like it is with all these new technologies, and you know, I would say on the topic of land, that certainly land is required for some of these big turbines, but there is increasing interest right now in offshore wind all the way around, you know, around the world. So I think this is another area where with American innovation, American ingenuity, and research we can create the technology of the future that will allow us to have cheap, clean, secure energy.

Mr. WHITFIELD. Thank you. My time has expired.

Mr. Gonzalez, you are recognized for 5 minutes.

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

Let me go straight to Mr. Hicks, because you said a couple of things that were rather interesting. Regarding DOD and the role that it can play obviously as we go in search for alternatives, on page—I am trying to see what page this is actually. I think it is page 3 of your testimony, “the camelina grown in Florida and Mon-

tana, the algae grown in New Mexico, Hawaii, or in Pennsylvania, for example, can be turned into fuels blended in existing infrastructure in the Gulf or on the East or West Coast to power the Fleet.”

So you are saying that that may be a realistic alternative in your opinion?

Mr. HICKS. It certainly is a realistic and growing alternative for us, literally and figuratively. I mean, it is one that we are seeing—today we are aware of a facility in the—in Texas, for example, that is capable of alternative fuels, bio-based alternative fuels, 90 million gallons per year, and claiming at competitive prices with petroleum.

So we are seeing that. You know, what we are looking at is fuels that don’t need new infrastructure, and that is both for the commercial sector but also for us. We need ready, dropped-in fuels, fuels that don’t require changes to our platforms and our engines, that don’t require changes to our infrastructure to store and use the fuel, and that is exactly what we are getting by looking at these advanced biofuels.

And to be clear, we are looking at these in 50/50 blends, so these are blended with petroleum, and that is a common point for the commercial industry as well, going to a 50/50 blend.

Mr. GONZALEZ. In the production of these alternatives, but they still require some incentives, some encouragement in the way of tax credits and such that we have attempted to do in the past. Is that something that still would be in the mix?

Mr. HICKS. Certainly that would help. That said, there are companies and there are about a handful of those that are publicly traded now and are moving forward with their plans without necessarily those subsidies in hand. But certainly that type of support would accelerate the maturation of that market and enable that—those technologies in this country to be something that can be exported outside of this country, and I think to the betterment of those commercial industries.

Mr. GONZALEZ. Let me ask you about the Department of Defense specific as far as contracting for alternatives. Are you allowed to enter contracts that are long-term, because obviously that would have some benefits, there would be some predictability in the producers of biofuels alternatives and so on.

What is the situation when it comes to DOD contracting long term?

Mr. HICKS. Sure. So for contracting long term for fuels and to be very clear, the Navy and all the services purchase our fuels through Defense Logistics Agencies, Energy, which is part of the Department of Defense. Their limit is a 5-year agreement to purchase fuels.

Mr. GONZALEZ. And I don’t know the answer, that is why I would ask you. Is 5 years something that works to the benefit of both the Department of Defense as well as the producers of the alternatives that were seeking greater use?

Mr. HICKS. Well, certainly as we have talked to the producers, 5 years for an emerging industry is not something that they feel is sufficient, and I know through legislative proposals the Defense Logistics Agency Energy has put forward requesting as much as 20 years, and what we have heard consistently from industry is 10, 15

years are needed, but I think where the Department of Defense is today is requested through DLA Energy upwards of 20 years.

Mr. GONZALEZ. And full disclosure, Mr. Griffith and I have a bill to that effect. That is the reason I am asking. It is kind of self-serving but—

Mr. HICKS. We thank you for your support, and I think it would be a help as well as the ability to address some of the scoring issues that go with those purchases as well.

Mr. GONZALEZ. I only have 40 seconds left, and Mr. Sandalow, I have a question for you, and that is I know the chairman had some doubts about electric vehicles, but I do see that is an increasing role, but have you all been able to or is there another agency or department that would be more appropriate to factor in the increased demands on the production of electricity if, in fact, we increased the number of electric vehicles? Some could be hybrid, and some would be like the Leaf, which is fully electric. Nevertheless, you still got to plug them in.

Mr. SANDALOW. Thank you for the question, Congressman. That is something the Department of Energy has looked at very closely, and the good news there is that we have a lot of excess capacity in our power generating sector at night, and when cars plug in at night, they are going to be able to refuel.

Another piece of good news is that these electric vehicles are very efficient. They are much more efficient in terms of their use of energy than in a standard internal combustion engine. So the technical productions that have been done say that even with tens of millions of these cars on the road we would not be putting major stresses on our electric generating.

Mr. GONZALEZ. Thank you very much. My time is up.

Thank you, Mr. Chairman.

Mr. WHITFIELD. Yes, sir, and Mr. Terry, you are recognized for 5 minutes.

Mr. TERRY. Thank you. Mr. Hicks, I appreciate your testimony here today and presence. In your opening you made statements and suggestions about making the Navy vehicles more energy efficient, and of course, you also then mentioned that the major users of fuel are ships and planes.

How do you make them more fuel efficient? How do you get better air miles per gallon for your planes and ocean miles for your ships? And following up you can just make them more efficient, why haven't you?

Mr. HICKS. Well, we are making them more efficient, and the way you do that, and I will speak both for our surface vessels as well as our aircraft, in many ways you can look at the codings on those, and so for our service vessels, for example, we are putting on whole codings, propeller codings to make the ships effectively silkier in the water, better able to float through the water.

We are also putting on stern flaps onto many of our ships, and where we can, where it is economically justified in the lifespan of those platforms, as they go through their dry docking procedures, we are putting those measures on place—on board.

With our aircraft it is largely, again, looking more at some of the codings we have on our aircraft, and again, we are doing that, but there is another opportunity that we are working on, we have had

some success with our surface vessels, and that is an incentivized energy conservation program. We call it INCON, and it is a way for the skipper of the ship as they go forward and plot out their course if they can do that in a more efficient way, some of the savings that comes from that could be used for other supplies on the ship, and the rest of that savings coming back to the Navy for other purchases such as fuel order training.

So there is a culture aspect to this as well that we are looking at, and we are also looking at the so-called hotel loads on these—on the ships, so not only as they are under way, what do we really need to power and when and then certainly as they plug into the shore and literally plug in and get much of their power from the shore, how can we reduce the energy on there to limit it to what is really required to maintain the combat readiness of that craft.

So we are doing these, and we are exploring many other opportunities as well, but, you know, the ships and the aircraft we have today are the ones we are going to have for the future. So being more efficient is critical to that but also finding alternative sources of fuel is—

Mr. TERRY. Let us go into that quickly, and you had mentioned coal to liquid, and in fact, a few years ago that was a major push by the Department of Defense for national security and defense security in having a domestic source that is reliable and secure.

Where are—where is the Defense Department overall, Navy, on production of aviation fuel or diesel fuel from coal? Has that been shut down?

Mr. HICKS. Well, the Navy—I can't speak for all the Defense Department, but the Navy never really had a coal to liquid certification program. The Air Force has had that program. They are also testing hydro-renewable fuels, jet fuels, as we are. Our path has been more with the hydro-renewable jet fuels. We will have tested and certified every service vessel and every aircraft frame by 2012, to use 50/50 blends of alternative fuel, hydro—

Mr. TERRY. Is the Navy's position that they would like to have a coal-to-liquids program? You had mentioned that in your statement.

Mr. HICKS. I don't believe I mentioned it, sir, and if I did, I misspoke, but I think we are very comfortable with the program that we are on, and we feel that that is the best near-term solution for the Department of Navy is one that is focused on alternative biofuels. The challenges with coal to liquids, as has been mentioned before, it is a technology that has been around since pre World War II Germany. The challenges there are the capital expenditures required, \$5 to \$10 billion, the amount of water and the sources of water that you need for that, the amount of waste that is generated from those plants, and then certainly there is the carbon picture there that—which is typically those plants without carbon capture and storage—

Mr. TERRY. And my last—

Mr. HICKS [continuing]. Hasn't been done in this country.

Mr. TERRY [continuing]. Question, I hate to interrupt but—

Mr. HICKS. Sure.

Mr. TERRY [continuing]. I have been told that the Navy has used aviation fuel blend with the aviation fuel from algae. Can you tell me how that has worked?

Mr. HICKS. It has worked flawlessly. I have actually had the privilege to sit down with the pilot of the F-18 that used the 50/50 blends of biofuels. Part of what we, you know, one of the things that we require is that the ready drop-in fuels, the blends that we have is transparent to the end users and does not sacrifice any part of our mission, and that is what we are finding today.

So F-18 hornet a year ago in April flew at mach 1.2 and has since gone through its entire envelope with not a—any sort of issue at all with the fuel, and we are finding out that same case in the rivering command boat that we have got, a Seahawk helicopter, and the other platforms that we see. Algae is one of the biofuels or feedstocks that we have used to date. It is not the only one. We have also used camelina, and there are many other types that would be, that could be grown in, again, all 50 States in the country, and we are seeing that.

Mr. TERRY. Thank you.

Mr. WHITFIELD. Thank you. Mr. Waxman, you are recognized for 5 minutes.

Mr. WAXMAN. Thank you very much, Mr. Chairman. Mr. Sandalow and Mr. Hicks, I would like to thank you for appearing before us.

Mr. Hicks, our Armed Services set an interesting nexus in our energy policy. They are both the biggest single user of energy and also reliant on the civilian energy infrastructure. Because of these two factors they can be a significant catalyst for helping the Nation transition to a clean energy future by advancing new technology and leading the way for the development of new commercial transportation fuels.

In 2007, we enacted the Energy Independence and Security Act. Section 526 of that act contained a provision to ensure that long-term government contracts are not used to prop up dirty, unsustainable fuels.

Mr. Hicks, from the Navy's perspective what signal has Section 526 sent to industry and the Armed Services, and can you explain what the result has been?

Mr. HICKS. I can explain that from the Department of Navy's perspective, again, not speaking for Department of Defense or the administration, but what we have seen is in working with, again, industry from the refiners and the companies themselves to the equity communities that support them is that they are responding to that, and they are holding themselves to that higher standard, not only on greenhouse gas emissions as 526 requires, so we see that as an effective policy tool, but also on things such as food, security, water use, land use, indirect and direct, and they are holding themselves to that higher bar because, well, I will leave it to them to describe why, but that is what we are seeing as a trend.

Mr. WAXMAN. Well, you mentioned the algae-driven jet fuel the Navy purchased from Solazyme. I had the opportunity to visit their operations in Northern California. It is the world's first 100 percent algae-based jet fuel, and you have mentioned that there are other things along those same lines, but this just seems to be the right

result from the market signal that has been sent by Section 526. Is that right?

Mr. HICKS. Yes, it does, and I think as you mentioned Solazyme is a great example as a company that literally started in a garage as I understand it and has as of a week ago just went public and was over subscribed by 10 or 12 fold. So—and hundreds of jobs coming along with that, but bottom line providing fuel for us in the areas where we have used it for the testing and certification, you know, blended with traditional fuels and, again, transparent to the users.

It has been an effective tool. The market is responding to this and is ramping up to support it, and I would also say that private equity in our conversation, multiple, multiple conversations with them is lining up as well, and they are starting to see these companies with some very solid business plans and business models and supporting them as well.

Mr. WAXMAN. The bill that is before us for discussion would repeal Section 526. From the Navy's perspective, from your perspective, would repealing Section 526 send the right direction of the industry and the Armed Services?

Mr. HICKS. I think, again, we are comfortable with 526. It is an effective policy tool. It is having an affect on the market that I think is one that is the right direction in the sense that it is providing not only clean fuels but fuels that ultimately will be competitive, and I think that is what we are looking for.

Mr. WAXMAN. It in effect means the Armed Services and the Congress are consistent in the message that we must pursue new, more sustainable fuels. I think that is an important policy that we want to continue.

Mr. SANDALOW, the bill before us purports to be a roadmap to our energy future, but it omits key policies that many recognize are critically important. For example, it does not even mention energy efficiency. It also fails to mention technologies that show so much promise and are just now beginning to be commercialized like electric vehicles.

Instead it seems to be a proposal to return to the energy policies of the Bush administration with a focus on drilling in the Arctic Refuge and the Outer Continental Shelf.

Can, Mr. Sandalow, can you discuss whether this legislation identifies the right areas for us to focus on as a roadmap to our energy future?

Mr. SANDALOW. Well, thank you, Mr. Ranking Member. Let me emphasize in response to the point you made about energy efficiency. I talked to a power plant executive recently who told me that the cheapest power plant for him is the one that he doesn't have to build, and he underscored the tremendous potential in this country to improve our economic performance by saving energy, by stopping the wasting of energy. So any comprehensive energy plan for our country needs to include energy efficiency, what some people call the first fuel.

It also needs to emphasize innovating, and you know, we are an extraordinary Nation with—throughout our history we have innovated and succeeded by doing so. The energy race in the next century is going to be absolutely central, and I think government and

business working together can help position the United States in this global competitive marketplace.

Mr. WAXMAN. If this committee were to craft an energy policy to meet our Nation's needs now and in the future, would the Department be willing to work with us and support those efforts?

Mr. SANDALOW. Yes, Mr. Ranking Member, very closely.

Mr. WAXMAN. Thank you. Thank you, Mr. Chairman.

Mr. WHITFIELD. Mr. McKinley, you are recognized for 5 minutes.

Mr. MCKINLEY. Thank you, Mr. Chairman.

Since I have come to Congress now, what, 140 days now, I have come to really understand more the frustration of the process here, and I have really come to the characterization coming from West Virginia that is a coal State, I really can sense a strong disdain in this administration for using coal, and it manifests itself time and time again, even at the White House here today, how he, the President mischaracterized fly ash as being poisonous and running in our streams and killing our marine life. Just patently false.

I see in Wellsville that there was a coal liquefaction facility plan for there to create diesel fuel, excuse me, airplane fuel for our military. That has been held up by permitting. There was a facility constructed in Marshall County, West Virginia, in the '60s with a coal liquefaction facility there.

I would ask you, I guess, Mr. Sandalow, that might be—no one has records of that that we can find. Is that something that you could get back that that plant was operating for numbers of years to prove the viability of that technology and conclusions?

As I recall from the '60s that there was something that as long as petroleum was over \$40 a barrel, that is age ago, that is before inflation obviously, that it was commercially viable that we could take coal and liquefy it.

Could you possibly try to find that, some of those older findings so we could refresh that? It is just an ongoing characterization I have of this administration that they have—they are avoiding—you all seem to be avoiding accountability. I am an engineer. I want to solve a problem, not take on more problems. Once I identify and we have got issues out here, and we never seem to finish them.

We have talked—we know about liquefaction, we know about some of these things, but now let us take on another project so that we never conclude that project. Clean coal technology. Everyone was thumping their chests over the years. We were going to have clean coal technology, we are going to put more money into research, and then when the President submits his budget, he slashes the money in the National Energy Technology Lab. It is just so blatantly evident that you all don't want to use coal.

So now my question would be if we can, I guess we just have to wait you out. Two years we will find out. Can we not use the spent fuel rods? Then you all have, I mean, participated—the Yucca Mountain Project is on hold. Correct? Can we put fuel rods in Yucca Mountain today? The answer is no?

Mr. SANDALOW. Congressman, if I could, first I want to be sure to respond to the question you asked about the specific plant you mentioned, and I would be happy to—I am not familiar with that particular plant, but I would be happy to look into that for you.

Mr. MCKINLEY. Thank you.

Mr. SANDALOW. Follow up on that. Second, I want to state clearly that coal is a vital energy source for this Nation, that it is one that is essential for our future, and it is one that this administration is committed to as an important source of energy for our country. And that is one reason that we have invested so much in our coal future, in funding for clean coal research, and funding for deployment of carbon capture technologies, and a variety of other programs that would make the difference for this country, and you know, I have had the privilege of visiting the National Energy Technology Lab in your State, Congressman. It is—I think it is a real jewel of the Department of Energy lab system, doing important work in this area.

So I hope it is something we can work on.

Mr. MCKINLEY. The Department, the EPA has become a rogue agency for—they are pulling permits for mines, they are shutting them down, they were operating for 4 years, Melville Mine down in Logan County. They pulled the permit for Dan Mine in northern West Virginia over a water permit.

These are operating mines. I want to get back now to the—I think it is clear where the administration is. They don't want to be held accountable, they want to continue doing research rather than finish the job on what they are, and one of those elements is coal.

But I want to go back to nuclear. Is there any way that we can take those spent fuel rods instead of storing them, are they—is there any way that we could use them for the military in fueling our ships that once they have been completed, their lifecycle is finished for creating energy?

Mr. HICKS. We can take that one back for the record, sir. I am not able to speak to that today.

Mr. MCKINLEY. Do you have any—

Mr. SANDALOW. I know this, I mean, this committee has had extensive conversations about Yucca just this week, Congressman, I know, and my colleague, Pete Lyons, was up here testifying on exactly this topic, and I know he is answering extensive questions for the record from your committee on exactly this topic.

Mr. MCKINLEY. But right now for the—we cannot store any fuel rods at Yucca Mountain. Is that correct?

Mr. SANDALOW. Right. I mean, Yucca Mountain, of course, Congressman, is, you know, right now not in a position, and it is—

Mr. MCKINLEY. Fifteen billion dollars spent—

Mr. SANDALOW [continuing]. The blue ribbon—

Mr. MCKINLEY [continuing]. And we can't put anything in it yet. Sorry. I have run over my time.

Mr. WHITFIELD. The gentleman from Texas, Mr. Green, is recognized for 5 minutes.

Mr. GREEN. Thank you, Mr. Chairman. I have a number of questions.

My first one is for Mr. Hicks. Section 526 of the Energy Independence and Security Act of 2007 sought to limit the DOD's ability to enter into contracts for fuels derived from coal-to-liquid fuels or "non-conventional" oil sources, such as Canadian oil sands. Advocates of Section 526 claim it was supposed to impact the purchase of fuels that were made available to the general fuel supply,

but environmental groups are suing DOD for purchasing fuels derived from oil sands.

Is it practically possible for the DOD to determine which fuels are derived from Canadian oil sands or which are not in the general—Nation's general fuel distribution system?

Mr. HICKS. Congressman, I appreciate that question. I think the best way for me to answer that is really take that one for the record. That is really a better question I think for Defense Logistics Agency Energy, who is the one who that is purchasing the fuel on behalf of the services to answer. Yes. I would prefer that, to take that for the record, sir.

Mr. GREEN. Well, I have refineries that produce—bring in crude oil from a lot of different places, and the result is aviation fuel, and you can't tell if the aviation fuel meets the criteria whether it comes from the Gulf of Mexico, Saudi Arabia, or even Canadian oil sands. So—

Mr. HICKS. Yes, Congressman. I know that is a challenge and how they can find that accounting, and we can do, can kind of track where the dropped fuel and barrel of oil came from, but it is one that is probably better suited for DLA Energy to respond.

Mr. GREEN. Thank you.

Mr. Sandalow, Wednesday the last question from my colleague, the Environment Subcommittee had a hearing on Yucca Mountain. In that hearing we discussed the need to develop at least one interim storage facility to ease the burden of the storage dilemma.

The President has said that he supports investments in alternative forms of energy, and Secretary Chu testified before this committee that we are unable to meet the President's goal if we do not continue to invest in nuclear energy. This, of course, means that we will have to have an increase in nuclear waste, and we need to safely store it. So we will need to resolve the situation sooner or later.

In June of 2009 the DOE withdrew its proposed Global Nuclear Energy Partnership Technology Demonstration Program. This program would explore different ways to recycle spent fuel much as the French system. If the administration does not support long-term storage at Yucca Mountain or recycling fuel rods but remains insistent on we must rely on energy sources such as nuclear, then just what do we intend to do with this nuclear waste? Is there an alternative? Because I know the French have been, you know, recycling those rods for at least 20 years.

Mr. SANDALOW. Yes. Thank you for the question, Congressman. It is very important and along the same lines as Congressman McKinley.

This is a topic that is being addressed by Blue Ribbon Commission appointed by the Secretary of Energy, composed of some of our Nation's leading experts on this topic, and their report is expected this summer. So I would defer any further question, you know, and answer on that, I mean, answer on that to Blue Ribbon Commission.

Mr. GREEN. Mr. Chairman, we might need to have the Blue Ribbon Commission come up some time because I wasn't in Congress in the '80s when the decision on Yucca Mountain was made, but

obviously, hopefully, they had a Blue Ribbon Commission in the 1980s to make that decision.

Let me ask a question also. H.R. 909 has set up a reverse auction to incentivize renewable energy development. I have some concerns on how the details are laid out in the legislation. Mr. Sandalow, you testified about the Department's experience with reverse auction for cellulosic biofuels which has yet to achieve its objectives. The cellulosic biofuels industry, which was expected to take off, has stalled, and last summer's call for bids in the reverse auction went unanswered.

Clearly reverse auctions must be carefully crafted in order to achieve the dual goals of saving money and incentivizing production. Several aspects of reverse auction in this legislation may be problematic. Reverse auctions have potential as incentive for renewable energy development, but it is clear from DOE's experience that the details matter, and if our committee develops legislation on the matter, we will be mindful to do so very carefully.

For example, in order to be eligible to participate in reverse auction, facilities have to have power purchase agreements in place. My question, Mr. Sandalow, is what stage of development will a renewable energy project developer enter into a power purchase agreement?

Mr. SANDALOW. Well, I think the way that that relates to the reverse auction is something that will need to be worked out in the course of discussions about this legislation, Congressman. I agree completely with the point you are making that reverse auctions have tremendous potential. They are an important market-based mechanism, but the details do matter in terms of how we work that out.

Mr. GREEN. Is there any portion of the renewable energy sector in your estimation that has progressed to that stage?

Mr. SANDALOW. I am sorry, Congressman. When you say that stage?

Mr. GREEN. To the stage of even talking about a power purchase agreement.

Mr. SANDALOW. Yes, absolutely, Congressman, there are.

Mr. GREEN. And as soon as they reach that stage, will they have done so without the benefit of federal loan guarantees included in—including DOE loan guarantees and loan guarantees administered by USDA for biofuels?

Mr. SANDALOW. That is a good question which I will take for the record, Congressman.

Mr. GREEN. OK. I don't expect you to answer about USDA, but if you could—if they have done it without the Department of Energy loan guarantees.

Mr. Chairman, I know I am out of time. I will submit the rest of the questions.

Mr. WHITFIELD. OK. Mr. Olson, you are recognized for 5 minutes.

Mr. OLSON. Thank you, Mr. Chairman. I seem to be the guy who always comes up when votes are being called, so I will try to be brief. But thank the witnesses for coming today, thank you for your expertise.

My first question is for you, Mr. Sandalow. As you know now, the U.S. is the largest producer of natural gas in the world, and there

is great potential there to improve our energy security, our national security. Hydraulic fracturing advancements in horizontal drilling techniques have been the key to developing these resources. President Obama in the State of the Union and energy speeches this year has said natural gas is a big part of our energy future.

EPA is studying the fracturing process over concerns about contamination of drinking water, but Administrator Jackson admitted on the Hill over on the Senate side last week that there are no known cases of contamination as results of hydraulic fracturing.

Last year in a reference to hydraulic fracturing Secretary Chu was quoted as saying, this is a quote, "We are going to have some regulation going on then." Let me read that again. "We are going to have some regulation going on then." So basically DOE is looking to have DOA doing some regulation, and has your agency been actively pursuing any regulations over the practice of hydraulic fracturing?

Mr. SANDALOW. Congressman, thank you for your question. A couple of points in response to it. First, I would emphasize that all the—that the technical progress that we have made in shale gas in the past couple of years is extraordinary and impressive and that much of it started with funding from the U.S. Department of Energy. It is a great example of the important role of the Federal Government in spurring technological innovation.

At this—in your question about the environmental impacts, the Secretary of Energy has asked his advisory board to take a look at this issue, and in fact, just this week that advisory board has been meeting, looking at technologies that will allow us to develop our shale gas resources using hydraulic fracturing and doing so in a way that minimizes environmental impact. And that has been the main focus of our activity at the Department of Energy on this topic.

Mr. OLSON. OK, but there is no known contamination of drinking water from a DOE perspective. Correct?

Mr. SANDALOW. I don't have specific information on that, Congressman. That would mainly fall into the purview of the Department of the Environmental Protection Agency.

Mr. OLSON. I couldn't agree with you more. The government has a great record of investing resources but once we get beyond that, that is about it, and it is my concern that we don't have the competing things, EPA, these things to keep these resources going, because, again, our natural gas reserves are—right now, clean source of energy, so our generation is probably in transportation, the next, you know, replace gasoline with something we need to do right here in our country, American jobs and decrease our dependence on foreign sources of oil.

Mr. Hicks, I appreciate your comments today about the Department of Defense, the Department of the Navy's dependence on fossil fuel. If I understand your comments to Mr. Terry, DOD and the progress you are making isn't because you are changing fuels per se. It is because you are doing all sorts of things outside, streamlining the aircrafts, moving in the propellers, those type of things, the screens on the surface vessel subs. And obviously wind and solar aren't going to be used in those—our carriers, our subs, or our

airplanes. I mean, some fossils are going to be a big part of our future and very specific fossil fuels; mosinavia and JP, JP-5, JP-8. JP-8 was on—because it was specifically designed to have a lower flash point so the fires we had in history like the USS Forrestal during the Vietnam War.

And that is a very special fuel, and most of that, a lot of that is, built is not the right word, but is processed in the district Congressman Green represents at the shale facility in Deer Park, Texas, and you know, it is, again, if it was made more difficult to obtain these fossil fuels, would that have a weakened affect on the military of today?

Mr. HICKS. Certainly that would have an effect, and I think it speaks to our overall energy strategy, which is both one of efficiency and one of finding domestic alternative sources so we can be more independent in our field choices, and, again, the waypoint that we are going toward is a 50/50 blend of the JP-5 that you mentioned in hydro-renewable jet fuel, and likewise, F-76 Marine diesel and a combination of HRD hydro-renewable diesel fuel for our service vessels.

Mr. OLSON. Thank you for those comments, and I am about running out of time, but I know you share these sentiments, but, you know, our job, our main job of our military is to kill our enemies, and our job here in Congress and your job is to give them all the equipment, the proper equipment, the proper fuel they need to do that and not to be some sort of test bed for some future generated source of energy. Other people can do that. We need you to have your fuel and fossil fuels for as long as you need it to have the best equipment out there that is second to none.

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

Mr. WHITFIELD. Mr. Inslee, you are recognized for 5 minutes.

Mr. INSLEE. I thank you, thanks, Mr. Sandalow, for being here. Glad you are on duty, and I want to ask you both about biofuels potential. I am going to be a little parochial talking about this for a moment because we really have an aggressive effort to develop a biofuels industrial base in the Pacific Northwest. There is a very active consortium with Boeing and a host of civilian aviation firms, and we appreciate Secretary Mabus's leadership on this. He was hugely excited on our Earth Day last year in the rose garden when he announced that we had had our Green Hornet first time break the sound barrier using biofuels. That was pretty exciting.

Mr. SANDALOW. Yes.

Mr. INSLEE. So I guess the question is what can we do to facilitate a bioreactor actually going in out in the Northwest, how can we help that effort, and what is the status of those considerations?

Mr. SANDALOW. I am going to start by thanking you, Congressman, for your long-time leadership on these issues. I have learned a lot from reading what Mr. Inslee has written and—

Mr. INSLEE. Good. There was somebody out there. I wasn't sure.

Mr. SANDALOW. This is an extremely important area of our country, one with tremendous potential. I am going to have to take back the specific question about the opportunities in the State of Washington and come back to you on that, but there is no question that overall this country can create jobs and reduce our dependence on oil with investment in new biofuels technologies. We just heard

what I think is an amazing American story about taking a fighter jet to mach 1.2, you said, I believe, and using American-made, you know, biofuels from a technology nobody would I think believe was possible 10 or 20 years ago.

That is exactly the type of thing that we can do, and the future, I think, many—I have heard experts say that the next stage in this industry is scaling up commercial-sized bio-refineries that will get significant volumes of biofuels that have been tested at bench scale up and into the marketplace, and I think it is very important that we look at ways to do that in the years ahead.

It is important that we continue the research in the new types of feedstocks that are really going to make a difference in the years and decades ahead.

Mr. HICKS. And if I could add, and I would be remiss if I didn't mention that the Green Hornet actually has now gone to 1.7, mach 1.7. Commander Weaver, Pie, as he is known, I think would want it to be known that he has taken it to its full limit with no challenges at all to the fuel whatsoever.

Certainly as we know a couple of companies in the State of Washington, they are doing great work, AltAir Fuels is one, and I believe Imperium is another, and we are watching those companies as they mature.

In terms of your question I think just, you know, continued support toward alternative fuels is something that we can do as a country to help us and enable us to be more energy independent. As David mentioned, you know, R&D plays a critical role in this both in the near term and the long term. I think for our efforts being able to test and certify the platforms we have and be able to accomplish those missions at 100 percent of their abilities with no challenges at all with those fuels is something that we would also just, you know, request continued support for.

Mr. INSLEE. Well, just to be a little parochial, there is an amazing consortium out in our neck of the woods, and we have multiple companies, Targeted Growth is doing genetically-modified base, a company with some leadership in Washington State, Sapphire Energy, is doing algae-based. There are now commercial scale or pre-commercial scale ponds in New Mexico, and I know you will be looking for—from growing to distribution to testing to commercialization. I think we are developing that kind of environment out in the Northwest, and if there is any way we can help accommodate your efforts, that would be great.

I want to ask you about coal to liquids. I am a person who has supported the effort to develop cleaner coal to reduce CO₂, and we supported here in the bill we passed in the House last year, the year before last, a billion-plus dollars a year to help develop a way to use coal in a way that does not significantly disrupt the climate.

But the coal to liquids that I am familiar with that are addressed in this bill it appears to me would actually go backwards from a CO₂ pollution context and lifecycle of the product. If that is correct, then why would we want to go backwards to a product that actually is going in the opposite direction than we all know we need to go?

Mr. HICKS. I would just say those are some of the questions that we have from the Navy's perspective, which are—I think there are

some large questions around that technology and may explain why some of those in that industry are pulling back or dialing back some of their efforts there.

But the questions of the enormous capital expenditures needed, \$5 to \$10 billion, enormous water needed, as well as, you know, just some of the waste product that would come out of that are all areas that need to be addressed, in addition to, and this is what is great with Department of Energy is dealing with and doing the research and development on carbon capture and storage technology, which can be used, you know, with the coal plants that we do have, the plants that have been providing affordable power for, you know, a century now and will into the next and using that technology focused on those plants I think is something that could be an advantage.

But for coal-to-liquid facilities and to suggest that that is the near-term solution with all these other question marks I think is something that needs further inquiry.

Mr. INSLEE. Thank you.

Mr. WHITFIELD. Thank you. We have one vote on the House Floor, and so we are just going to take a little time off here. I think Ms. McMorris Rodgers will be coming back, and when she comes back, I think she will have questions for the two of you, but whether she does or does not come back, we will be back within about 10 minutes.

So we will be in recess until then.

[Recess.]

Mr. TERRY. [Presiding] Hopefully I will have some of my colleagues continue to join me, but we are finished with the second panel. So Mr. Sandalow and Mr. Hicks, really appreciate your testimony. It was interesting, and I thought you gave good detail on your answers, which is much appreciated by this committee.

So at this time you are dismissed.

At this time we will call up the next panel. While we are setting up name plates and getting the chairs organized, our third panel is Neil Auerbach from the Hudson Clean Energy, James Bartis, Senior Policy Researcher, RAND Corporation, and Jack Spencer, Research Fellow, Nuclear Energy, from The Heritage Foundation.

Mr. Auerbach, we are going to start with you. Give us just a few more seconds to get settled in, get your water, turn your mike on, and Mr. Auerbach, if you would begin.

STATEMENTS OF NEIL AUERBACH, MANAGING PARTNER, HUDSON CLEAN ENERGY; JACK SPENCER, RESEARCH FELLOW, NUCLEAR ENERGY, THE HERITAGE FOUNDATION; AND JAMES T. BARTIS, SENIOR POLICY RESEARCHER, RAND CORPORATION

STATEMENT OF NEIL AUERBACH

Mr. AUERBACH. Thank you very much, members of the committee, for the opportunity to testify for you today. It is an honor and privilege.

My name is Neil Auerbach, and I am the Founder and Managing Partner of Hudson Clean Energy Partners. Hudson Clean Energy Partners is a global private equity firm that focuses exclusively on

investing in the clean energy sector. With over \$1 billion in assets under management, Hudson is a leading global investor in sectors that include wind, solar and hydroelectric energy, and biofuels, biomass, smart grid, electric vehicles, energy efficiency, and storage. Given our position on the front lines of these fast-growing industries, we have seen firsthand the impact of government policies on private sector capital flows, both at home and abroad.

New capital flowing into our sector is coming in at such a quick pace that we are already drawing nearly equal to capital flowing into new fossil-fuel-fired power plants around the world, and in fact, in 2010, the amount of capital in renewable energy power generation was about 85 percent of global capital flowing into fossil-fuel powered generation. So this is becoming and is now a very big business.

The increasing scale of our industry is causing dramatic changes and strategic thinking of industry players and policymakers around the world. Other forces at work in the energy industry are also causing a reassessment of strategic thinking, most notably the rapid advances made in extracting shale gas cheaply.

While these and other forces at work are putting pressure on lowering the cost of power, upward pressure on the price of oil is occurring, leading to higher prices at the gasoline pump for motorists here in the U.S. and around the world.

As the Chinese economy continues to grow, demand for petroleum will continue to increase. Today China is by far the world's largest market for automobiles, yet on a per capita basis the market penetration for automobiles is roughly about 1/20 of what it is in the United States. Imagine what will occur when they draw equal to the United States.

While my written testimony addresses the reverse auction mechanism in Title III of H.R. 909, I just want to articulate first, although my specialty and frankly a majority of my network and my career is now devoted to clean energy, I am broadly in support of an all-of-the-above strategy and that strategy informing this legislation, and so I support the basic concept of using dedicated oil and gas royalties as a funding source to create a trust fund out of which payments will be made to renewable energy generators.

It is important to understand why I believe so passionately in the future of clean energy and why I believe it is actually in the present. There are three basic reasons why clean energy is increasingly attractive to consumers and to policymakers around the world. It is good for energy security, including American energy security, it is good for economic growth, and it is also good for the environment, and I believe that by looking at all three factors one concludes that more clean energy, in particular, renewable energy, is better than less for America's energy future.

I want to focus before getting into renewable—to reverse auctions directly on the chart which is to my right, and if you want, I can—if the camera can focus on it. Just as an illustration to make it as clear as I can with a chart, that looks fairly complex I will try to simplify it, at just how dramatic the changes are that I refer to in the—in what is happening today in clean energy.

Over the past 80 years there have been obviously significant price movements in the electricity sector in the United States of

coal-fired, gas-fired, nuclear-fired, wind-powered, and solar-powered electricity. And what this chart shows is how prices have come down as each of these power sources has scaled over the past roughly 100 years. The fastest declining cost for power is coming from solar, and that is the orange dotted line all the way on the right. Next fastest is wind, and then we have got natural gas and coal and then nuclear, which to date has actually been increasing in cost.

Now, again, I am not against any of the power sources but ultimately I believe that the reverse auction mechanism that I will address in more detail now speaks to the need to allow market forces to drive down the cost of all sources of energy in our economy, and the most—and so what we have seen here is enormous progress.

Last week the research director for GE gave his pronouncement that he thought that solar electricity would be cheaper than coal, electricity in 3 to 5 years. My personal assessment from investing hundreds of millions, if not billions, of dollars in the solar industry over the past 10 years is that it may be 5 years away, maybe a little bit more, but it is coming very fast.

Just to give you a further example, the solar industry has grown from 2005 to 2011, 15 times. The changes that are occurring in that industry alone are enormous, and they are going to bring cheaper power to Americans everywhere if we scale up the industry wisely in the United States.

The reverse auction mechanism, first of all, very simply, there is a lot of confusion about what a reverse auction is, and I think Congressman Nunes addressed it clearly. A regular auction is clearly where one seller is trying to induce multiple buyers to bid, to raise the price. In a reverse auction the buyer is trying to do the opposite, and so there is a lot of window dressing or detail associated with how one constructs a reverse auction, but reverse auctions work, and they have been demonstrated to work, and I will get into the Brazil example in a few minutes.

The bill effectively proposes replacing the current tax credit system over time that has existed for about 18 years for supporting renewable energy with a reverse auction. I want to point out here that the reverse auction mechanism in essence works. There are some issues that need to be addressed, and I will just mention two of them, and then we can get into the rest of it in questions.

I believe that we need to remove the reverse auction from annual appropriations. Billions, hundreds of billions of dollars of capital can be mobilized in support of renewable energy in the United States, but capital will not flow if the reverse auction mechanism is subject to annual appropriation, and I think that the PPA issue that has been raised by several members that is noted in my testimony also needs to be addressed. In my written testimony we focus on a recommendation to actually expand the use of the reverse auction to include all three revenue streams.

[The prepared statement of Mr. Auerbach follows:]

**TESTIMONY OF NEIL Z. AUERBACH, MANAGING PARTNER OF HUDSON CLEAN
ENERGY PARTNERS, BEFORE THE
COMMITTEE ON ENERGY AND COMMERCE
UNITED STATES HOUSE
JUNE 3, 2011
on
“THE AMERICAN ENERGY INITIATIVE”
POLICY RECOMMENDATIONS IN H.R. 909, “A ROADMAP FOR AMERICA’S ENERGY
FUTURE”**

Mr. Chairman, Ranking Member, members of the committee, thank you for the opportunity to testify here today. It is truly an honor.

My name is Neil Auerbach, and I am the Founder and Managing Partner of Hudson Clean Energy Partners. Hudson Clean Energy Partners is a global private equity firm that focuses exclusively on investing in the clean energy sector. With over \$1 billion in assets under management, Hudson is a leading global investor in sectors that include wind, solar and hydroelectric energy, biofuels, biomass, smart grid, electric vehicles, energy efficiency and storage. Given our position on the front lines of these fast-growth industries, we have seen firsthand the impact of government policies on private sector capital flows in our sector, both at home and abroad.

Based on this experience, I would like to offer my support for the Reverse Auction Mechanism for Renewable Energy Generation in Title III of H.R. 909. The innovative approach to supporting the continued growth of the renewable energy sector contained in H.R. 909 is entirely consistent with the stated goals of the American Energy Initiative to reduce overall energy costs, increase domestic sources of energy, and support long-term job and wealth creation in the United States. Before I offer detailed comments on the reverse auction proposal, I want to explain clearly and in the simplest terms why support for clean energy¹ is critical to our energy security, and is beneficial to our economy and our environment.

¹ The term “clean energy” has many definitions, as many industries want the moniker of being called “clean.” Here, I used the term to refer to renewable energy (wind, solar, biomass, geothermal, hydropower, biofuels) and energy smart technologies (including smart grid, building efficiency, industrial efficiency, transport efficiency and storage).

Domestic clean energy development is vital to our national interest

Energy Security

Energy security is enhanced when we produce more of the energy we consume here in the United States. The United States currently imports roughly 23% of its primary energy from abroad², including 51% of the oil that we consume³. In dollar terms, we shipped almost \$275 billion abroad in 2010 and will ship close to \$370bn abroad in 2011 in order to fuel our economy at home⁴. In order to mitigate the risks associated with our dependence⁵ on foreign sources of energy, the United States should increase domestic production of all sources of energy. Although Congress should not pick energy winners and losers, the goal of improving our energy security is enhanced further by improving access to unlimited sources of domestic energy than by improving access to energy resources of finite duration. Increasing our production of domestic fossil fuels may improve our energy security, but a careful analysis of resource availability shows that increases in our domestic stores of accessible fossil fuels are measured at most in decades, whereas increases in our stores of renewable energy capacity have infinite duration.⁶ Figure 1 highlights the stark contrast between global coal and gas reserves and just two years worth of wind and solar supply. Our energy policy should focus on utilizing more of these clean energy resources.

² EIA estimates for 2009 total US energy production (72,970 quads) and consumption (94,578 quads)

Consumption: <http://www.eia.gov/totalenergy/data/annual/txt/p1b0201a.html>

Production: <http://www.eia.gov/totalenergy/data/annual/txt/p1b0102.html>

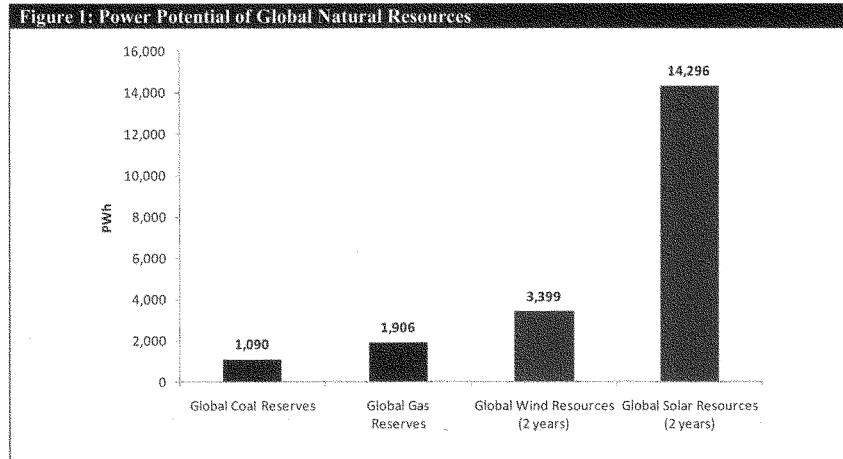
³ EIA – “How dependent are we on foreign oil?” http://www.eia.gov/energy_in_brief/foreign_oil_dependence.cfm

⁴ Assumes an average \$/bbl of WTI Crude of \$79.40 in 2010 and \$102.67 in 2011 and net imports of 9.4 and 9.8mmbd respectively: <http://www.eia.gov/emeu/sgeo/pub/contents.html>

⁵ Location of equipment manufacturing is not more relevant to energy security than location of manufacturing of an oil rig or gas turbine.

⁶ Proven reserves of coal in the US (260bn tons) equal roughly 200 years worth of US supply at current consumption rates (1.1bn tons/yr). Proven reserves of conventional and unconventional oil (200bn bbl) and gas (400 - 2,000tcf), however, represent only 30 and 15-80 years, respectively, of remaining oil and gas supply at current consumption rates (oil: 7bn bbl/yr; gas: 26tcf/yr). By contrast, wind and solar development sites can be upgraded every 25-30 years to continue providing renewable energy into perpetuity since there are no resource constraints. (US theoretical wind potential: 8,000GW onshore and 2,200GW off-shore; US theoretical solar PV potential: 206,000GW)

– EIA, MIT, NREL, Hudson Estimates



Sources: BP, Chatham House, U.S. Department of Energy, Physics Factbook, Hudson estimates

Economic Rationale

Increasing our domestic production of clean energy, along with siting a significant part of the associated manufacturing chain in the United States, promotes US competitiveness, increases domestic jobs and creates wealth that grows our GDP and reduces our trade deficit.

Our international trading partners -- led by China -- are laying plans for massive investments in the clean economy. The clean energy market is forecast to triple in size during this decade, from \$740 billion in 2009 to over \$2 trillion by 2020,⁷ exceeding global GDP growth even under the most conservative growth scenario and annual capital invested in additions to clean energy generation capacity is already pulling even with fossil fuel generation capacity.⁸ The vibrant markets for clean energy and energy smart technologies, such as smart grid, ultra high capacity transmission, advanced energy storage, LED lighting, and electric vehicles, will be dominated by countries encouraging investments in R&D, manufacturing and deployment. In 2010, the U.S. accounted for 14% of the clean energy market, but its pole position fell for the second year in a row. Germany and China accounted for 17% and 22% respectively in 2010, taking the number one and two positions, which belonged to the US in the two years prior.⁹ Further, the

⁷ HSBC Global Research, "Sizing the climate economy", September 2010

⁸ Bloomberg New Energy Finance: annual capital invested in additions to clean energy (\$187bn) and fossil fuel generation capacity (\$219bn)

⁹ Bloomberg New Energy Finance and Pew Charitable Trust "Who's Winning The Clean Energy Race? 2010"

United States lags our trading partners in terms of clean energy manufacturing capacity. For example, only 6% of worldwide PV cell production takes place in the United States while 59% of global cell production takes place in China.¹⁰ And, in terms of clean energy deployment, the US leadership has begun to wane. For example, in 2007, the United States installed nearly 6GW of renewable energy capacity, approximately 60% of all domestic newly installed power generation capacity¹¹. China, by contrast, installed less than 5GW¹² of renewable energy capacity, approximately 6%¹³ of its newly installed power generation that year. Just 3 years later the picture changed dramatically. In the United States, only 5GW of renewable energy capacity was installed in the United States, whereas nearly 17GW of renewable energy capacity was installed in China.¹⁴ Over the same period, China moved up the league tables of top ten manufacturers of wind turbines and solar panels (See Figures 2 & 3).

Figure 2: Top 10 Global Wind Manufacturers 2005, 2010 (Rank Order by Production - GW)

2005				2010			
	Company	Country	Production		Company	Country	Production
1.	Vestas	Denmark	3.2	1.	Vestas	Denmark	6.3
2.	Enercon	Germany	2.7	2.	GE Wind	US	6.0
3.	Gamesa	Spain	1.9	3.	Sinovel	China	5.3
4.	GE Wind	US	1.3	4.	Gamesa	Spain	4.4
5.	Siemens	Denmark	1.1	5.	Goldwind	China	3.6
6.	Suzlon	India	0.9	6.	Suzlon	India	3.5
7.	Repower	Germany	0.9	7.	Enercon	Germany	3.4
8.	Goldwind	China	0.7	8.	Dongfang	China	3.0
9.	Nordex	Germany	0.5	9.	Repower	Germany	2.9
10.	Ecotecnica	Spain	0.3	10.	Siemens	Denmark	2.9
		Europe	10.6			China	0.7
		US	1.3			Other Asia	0.9
2005 Totals							
2010 Totals		19.9	6.0			11.9	3.5

Sources: Bloomberg New Energy Finance (It is reported that Sinovel has overtaken GE as the second ranked manufacturer)

¹⁰ Solarbuzz (data includes Taiwan)

<http://www.solarbuzz.com/our-research/recent-findings/solarbuzz-reports-world-solar-photovoltaic-market-grew-182-gigawatts-20>

¹¹ U.S. EIA – Electric Net Summer Capacity

http://www.eia.gov/cneaf/alternate/page/renew_energy_consump/table4.html

¹² Bloomberg New Energy Finance Database

¹³ Reuters: China installed capacity hits 710 GW in 2007

<http://uk.reuters.com/article/2008/01/09/china-power-capacity-idUKPEK24321320080109>

¹⁴ Bloomberg New Energy Finance and Pew Charitable Trust “Who’s Winning The Clean Energy Race? 2010”

Total installed renewable capacity: US (58GW) China (103GW) - <http://bnef.com/WhitePapers/download/36>

Figure 3: Top 10 Global PV Cell Manufacturers 2006, 2010 (Rank Order by Capacity - MW)

2005			2010		
Company	Country	Production	Company	Country	Production
1. Sharp	Japan	500	1. JA Solar	China	1,900
2. Q-Cells	Germany	420	2. Suntech	China	1,620
3. Suntech	China	270	3. First Solar (TF)	US	1,502
4. Motech	Taiwan	240	4. Yingli	China	1,100
5. Solarworld	Germany	200	5. Trina Solar	China	1,000
6. China Sunergy	China	180	6. Q-Cells	Germany	1,000
7. Kyocera	Japan	180	7. Canadian Solar	China	800
8. Isototon	Spain	130	8. Motech	Taiwan	600
9. Schott	Germany	121	9. Gintech	Taiwan	600
10. Sanyo Electric	Japan	115	10. JinkoSolar	China	600
Europe US			China (incl. Taiwan) Other Asia		
2005 Totals	871	0	690		1035
2010 Totals	1000	1502	8220		0

Sources: Bloomberg New Energy Finance

To be competitive, the US must not just maintain its edge in R&D investment, but focus even more on encouraging the growth of manufacturing and deployment at home, as are other countries around the world. America is not predestined to remain home to the most vibrant economy in the world forever. We need to rise to the challenge.

While striving to improve our global competitiveness, we must also address our most immediate concerns at home: creating jobs and reducing the cost of energy. Investments in clean energy today can support a 21st century industry in the United States and foster productive job creation as the country diversifies its energy mix. Interestingly, despite the recession, we are expected to see 143,000 jobs created in the wind industry and 58,000 jobs created in the solar industry.¹⁵ Two of our trading partners, China and Germany, boast even more jobs in their home markets. China estimates that it employs approximately 1.4 million people in the clean energy sector.¹⁶ Germany, on the other hand, estimates that it employs approximately 370,000 people in their clean energy sector.¹⁷ A focused effort on making the United States a more welcome home for clean energy manufacturing and deployment can result in even more job creation here at home.

¹⁵ Lawrence Berkeley National Laboratory (LBNL) and The National Renewable Energy Laboratory (NREL)

¹⁶ NY Times: "China Leading Global Race to Make Clean Energy"

<http://www.nytimes.com/2010/01/31/business/energy-environment/31renew.html>

¹⁷ Gross employment from renewable energy in Germany in 2010

http://www.bmu.de/files/english/pdf/application/pdf/ee_beschaeftigung_2010_en_bf.pdf

Many people mistakenly believe that wind and solar, as well as other forms of clean energy, are interesting technologies that may become scalable and affordable in the future if we make sufficient progress on the technology front. This is a serious error. More solar energy capacity was installed in 2010 around the world than nuclear power.¹⁸ The cost of solar energy today is cheaper than the cost of nuclear energy from a Gen III nuclear power plant.¹⁹ The pace of annual solar installations around the world will have increased nearly fifteen fold between 2005 and 2011, and installations are forecast to double again by 2015.²⁰

Costs of wind and solar energy have come down almost as quickly as the scale of the industries has increased. The history of the power industry reveals that all new energy sources start out expensive, and get cheaper with scale. Wind and solar are following suit today, and at a pace even more dramatic than coal, natural gas or nuclear did in their day. The cost of wind power, for example, has fallen by 30% over the past 3 years.²¹ Recent anecdotes suggest that in some markets, wind power is now cheaper than power generated from a combined cycle gas plant (CCGT). The progress of the solar industry in reducing costs is even more impressive. The cost of solar power has dropped approximately 15% per year over the past several years, and is expected to continue. On the current pace of cost reduction, solar energy may be cheaper at distributed generation scale in many markets than power generated by fossil fuels within 5 years.²²

The following chart, which was produced by my colleagues for an article published in the *Journal of Environmental Finance*²³, catalogues the history of price movements of electricity powered by coal, natural gas, and nuclear energy since 1930. History teaches us that each of these power sources has required achieving massive scale in order to achieve their current favorable cost structures. Hudson's research confirmed that small increases in scale are causing significant improvements in the cost structures of the wind and solar industries. Figure 4 clearly demonstrates that wind and solar energy have reduced costs more rapidly than any other type of conventional energy source over the last 80 years.

¹⁸ The World Nuclear Industry Status Report 2010-2011, Draft Version – 2010: 5GW of nuclear reactor startups
http://www.worldwatch.org/system/files/NuclearStatusReport2011_prel.pdf

¹⁹ "Solar and Nuclear Costs – The Historic Crossover" – Solar (14-18 cents/kWh) vs. Nuclear (~20 cents/kWh)
http://www.newam.org/wp-content/uploads/2010/07/NCW-SolarReport_final1.pdf

²⁰ Photon Consulting Database:

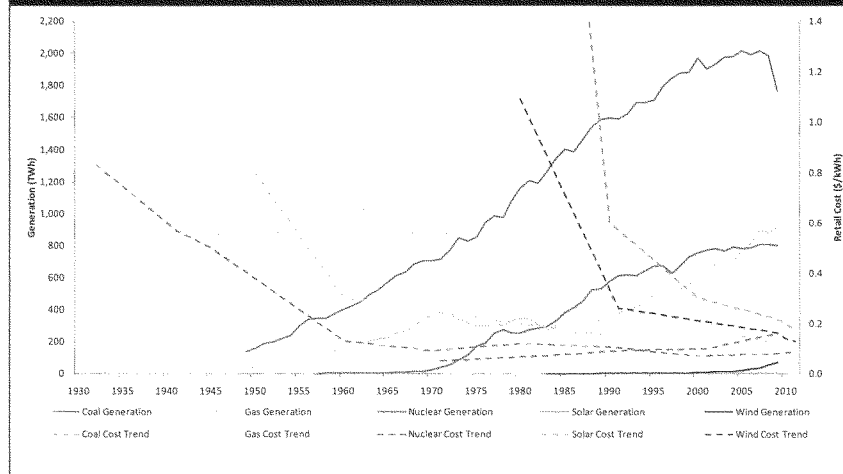
2005–2011 annual installations (1.8GW to 27GW); 2015 (51GW annual installation, 225GW total installed)

²¹ Hudson estimates

²² See comments of Mark Little, research director of General Electric, reported in <http://www.bloomberg.com/news/2011-05-26-solar-may-be-cheaper-than-fossil-power-in-five-years-ge-says.html>

²³ Environmental Finance, "Making the Case for Clean Energy", December 2010 - January 2011

Figure 4: U.S. Electricity Generation and Retail Cost by Energy Source (1930 – 2011)



Sources: U.S. Energy Information Administration; Massachusetts Institute of Technology; American Energy Independence; US National Renewable Energy Laboratory; "The Economics of Nuclear Reactors: Renaissance or Relapse", Cooper, 2009; Hudson estimates

The rapid reduction in clean energy's cost structure is projected to continue, and will bring these technologies into grid or retail parity with conventional power sources over time, even cheaper than conventional power sources in more and more markets over time.

Two solar companies in our portfolio illustrate the dramatic progress being made in reducing the cost of solar energy.

Calisolar is a California-based manufacturer of silicon, wafers and cells that are sold to manufacturers for use in making solar panels. Calisolar is unique in its ability to manufacture silicon feedstock that is much cheaper than conventional silicon without compromising quality. With manufacturing scale only a fraction of its more established competitors, Calisolar is manufacturing its silicon far cheaper than most of its industry peers. And in an all-too-rare industry role reversal, our American company is exporting its product to China. We expect Calisolar to be able to manufacture at below \$20/kilogram as compared to the current industry average of \$34/kg on volume-weighted basis/kilo²⁴, and therefore we believe that Calisolar will become the lowest cost manufacturer of silicon in the world when it builds its manufacturing facility in the United States.

²⁴ Photon Consulting Database, Hudson Estimates

Another innovative company dramatically reducing the cost of solar energy is SoloPower, a California based manufacturer of unique lightweight, flexible, high-power solar panels that possess critical advantages for both rooftop and ground mount solar market applications. By flexible, I mean thin, bendable, and utterly unlike the traditional flat-plate solar panels familiar to most people attending today's hearing. This unique form factor expands the total addressable market for solar energy given that approximately three quarters of commercial and industrial rooftops in sunny environments are not designed to bear the load of rigid glass solar panels, which weigh about five times as much as SoloPower's panels. SoloPower's product can be integrated into a roofing membrane and unrolled on a rooftop much like carpeting. Alternatively, it can be adhered directly to a rooftop without the need for physical penetrations or racking systems. This speeds installation time and reduces balance-of-system ("BOS") cost, delivering an industry-leading levelized cost of energy that is competitive with retail electricity prices in many regions of the world. We expect that SoloPower rooftop solar systems will bring the cost of delivered to approximately 10 cents/kwh, below the cost of retail peak power in many power markets in the United States. As a result, demand for SoloPower's product far exceeds its current manufacturing capacity, and the company has decided to build a large-scale manufacturing plant in the state of Oregon.

Environmental

Finally, clean energy is more beneficial to our environment than energy derived from fossil fuels. There are a wide variety of environmental hazards associated with utilizing fossil fuels for energy generation. The largest contributors to air and water pollution are automobiles and industry because of their reliance on fossil fuels. Burning oil, gas, and coal produces waste streams that include sulfur dioxide, nitrogen dioxide, carbon monoxide, airborne particulates, and volatile organic compounds that cause acid rain and urban smog. Acid rain is among the worst contributors to estuary, bay and water table contamination, while urban smog and particulates cause serious respiratory problems in humans and have adverse effects on wildlife and agriculture. The fossil fuel that is most deleterious to the environment is coal. Of particular relevance here is the impact of coal combustion on mercury levels in the atmosphere and water, as well as sulfur and nitrogen compounds. It is projected that mercury and acid gas regulations for coal fired, utility scale power plants will lead to a significant reduction of these plants in the near term. Furthermore, the vast majority of the scientific community views the buildup of greenhouse gases in our atmosphere from fossil fuels as a serious environmental hazard. By contrast, the environmental impact of clean energy on air, water, and land is the most benign of any natural energy source.

Policy makers must balance the environmental risks associated with increased production of fossil fuels with the economic and energy security benefits they offer. The idea that we must choose between cheap

energy and our environment is false. We can have both. By providing a market-driven mechanism for facilitating the next phase of growth for clean energy deployment in the United States, the Reverse Auction Mechanism proposed in H.R. 909 cheapens the cost of a cleaner environment with increased clean energy deployment.

Reverse Auction: A more efficient way to grow our domestic clean energy industry

I would now like to focus my testimony on the Reverse Auction Mechanism for Renewable Energy Generation in Title III of H.R. 909, specifically how it can be designed to be more efficient than existing incentives for clean energy.

The incentives currently on the books for clean energy, which reside primarily in the tax code, are not efficient. Although the industry has found ways to utilize and thrive on these incentives, neither the industry nor the government is getting the best bang for its buck. Most renewable energy generators cannot utilize the tax credits that are created by Sections 45 and 48 of the Internal Revenue Code because even the most successful renewable projects generate net operating losses in their first years as a result of accelerated depreciation and interest expense deductions. The tax credits, which often are the determining factor in whether a project makes economic sense, must then be sold into a small market of institutional investors with tax appetite. The friction cost associated with selling these tax credits been estimated at between 35-40 cents for every tax credit dollar.²⁵

During the financial crisis, the market for tax equity dried up and investment in the clean energy industry came to a stand-still. To address this problem, Congress passed legislation in 2009 to empower the Treasury Department to exchange tax credits held by renewable energy project owners for cash. In so doing, Congress eliminated much of this friction cost and made the existing Federal clean energy incentive mechanism more efficient.

I believe that a reverse auction, properly structured, can be a more efficient policy to grow our domestic clean energy industry than the current system of tax incentives. Reverse auctions are conducted by buyers to encourage sellers to sell at the lowest price. The history of reverse auctions suggests that they work to lower cost.²⁶ In addition to the benefits of placing a market-driven auction mechanism at the heart of Federal clean energy policy, H.R. 909's Reverse Auction Mechanism offers other tangible improvements over the current system. First, without the need to resort to a limited market of tax equity

²⁵ Bipartisan Policy Center, "Reassessing Renewable Energy Subsidies" (March, 2011)
<http://www.bipartisanpolicy.org/library/staff-paper-reassessing-renewable-energy-subsidies-issue-brief>
²⁶ Bloomberg New Energy Finance, "Wind tender analysis in Brazil: Winner's Curse?"

lenders, the U.S. market for clean energy project finance would become much more liquid, resulting in lower funding costs. In addition, without the specter of perennial expiry of Federal tax incentives, the comfort of a solvent trust fund as envisioned by H.R. 909 would give all market participants, including manufacturers of value chain products, more confidence in the longevity of the U.S. market, increasing capital commitments to the sector with long term payoff profiles. The market values of most companies with significant clean energy investments in the U.S. would likely improve.

The U.S. Federal Government is not alone in its interest in the use of reverse auctions to support clean energy deployment. Brazil, for example, recently completed two reverse auctions for capacity to be built in one and three years. Contracted power under Brazil's previous feed-in tariff incentive policy, PROINFA, averaged \$136/MWh. One year later, under the new reverse auction mechanism, wind power prices came down precipitously to an average of \$74.4/MWh, over 40% lower than under the previous feed-in tariff regime. Many other Latin American countries are following suit in an effort to reduce overall system costs.²⁷ Argentina, Mexico, Peru, Honduras, Uruguay, in addition to China, Morocco, and Egypt, all developing markets with an interest to displace more expensive fossil generation, have recently conducted reverse auctions for wind power. These countries are finding that reverse auctions are particularly attractive because they offer price discovery through competitive bidding that often leads to dramatic price reductions.

The California Public Utilities Commission also recently approved a reverse auction mechanism that will apply to the state's three largest investor-owned utilities. Although we will need to wait for the results of California's experience, the California Public Utilities Commission (CPUC) has indicated that it expects the mechanism to "allow the state to pay developers a price that is sufficient to bring projects online but that does not provide surplus profits at ratepayers' expense, providing a clear and steady long-term investment signal rather than providing a pre-determined price [via] a competitive market."²⁸ Developers and industry groups alike have expressed enthusiasm for the upcoming auctions because the program is anticipated to spur the development of many 1 – 20MW projects across the State.

Positive attributes of the Reverse Auction Mechanism Proposal in H.R. 909

The Reverse Auction Mechanism as designed in Title III of H.R. 909 includes many positive attributes. It would provide for consistent and efficient support for renewable generation. By establishing a dedicated source of funding through the creation of the American-Made Energy Trust Fund ("Trust Fund"), the bill would provide the kind of long-term certainty absent from the current tax credit approach. Through the

²⁷ Bloomberg New Energy Finance, "Wind tender analysis in Brazil: Winner's Curse?"

²⁸ New York Times, "A 'Reverse Auction Market' Proposed to Spur California Renewables"

<http://green.blogs.nytimes.com/2009/08/28/a-reverse-auction-market-proposed-to-spur-california-renewables>

Trust Fund mechanism, renewable developers would be able to rely on a steady source of support without the need for Congressional appropriations, or any other action by Congress. Moreover, the cash flowing to a particular project from the Trust Fund would reflect a market-driven assessment of the actual amount of cash flow required by the project developer to complete the project, rather than an amount prescribed by Congress, as is currently reflected in the tax code. This amount invariably would be lower than the amount currently funded by taxpayers. Rather than relying upon complicated ways to transfer tax benefits to financial institutions, accessing cash flow from the trust fund would be far simpler, encouraging the development of a more liquid project finance market, resulting in even lower costs for clean energy to rate payers.

H.R. 909's reverse auction mechanism incorporates a host of features that seek to avoid the design mistakes of other reverse auctions, including the recent Brazilian auction experience. For example, H.R. 909 calls for security requirements at the time of the bid submission, to ensure that bidders have the requisite financial resources to deliver on their contractual promises. Additionally, to ensure that the reverse auction mechanism furthers the goal of diversifying our energy sources, the Bill calls for separate reverse auctions conducted in different regions of the country, and also requires that no more than 60% of the awards can come from one type of renewable technology and no more than 90% come from two technologies.

To provide for flexibility, the language provides that a winning bidder be able to generate in excess of their specified annual amount and earn credits to be used for insufficient generation in the subsequent two years. If a winning bidder fails to generate the quantity of electric energy guaranteed in four successive years, the Authority may terminate the contract. The awards from the Trust Fund would be capped each year at the amount of energy to be generated under the contract.

Finally, to prevent double dipping, the language provides that a winning bidder would not be eligible for tax credits under Sections 45 or 48, and would not be eligible for a loan under the Loan Guarantee Program. A developer would need to make a choice. Moreover, the award would not be included in gross income to ensure that the developer's tax bill does not increase.

Suggested improvements to the Reverse Auction Mechanism Proposal in H.R. 909

Although the Reverse Auction Mechanism in H.R. 909 is thoughtfully designed, there is room for improvement. At present, some design flaws might prevent the system from working at all. Other improvements can be made to make the system work even more efficiently. Allow me to offer more concrete examples.

As currently drafted, H.R. 909 requires the renewable generator to identify a purchaser for the electric energy before participating in the reverse auction. This could be particularly problematic, since developers generally enter into PPAs only once they know whether they can earn their target return on equity. Thus, requiring that a bidder secure a PPA before it can submit a bid would likely prevent that bidder's participation in the reverse auction since, without securing a trust fund allocation, the renewable generator would not meet its required return. One way to solve this problem would be to empower a Reverse Auction Authority (RAA) to be directed to purchase energy from generators under long-term PPAs, as well as to allocate money from the trust fund. The RAA could hedge its risk from entering into long term PPAs by selling electricity into wholesale and bilateral power markets. Guidelines could be established around the RAA's purchase and sale of electricity to limit risk taking. The Trust Fund could then be used to cover any losses from power trading, with gains returned to the Trust Fund.

In addition to empowering the RAA to purchase and sell power, another improvement to the Reverse Auction Mechanism in H.R. 909 would be to empower RAAs to purchase and sell renewable energy credits ("RECs"), which often represent a vital income stream to renewable energy developers. Therefore, I propose that the Reverse Auction Authority be required to offer to purchase RECs from renewable energy developers and resell them in the market, returning any gains to the Trust Fund. Renewable developers could bid in RECs as part of its project price, and the RECs then could be resold to entities that have REC obligations. Inclusion of RECs in the reverse auction would have the effect of lowering REC prices, thereby benefiting ratepayers in states with renewable portfolio standards. In effect, inclusion of REC trading within the mandate of the RAA would immediately bring many of the benefits of a national renewable energy standard without imposing a Federal mandate.

Therefore, the limitation contained in H.R. 909 of the use of the reverse auction to the distribution of monies from the Trust Fund should be eliminated. A more complete use of the reverse auction, along with expanded powers by the RAA, would further the goal of reducing the cost of clean energy.

In thinking about how this reverse auction would work, it seems to me that the amount of energy and RECs to be purchased could be determined by the RAA based on (i) the amount of funds available in the Trust Fund and (ii) the amount of interest expressed by entities for the purchase of Federal RECs. To ensure that there is sufficient interest in the reverse auction – particularly in the early years – I would recommend that Federal agencies be directed to purchase all their REC needs through the reverse auctions. Moreover, I would recommend that each State regulatory authority in states that have a renewable portfolio standard be directed to conduct a proceeding to consider permitting utilities in their state to purchase "Federal RECs" to satisfy, in whole or in part, their utilities' state REC obligations under their RPS. While States are engaging in such proceedings, the RAA would be permitted to sell

“regional RECs” in addition to Federal RECs. Regional RECs are RECs from a generator located either inside the state in which the purchaser is located or outside the state, but within the same region, as the state in which the REC purchaser is located. Most states with RPS requirements currently permit their utilities to satisfy their RPS obligations with regional RECs. This approach would allow for the establishment of a truly national REC market, lowering the compliance burden on utilities and the cost to ratepayers, without the need for a Federal mandate.

H.R. 909 proposes that the Secretary of Energy conduct the reverse auction through an office within DOE. Since I am proposing that the RAA’s functions be expanded to include the purchase of power and RECs, I am concerned that the approach would impose on DOE a responsibility it current does not have – the purchasing and selling of power and associated RECs. Instead, I propose that the functions be delegated to a private entity with the expertise to conduct such auctions. DOE would be given oversight responsibilities.

Finally, H.R. 909 provides that monies from the Trust Fund would be subject to appropriations Acts. The intent of the reverse auction process is to provide for consistent, economical and long-term support for the renewable industry. One of the key challenges in relying on federal tax credits for support has been the cycles of expirations and extensions. During each period leading up to an expiration, investments in renewable generation have fallen dramatically. I am concerned that subjecting the amounts in the Trust Fund to annual appropriations would have the same chilling effect on renewable development. I therefore propose that language be added to assure that the Trust Fund provides renewable developers with a steady source of support without the need for Congressional appropriations, or any other action by Congress.

Conclusion

The U.S. has been the global leader in inventing the clean energy products that the world is currently using, and that leadership position, while threatened, has not yet been lost. However, without a national commitment to becoming a global manufacturing leader, and increasing domestic consumption of clean energy, the United States will lose its technology edge quickly. Our trading partners will seize on the wavering of our resolve, and will grab the mantle of clean technology leadership to the benefit of their citizens and public wealth. We have already seen these disturbing trends emerging. I have not appeared before this Committee looking for expensive handouts. The fossil fuel industry has benefited from far

more Federal largesse²⁹ than the clean energy industry ever will, and ever will need. Competition among various energy resources is healthy and should be encouraged. However, it is only with a broad, historical perspective and insight into the competitive dynamic of today's global energy marketplace, that Congress can make wise policy choices. I hope that my testimony will help this Committee to perform its vital task.

I thank the Committee again for the opportunity and honor to present my views on this important topic of national interest.

²⁹ Cumulative federal energy (electricity and transportation) incentives for oil, natural gas, coal and nuclear totaled \$594bn (2006 dollars), 82% of energy incentives, while federal incentives for solar, wind and geothermal totaled just \$52bn (2006 dollars), 7% of energy incentives. The remaining \$80bn, 11%, went to hydro.
- Analysis of Federal Expenditures for Energy Development. Management Information Services. February 2008 <http://www.misi-net.com/publications/2008energyincentives.pdf>

Mr. TERRY. Thank you. I appreciate that, Mr. Auerbach.
Mr. Spencer of The Heritage Foundation.

STATEMENT OF JACK SPENCER

Mr. SPENCER. Mr. Chairman, members of the subcommittee, my name is Jack Spencer. I am the Research Fellow for Nuclear Energy Policy at The Heritage Foundation. The views I express in this testimony are my own and should not be construed as representing any official position of The Heritage Foundation.

Thank you for inviting me to testify before you today regarding the Roadmap for America's Energy Future. I would like to focus on the nuclear power provisions of that bill.

Nuclear is among America's least expensive electricity sources. It emits nothing into the atmosphere, has a great safety record in the United States, including no injuries. Despite these facts, no plants have been ordered for over 3 decades. In many instances there will be none, there will be no additional construction without taxpayer backing.

So this has been the basic approach of most policymakers. In fact, looking at many of the proposals currently under consideration, one might conclude that Washington thinks that it can subsidize nuclear energy into commercial viability.

I would suggest, however, that a lack of taxpayer support is not the problem. The problem is an incoherent nuclear waste management policy and an antiquated regulatory system. The energy roadmap begins to address both of these areas.

Ultimately, America's failed approach to nuclear waste management presents a substantial risk to the future of nuclear power. Constructing a nuclear materials repository is essential to fixing this problem. Current law states that the repository shall be built at Yucca Mountain. The energy roadmap breaks the impasse over Yucca Mountain by establishing a 90-day timeline for the Nuclear Regulatory Commission to determine based on technical and scientific data whether or not to issue a permit for repository construction. If Yucca is not suitable, the proposal sets forth a process to find an alternative site.

But the roadmap goes a step further. It directs the Department of Energy to report back to Congress on the feasibility of both establishing an organization outside of the Department to manage Yucca and of removing the fee that ratepayers pay to the Federal Government for waste management services. Removing the fee would allow for a market-based system to emerge. It is this provision of the—that sets the roadmap apart from recent, from its recent predecessors.

Instead of attempting to fix the flawed system, this legislation allows for a fundamental reform of how nuclear waste is managed. In a market-based system instead of paying a preset fee to the Federal Government to manage used fuel or in this case not managed used fuel, nuclear power operators would pay a fee for service. This could include simply paying a fee for geologic storage or a more complex suite of processing services.

The key is to establish a pricing mechanism for placing nuclear waste storage in a geologic repository. Nuclear power operators could then decide, given the price of used fuel in Yucca, how to

manage their waste. As the price to access Yucca goes up, so will the incentive for nuclear operators to do something else with their used fuel.

This should give rise to an industry that competes to provide used management, used-fuel management services. One could imagine a marketplace where everything from interim storage to full fuel reprocessing was available. The basic regulation would be that all the waste must be disposed of by the time the plant is decommissioned, and of course, that everything is done within the guidelines set by the NRC to protect public health and safety.

This idea is gaining ground. For example, Tim Echols, a Georgia State Public Services Commissioner, recently published an op-ed in the Atlanta Business Chronicle supporting the approach. More recently, experts from the Center for Strategic and International Studies, the Federation of American Scientists, the University of Illinois Champaign-Urbana, and The Heritage Foundation, I would be the representative there, authored a report entitled, "U.S. Spent Nuclear Fuel: A Market-Based Solution." Even nations like Finland and Sweden are finding great success in waste management programs where waste producers are responsible for waste management.

The energy roadmap also would reform how new reactors are permitted by creating a second permitting track that would allow for a permit to be issued in approximately 2 years. The expedited process would entail more efficient processes for both environmental and technical review.

The bill also begins to build regulatory support for new reactor technologies. Without this regulation, new technologies are effectively banned from the marketplace. Customers do not want reactors that the NRC will not regulate, and the NRC does not want to put its resources toward a reactor technology that has no customers. The result is that new technologies are at a severe disadvantage.

To begin changing this, the roadmap directs the NRC to develop a set of guidelines for technology-neutral nuclear plants. Allowing our reactor designers to meet a general set of plant guidelines would represent a significant step forward in building a more diverse and competitive nuclear industry.

And the final point that I would like to bring to the committee, the subcommittee's attention is that the proposal would give the NRC a 90-day deadline to report to Congress what personnel and resources are required to establish a predictable, regulatory program for small modular reactors. Like other elements of the bill, this provision moves away from the subsidy-first mentality that consolidates market power in Washington to a market-based division that allows the actual commercial value of a technology to determine its ultimate success.

That concludes my testimony. I look forward to your questions.
[The prepared statement of Mr. Spencer follows:]



214 Massachusetts Avenue, NE • Washington DC 20002 • (202) 546-4400 •
heritage.org

CONGRESSIONAL TESTIMONY

Jack Spencer
Research Fellow, Nuclear Energy Policy
The Heritage Foundation

Subcommittee on Energy and Power of the Committee on Energy and Commerce

Friday, June 3, 2011
2322 Rayburn HOB
9:00 a.m.

"The American Energy Initiative"

Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee: My name is Jack Spencer. I am the Research Fellow for Nuclear Energy Policy at The Heritage Foundation. The views I express in this testimony are my own, and should not be construed as representing any official position of The Heritage Foundation.

Thank you for inviting me to testify before the Subcommittee on Energy and Power of the Committee on Energy and Commerce regarding the very important legislation introduced by Congressman Nunes, "An Energy Roadmap for America's Energy Future."

As we sit here today there are approximately 440 commercial nuclear reactors operating around the world. One hundred and four of them are operating in this country alone. With the exception of a few highly publicized and, I might add, often misunderstood accidents, these reactors have operated safely, cleanly, and to the benefit of society.

This is not to suggest that no problems have ever arisen as the accident in Fukushima, Japan makes abundantly clear. It is merely to acknowledge the good track record of nuclear power.

That is why, despite the recent accident in Japan, the introduction of the Energy Roadmap remains so important. U.S. demand for electricity is expected to increase by 31 percent over the next 23 years.¹ The United States must build 30 to 50 reactors just to maintain the 20 percent contribution of nuclear to America's energy mix. This alone does not justify reactor construction, but because nuclear power is emissions free, domestically produced, and affordable, expanding nuclear power must be a serious consideration.

Market Success Cannot Be Subsidized

Of the world's 440 reactors, 104 operate in the United States. Nuclear is among America's least expensive electricity sources, emits nothing into the atmosphere, and has a safety record that includes no injuries, much less fatalities. Despite these facts, no new plants have been ordered in the U.S. for three decades.

Given what we know about nuclear energy, there must be some underlying problems that would make investment in this proven technology so scarce. Indeed, today, despite all of the benefits of nuclear power, the industry insists that it will not build new plants without backing from the U.S. taxpayer.

Providing taxpayer support has been the approach of most politicians in recent years. They recognize that nuclear energy has many benefits, and to show their support they propose subsidies. In fact, looking at most of the proposals in recent years, one might conclude that Washington thinks that it can subsidize nuclear energy into commercial viability. Essentially, doing so was the basic premise behind the Energy Policy Act of 2005 (EPACT) proposals. That legislation put forth a series of subsidies to build five or so nuclear plants. That was supposed to help the industry get off the ground so that they could begin privately building plants. While the legislation instigated a series of permit applications to build new plants and even site work at one location, it has not brought about the advertised nuclear renaissance. Indeed, since the 2005 law passed, quite the opposite has occurred.

Instead of helping the nuclear industry to reestablish itself in the marketplace, the law has merely led to a proliferation of requests for additional taxpayer support. Since EPACT 2005, Congress has introduced a virtual parade of legislation to broaden the federal government's support for the nuclear industry. These proposals would increase capital subsidies, use taxpayer money for such activities as workforce development and manufacturing improvements, empower the Department of Energy to decide which technologies should move forward, and create mandates that essentially dictate that nuclear power is used.

¹U.S. Energy Information Administration, Annual Energy Outlook 2011, April 26, 2011, at http://www.eia.gov/forecasts/aeo/MT_electric.cfm (June 1, 2011).

One of the basic problems with using subsidies to promote an industry is that it allows both industry and government to ignore the underlying problems, from a business or government standpoint, that give rise to the need for subsidies to begin with. This perpetuates those structural issues and creates a cycle where industry becomes dependent on federal government—and that is where the nuclear industry is today.

U.S. nuclear power is being held back by two major issues: nuclear waste management and an antiquated regulatory approach. The Energy Roadmap addresses both of these areas.

REFORMING SPENT NUCLEAR FUEL MANAGEMENT

Despite growing political and public support for nuclear power, progress toward actually building any new plants has been a struggle. While the blame for this stagnation often goes to inefficient government subsidy programs, the real problem lies in why those subsidies are necessary to begin with. Chief among these structural problems is the nation's incoherent nuclear waste policy. Ultimately, the lack of a pathway to waste disposal creates substantial unpredictability for nuclear investors. That risk must be offset to allow investment to move forward.

This was a problem prior to the Obama Administration. The federal government was legally obliged, according to the Nuclear Waste Policy Act (NWPA) of 1982, as amended, to begin collecting nuclear waste in 1998. Despite collecting approximately \$30 billion (fees plus interest) from electricity ratepayers and spending nearly \$10 billion, it has not collected one atom of nuclear waste. The one bright spot was the progress on Yucca Mountain made by President George W. Bush's Department of Energy (DOE).

The Obama Administration's anti-Yucca policy destroyed this progress. It ignored existing statute, such as the NWPA and the Yucca Mountain Development Act of 2002, which stated clearly that Yucca Mountain shall be the location of the nation's nuclear materials repository. It unilaterally requested the withdrawal of the DOE's permit application for Yucca to the Nuclear Regulatory Commission (NRC). Questions over the legality of this policy are currently under review by the courts.

Meanwhile, in October 2010, former advisor to Senator Harry Reid and current NRC Chairman Gregory Jaczko ordered a stop to all Yucca-related NRC activities. He argued that his authority to close out the Yucca program was derived from President Obama's 2011 budget request. The problem is that neither the House nor the Senate passed that proposed budget. Further, the order ignores the fact that the NRC's own Atomic Licensing and Safety Board agreed unanimously that the DOE lacked authority to withdraw the application. The chairman's actions were so unusual and contentious that fellow NRC commissioners were compelled to publicly denounce the decision.

The combination of federal promises to store nuclear waste, the Obama Administration's policy, and the NRC's actions has resulted in a complete lack of direction on nuclear waste management and a dereliction of responsibility on the part of the federal

government. This creates substantial government-imposed risk on the nuclear industry, which is the primary obstacle to an expansion of U.S. nuclear power.

Yucca Matters

Regardless of the number or type of new reactors built or the technology used to manage the spent nuclear fuel, a geologic repository is critical to the long-term success of nuclear power in the United States. The reality is that some of the byproducts of nuclear fission will last a long time, necessitating a place where they can be stored safely. According to all analysis conducted thus far, Yucca Mountain is adequate for that purpose.²

Since entering office, the Obama Administration has worked to end the Yucca Mountain nuclear program. It has promised to develop non-Yucca options for nuclear waste disposal. These options include recycling nuclear fuel and opening interim storage facilities. Both could play critical roles in any American nuclear power renaissance, but they simply cannot eliminate the need to open the Yucca Mountain repository.

The United States generates about 20 percent of its electricity from 104 nuclear power reactors, and these reactors in turn have generated more than 65,000 tons of spent nuclear fuel.³ Commonly referred to as waste, this spent fuel is in fact a potentially valuable resource.

Although politicians and the public have begun to accept that nuclear power is a clean and affordable source of energy, questions remain about how to manage spent fuel. There are at least three solutions to this problem.

1. The spent fuel could be put directly into Yucca Mountain for permanent storage. While politics has made this impossible to date, no scientific, safety, or technological reason prevents it. Volumes of data attest to the repository's safety.⁴ These data have been generated by numerous sources, including both private and public entities, and more studies are being conducted.
2. The U.S. could reprocess spent nuclear fuel, which still contains fuel that could be recovered and used again for future power generation. This could be achieved through numerous methods. Some technologies have already been commercialized abroad, and others are being researched and developed. These technologies will enable more efficient use of uranium resources and could

²Jack Spencer and Nicolas Loris, "Yucca Mountain Remains Critical to Spent Nuclear Fuel Management," Heritage Foundation WebMemo No. 2131, May 1, 2008, at <http://www.heritage.org/Research/Reports/2008/05/Yucca-Mountain-Remains-Critical-to-Spent-Nuclear-Fuel-Management>.

³The Nuclear Energy Institute, "U.S. State by State Commercial Nuclear Used Fuel and Payments to the Nuclear Waste Fund, April, 11, 2011, at http://www.nei.org/filefolder/US_State_by_State_Used_Fuel_and_Payments_to_NWF.xls (May 31, 2011).

⁴U.S. Department of Energy, *Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*, October 2007, at http://nepa.energy.gov/nepa_documents/docs/deis/eis0250F-SID/ (June 1, 2011), and U.S. Department of the Interior, U.S. Geologic Survey, *Yucca Mountain as a Radioactive Waste Repository*, 1999, at <http://gscopubs.wr.usgs.gov/circulars/C184/C184.pdf> (June 1, 2011).

drastically reduce the amount of high-level nuclear waste. In the end, however, some byproduct will still need to be placed in permanent geologic storage.

3. The spent fuel could be stored on an interim basis at shorter-term storage facilities. This option also has advantages. Simply allowing the spent fuel to decay over time decreases its heat load, making it easier to store for the long term. Shorter-term storage would also provide time to develop new technologies that would improve long-term management of spent fuel.

Both recycling and interim storage would provide flexibility, but geologic storage in Yucca Mountain will still be necessary.

Yucca Is Not Enough

The accumulated sum of high-level nuclear waste stored at more than 100 sites in 39 states already exceeds the legal limit of Yucca's capacity.⁵ Furthermore, America's reactors are producing approximately 2,000 tons of spent fuel annually.

The first problem with Yucca Mountain is that the applicable statute artificially constrains Yucca's capacity to 70,000 tons of waste. This includes 7,000 tons of space set aside for military waste. Unlike the commercial waste currently stored around the nation, defense waste is not recyclable and has no use. Therefore, for defense purposes alone, it is critical to open Yucca. These caps were decided nearly three decades ago when most believed that nuclear power had little future in the U.S., but with nuclear power likely to expand in coming years—perhaps dramatically—the current program for managing America's nuclear waste is infeasible.

The actual capacity of Yucca Mountain is much larger. Numerous bills have been offered in recent years to repeal the artificial 70,000 ton capacity restraint and replace it with a more scientifically calculated cap.⁶ The Department of Energy calculates that the Yucca repository could safely hold 120,000 tons of waste.⁷ Some believe the capacity is even greater. According to the Department of Energy, the expanded capacity of Yucca Mountain would likely be adequate to hold all of the spent nuclear fuel produced by currently operating reactors.⁸

Yet even with the expanded capacity, Yucca Mountain could not hold all of America's spent fuel if the U.S. adds nuclear capacity. According to one analysis, assuming 1.8 percent growth in America's nuclear capacity after 2010, the U.S. would fill a 120,000-ton Yucca by 2030. At this growth rate, the U.S. would need nine Yucca Mountains by the end of the 21st century.⁹

⁵Samuel W. Bodman, U.S. Secretary of Energy, letter to Speaker of the House Nancy Pelosi, March 6, 2007, at <http://www.energy.gov/media/BodmanLetterToPelosi.pdf> (June 1, 2011).

⁶Two recent examples are the Nuclear Waste Policy Amendments Act of 2008 (S. 2551) and the Nuclear Fuel Management and Disposal Act (S. 2589, 109th Congress).

⁷Bodman, letter to Speaker of the House Nancy Pelosi.

⁸*Ibid.*

⁹Phillip J. Finck, Deputy Associate Laboratory Director, Applied Science and Technology and National Security, Argonne National Laboratory, statement before the Subcommittee on Energy, Committee on Science, U.S. House of Representatives, June 16, 2005, at http://www.acl.gov/Media_Center/News/2005/testimony050616.html (June 1, 2011).

The possibility of carbon constraints and other anti-fossil fuel restrictions raises the prospects of much more nuclear power in the United States. While Yucca Mountain will play an extremely important role in America's spent fuel management system, a more practical approach would use recycling, interim storage, and other tools to manage spent fuel.

Interim Storage

Spent fuel is highly radioactive when it is removed from the reactor. All radioactive materials decay, but while some lose their radioactivity within fractions of a second, others take hundreds of thousands of years. However, most stabilize within an intermediate period. The radioactivity of spent nuclear fuel falls to about 1 percent of its original levels within a year and to 0.1 percent within 40 years.¹⁰ This characteristic makes interim storage an important element of spent-fuel management.

Although the United States has a de facto interim storage system because the federal government has not fulfilled its legal obligation to take possession of and dispose of America's spent fuel, it does not fully integrate interim storage into its spent-fuel regime.

Interim storage could be integrated in a number of capacities. It could be done on-site. Under this system, the fuel would be removed from a nuclear reactor's cooling pools and placed in an on-site facility before it is moved to another location for permanent storage or further processing, as is done in some other countries, including Finland.

Spent fuel could also be collected and stored at one or multiple off-site locations. These could be co-located with other spent-fuel processing facilities. Yucca Mountain could be an optimal location for an interim storage facility. Either way, interim storage has some advantages that spent-fuel managers would find attractive.

First, permanent geologic storage is a scarce resource. Although a geologic storage facility's capacity is often expressed in terms of volume, the primary limiting factor is heat load. Radioactive material gives off heat as it decays. The more it has decayed, the less heat it will give off, allowing more to be stored in any one place. Thus, allowing the fuel to decay for a few decades at an interim storage facility would ultimately allow storage of more spent fuel in a long-term geologic storage facility, even without further processing.

Introducing interim storage would allow far more flexible use of Yucca Mountain. However, adding interim storage to the U.S. spent-fuel management regime cannot eliminate the vital role of the Yucca Mountain repository. Opening Yucca must remain a top U.S. priority.

Second, interim storage frees cooling pool capacity. When spent fuel rods are removed from the reactors, they are placed in cooling pools. After a reactor's pools are full, absent some other option, it would essentially be forced to shut down, because there is nowhere else to put spent fuel rods.

This is a problem in the United States, where plants were built with spent-fuel pools

¹⁰Posiva Oy, "Spent Nuclear Fuel," at http://www.posiva.fi/en/nuclear_waste_management/what_is_nuclear_waste/spent_nuclear_fuel June 1, 2011).

under the assumption that the spent fuel rods would be removed and stored off-site. However, the politics of Yucca Mountain has prevented the U.S. from executing its spent-fuel management strategy as planned. U.S. plants are facing the real possibility of filling their cooling pools. Interim storage should be an option in the U.S. as part of a comprehensive spent-fuel management regime along with permanent geologic storage and recycling.

Many types of interim storage are used throughout the world. For instance, Sweden operates multiple waste storage facilities including one where used fuel is stored under water in an underground cavern, whereas the Czech Republic stores its fuel on reactor sites. In the U.S., interim storage would likely be applied in multiple ways due to the diversity of U.S. nuclear power plants.

Recycling

The current U.S. policy is to dispose of all spent fuel permanently. This is a monumental waste of resources. To create power, reactor fuel must contain 3 percent to 5 percent enriched fissionable uranium (U-235). Once the enriched fuel falls below that level, the fuel must be replaced. Yet this "spent" fuel generally retains about 95 percent of its original fissionable content, and that uranium, along with other byproducts in the spent fuel, can be recovered and recycled.

Many technologies exist to recover and recycle different parts of the spent fuel. The French have been successful in commercializing a process. They remove the uranium and plutonium and fabricate new fuel.

Other technologies show even more promise. Most of them, including the process used in France, were developed in the United States. Some recycling technologies would leave almost no high-level waste at all and would lead to the recovery of an almost endless source of fuel. However, none of these processes has been successfully commercialized in the United States, and they will take time to develop. Until the future of nuclear power in the U.S. becomes clearer, it will be impossible to know which technologies will be most appropriate to pursue in this market.

Ultimately, the private sector should make these decisions, as long as it conforms to regulations protecting public health and safety. Valuing spent nuclear fuel against the costs of permanent burial is a calculation best done by the companies that produce spent fuel and provide fuel management services.

Breaking the Yucca Impasse

The Energy Roadmap establishes a pathway to determine whether or not Yucca is suitable as a repository and puts forth a plan to find an alternative site if one is necessary. This is of critical importance. The legislation reiterates that Yucca Mountain shall remain the site of a radiological materials repository until determined otherwise by technical and scientific data, and it sets a 90-day timeline for the Nuclear Regulatory Commission to make such determinations. Should the determination be made that Yucca is not a suitable site based on scientific and technical analysis, the proposal sets forth a process to determine an alternative site. Further, it lifts the statutory limitations on what Yucca can hold and relies instead on technical analysis to determine Yucca's limits.

Opens the Door to Real Reform of Waste Management Policy

The Energy Roadmap also directs the Department of Energy (DOE) to report back to Congress on the feasibility of establishing an organization outside of the DOE to manage the Yucca repository and removing the fee that ratepayers pay to the federal government for used-fuel management services. Removing the fee would allow a market-based system to emerge for used-fuel management, and this is where the Energy Roadmap introduces the possibility of an innovative approach to nuclear waste management.

The success of a sustained rebirth of nuclear energy in the U.S. depends largely on disposing of nuclear waste safely. New nuclear plants could last as long as 100 years, but to reap the benefits of such an investment, a plant must be able to operate during that time. Having a practical pathway for waste disposal is one way to ensure long-term plant operations. Establishing such a pathway would also mitigate much of the risk associated with nuclear power, but as long as the federal government is responsible for disposing of waste, it is the only entity with any incentive to introduce these technologies and practices.

The problem is that the federal government has never been able to fulfill its current waste disposal obligations, much less introduce new and innovative methods of waste management. Although the Department of Energy under its current leadership has opened the door to reform, it is unclear that such reform will help the long-term prospects of nuclear energy. Administrations come and go, but inflexible rules and bureaucracies that oversee waste management seem to endure forever, making it impossible for the government to respond effectively to a rapidly changing industry. When it does attempt to respond, it often acts in ways that make no business sense and are inconsistent with the actual state of the industry.

Many of these efforts culminate in large government programs. While some of these programs have some near-term benefit insofar as they demonstrate political support for nuclear power, encourage private and public research and development, and develop the nuclear industry, they inevitably do more harm than good. They are run inefficiently and are often never completed. They cost the taxpayers billions of dollars and are often not economically rational. Furthermore, they often forgo long-term planning, and this leads to unsustainable programs that ultimately set industry back by providing fodder for anti-nuclear critics and discouraging progress in the private sector.

A New, Market-Based Approach

Introducing market forces into the process and empowering the private sector to manage nuclear waste can solve the problem, but this will require major reform. The federal government will need to step aside and allow the private sector to assume the responsibility for managing used fuel, and the private sector should welcome that responsibility.

The primary goal of any strategy for used-fuel management should be to provide a disposition pathway for all of America's nuclear waste. The basic problem with the

current system is that every nuclear power plant needs a place to put its waste, and Yucca Mountain is potentially not big enough to hold it all under the current used-fuel management regime.

In other words, permanent geologic storage capacity is a scarce resource on which the industry depends. If used-fuel management were a market-based system, this storage capacity would carry a very high value. A new system should price geologic storage as a scarce resource and fold any costs into a fee for emplacing nuclear waste in Yucca Mountain.

Reforming Waste Management Finance

The key to this new approach will be to transform how waste management is financed. Once market-based pricing is in place, the fee that nuclear energy consumers pay to the federal government for waste management ~~should~~ be repealed, which the Energy Roadmap demands that the DOE consider. Under the current system, consumers pay for waste disposition through a flat fee, called the mill that is paid to the federal government at the rate of 0.1 cent per kilowatt-hour of nuclear-generated electricity. This fee as currently assessed has no market rationale. It is simply a flat fee that ratepayers pay to the federal government. It has never been changed, not even for inflation, and it is not a reflection of any actual services provided.

In a market-based system, instead of paying a pre-set fee to the federal government to manage used fuel, nuclear power operators would pay a fee for service. This could include simply paying to place used nuclear fuel into geologic storage or for a more complex suite of processing services. These waste-management costs would then be folded into operating costs, which would be reflected in the price of power. This cost might be higher or lower than the current fee; more importantly, it would reflect the true costs of nuclear power.

The idea would be to set a rational pricing mechanism for emplacing nuclear waste in a geologic repository. The price could be based on a formula that considers a set of relevant variables, including heat content of the waste, predicted production of used fuel, repository capacity, and lifetime operation costs. Each of these variables would help to determine the price of placing a given volume of waste in Yucca at any specific time.

As the repository is filled, the fee to emplace additional fuel would obviously increase. The fee could also increase, depending on the formula, as new plants are constructed or old plants' licenses are renewed, because they would produce additional used fuel, thereby increasing the demand for repository space. Prices would be lower for waste that radiates less heat. Prices would fall if Yucca's capacity is expanded or if waste is reduced through alternative processes.

This would create a market for repository space. The fee could be structured in a number of ways. One example would be to charge a floating fee according to a predetermined formula. Under this scenario, the fee would shift constantly as the price variables change.

Comment [51]:

For example, a volume of waste with lower heat content would cost less to emplace than a similar amount with a higher heat profile. An alternative to a floating fee might be one that resets at timed intervals, such as once a year.

A pure market solution could also work where repository managers simply set the price for emplacement based on what operators are willing to pay, much like how shoes or a new truck is priced.

Nuclear power operators could then decide, given the price to place waste in Yucca, how to manage their used fuel. As the price to access Yucca goes up, so will the incentive for nuclear operators to do something else with their used fuel. This should give rise to a market-based industry that manages used fuel in the United States.

The market would dictate the options available. Some operators may choose to keep their used fuel on site to allow its heat load to dissipate, thus reducing the cost of placing that waste into Yucca. Companies may emerge to provide interim storage services that would achieve a similar purpose. The operators could choose options based on their particular circumstances.

As prices change and business models emerge, firms that recycle used fuel would likely be established. Multiple factors would feed into the economics of recycling nuclear fuel. Operators would make decisions based not only on the cost of placing waste in Yucca, but also on the price of fuel.

If a global nuclear renaissance does unfold, the prices for uranium and fuel services will likely rise. This would place greater value on the fuel resources that could be recovered from used fuel, thus affecting the overall economics of recycling. Instead of the federal government deciding what to build, when to build it, and which technology should emerge, the private sector would make those determinations.

Some nuclear operators may determine that one type of recycling works for them, while others may decide that a different method is more appropriate. This would create competition and encourage the development of the most appropriate technologies for the American market.

Create a Market for Waste Management Services

Such a market for repository space could give rise to a broader market for geologic storage. As waste production causes Yucca's storage costs to rise, companies could emerge that provide additional geologic storage at a lower price. This additional space would in turn reduce the value of the space available in Yucca. These additional repositories would set their prices however they deemed appropriate.

Alternatively, as Yucca fills, nuclear operators may decide to develop additional geologic storage facilities in a joint venture. While this may seem unlikely, given the problems associated with opening Yucca Mountain, other communities may be more receptive to

hosting a repository once a reliable safety record is established and the economic benefits of hosting a repository are demonstrated. The federal government would still take title to any waste placed in future repositories once they are decommissioned.

It is impossible to predict how a market might evolve, but unlike the government-run process that led to the Yucca Mountain site—a process mired in politics—private entities would establish the path forward by working with government regulators. Private entities would also be able to pursue their plans without having to contend with as much of the bureaucratic inertia that accompanies government-run operations.

Most importantly, this system would encourage the introduction of new technologies and services into the market as they are needed, as opposed to relying on the federal government. New technologies would not be hamstrung by red tape or overregulation. This system would also allow for the possibility of no expansion of nuclear power. If the U.S. does not expand nuclear power broadly, there is probably no reason to build recycling or interim storage facilities.

Getting the Federal Government as Far from Yucca Mountain as Possible

As permanent geologic storage is commoditized, the problem then becomes one of establishing responsibility for managing that scarce resource. Leaving that responsibility with the government provides no benefits—other, perhaps, than political benefits. No overarching need mandates that the government must manage Yucca Mountain or used nuclear fuel. Furthermore, leaving this responsibility in the hands of government comes with all kinds of pitfalls, including inflexibility, inefficiency, politics, and being subject to annual appropriations, to name a few. Similarly, a public-private partnership is not necessary and has no inherent advantages, again, other than perhaps political.

Instead, a completely new organization should be established to manage Yucca Mountain. The new organization's purpose would be to ensure that Yucca is available to support the commercial nuclear industry's need for long-term geologic storage in a way that benefits Nevada and to set the fee for placing radiological materials in Yucca. This fee would be the primary mechanism for managing access to the repository. Its one operating mandate should be to remain open to receive radiological materials either until a second repository is opened or until the last commercial nuclear power plant ceases operations.

The federal government should not be part of the management team; however, local and state government could. The new entity could be organized in any number of ways. It could take the form of a nonprofit organization that is independent of but represents the nation's nuclear energy producers. Such a structure would ensure that no operator receives preferential treatment and that it functions as a service to all nuclear operators. It also would prevent a profit-seeking entity from holding a monopoly over a key asset on which an entire industry depends. The entity could also be a public-private partnership with, perhaps, the state of Nevada being a majority partner. The federal government

would provide oversight through the Nuclear Regulatory Commission (NRC) and other appropriate agencies.

The new organization should be created as soon as possible and immediately commence a transition plan, which would coincide with the NRC's review of the Department of Energy's application for a Yucca Mountain construction permit. During the transition period, the new organization would work with the Department of Energy's Office of Civilian Radioactive Waste Management to move the application for the Yucca construction permit through the NRC. If the license is granted, the new organization would take control of Yucca operations, which would include overseeing Yucca construction and preparing for long-term operations.

Protecting the Taxpayer from Cleanup Costs

The NRC requires that each nuclear plant operator establish a funding mechanism to ensure that resources will be available to decommission the plant once operations cease. This is achieved either through guarantees from its parent company or by establishing a decommissioning fund. This protects the taxpayer from the financial obligations of plant decommissioning if the operator becomes financially unable to carry out that responsibility.

A similar funding mechanism should be required for new plant licenses and life extensions to cover the costs of waste disposal once the mill is repealed. This could be included in the decommissioning fund or set up as a separate entity. It would not be a payment to the federal government and would always be controlled by the nuclear operator. The monies set aside should be adequate to finance the geologic disposal of any used fuel held on-site in dry storage. This guarantees that waste disposal funds will be available, even if the operator becomes insolvent.

Growing Support of Market-Based Waste Management

The idea that the market may ultimately hold the answers to the nation's nuclear waste dilemma is gaining ground. For example, Tim Echols, a Georgia state public services commissioner, recently published an op-ed in the *Atlanta Journal-Constitution* supporting the idea. Echols argues that market forces must be brought to bear if we are ever to solve the nuclear waste issue. More recently, the Center for Strategic and International Studies, the Federation of American Scientists, the University of Illinois Champaign-Urbana and The Heritage Foundation authored a report entitled "U.S. Spent Nuclear Fuel: A Market-Based Solution." This document, like Echols' op-ed, articulates the need to introduce market forces into nuclear waste management and, significantly, was published by group of experts who represent a diversity of political views.

Most telling, however, are the foreign countries that have embraced private-sector responsibility for nuclear waste management. Swedish utilities, for example, are responsible for waste management and have developed a comprehensive management

regime that includes geologic storage. Similarly, Finnish nuclear waste producers are responsible for managing their nuclear waste.

REGULATORY REFORM

The Energy Roadmap also would reform how new reactors are permitted. The current permitting process to build new reactors is a product of a streamlining effort established by the Energy Policy Act of 1992, but it is still proving to be slow and unpredictable. The Nunes legislation would create a second permitting track that would allow for a permit to be issued in approximately two years.

To be eligible, applicants must:

- Construct a reactor with a design that has already been certified by the Nuclear Regulatory Commission (NRC);
- Build the new reactor on or adjacent to a site where reactors already operate;
- Not be subject to any NRC actions to revoke operating permits; and,
- Have submitted a completed combined construction and operating license permit application that has been docketed by the NRC.

The expedited process would entail the issuance of a draft Environmental Impact Statement (EIS) within 12 months of the application being docketed, and the final EIS would be issued within 18 months. Further, hearings over contested application issues would begin once the draft EIS is issued rather than after the final EIS. This would allow the NRC and applicant to resolve contested licensing issues within 24 months of the application being docketed. The bill also calls for the Safety Evaluation Report—NRC's application technical review report—to be completed within 18 months of the application being docketed. While such timeframes would be tight, with close coordination between the applicant and the NRC, it should allow for a significantly shortened process.

The bill also begins to break down one of the primary obstacles that new reactor technologies face in entering the marketplace: a lack of regulatory support. The current NRC does an outstanding job of regulating large light-water reactors, 104 of which operate in the U.S. today, but it performs inadequately in developing regulations that would allow new technologies into the marketplace.

Without this regulation, new technologies are effectively banned. Customers are hesitant to buy reactors that the NRC will not regulate, and the NRC does not want to put its resources toward a reactor technology that has no customers. The result is that new nuclear technologies are at a severe disadvantage.

To begin changing this, the Roadmap directs the NRC to develop a set of guidelines for technology-neutral nuclear plant designs. Instead of mandating that a specific nuclear technology be wedded to a specific plant design, the new guidelines would allow other nuclear reactor technologies to be used in a nuclear power plant, a significant step toward building a more diverse and competitive nuclear industry.

It also gives the NRC a 90-day deadline to "transmit to the Congress a report containing recommendations, including personnel and resource requirements" needed to establish a predictable regulatory program for small modular reactors. Like other elements of the bill, this provision moves away from the subsidy-first mentality that consolidates market power in Washington to a market-based vision that allows the actual commercial value of a technology to determine its ultimate success.

Finally, the proposal allows provisional certification of new reactor designs. While the provision does not eliminate or reduce any requirements for reactor design approval, it would allow a reactor plant permit applicant to move forward with the permitting process. In issuing provisional certification, the legislation would direct the NRC to consider such factors as whether a design is commercially viable in other markets or if it has been certified in other countries.

That concludes my testimony.

I look forward to your questions.

The Heritage Foundation is a public policy, research, and educational organization recognized as exempt under section 501(c)(3) of the Internal Revenue Code. It is privately supported and receives no funds from any government at any level, nor does it perform any government or other contract work.

The Heritage Foundation is the most broadly supported think tank in the United States. During 2010, it had 710,000 individual, foundation, and corporate supporters representing every state in the U.S. Its 2010 income came from the following sources:

Individuals	78%
Foundations	17%
Corporations	5%

The top five corporate givers provided The Heritage Foundation with 2% of its 2010 income. The Heritage Foundation's books are audited annually by the national accounting firm of McGladrey & Pullen. A list of major donors is available from The Heritage Foundation upon request.

Members of The Heritage Foundation staff testify as individuals discussing their own independent research. The views expressed are their own and do not reflect an institutional position for The Heritage Foundation or its board of trustees.

Opinion

Congress should act on nuclear waste

With the Japanese nuclear crisis almost under control, a clear lesson for Americans is that storing waste on site is a bad idea. It is my hope that the management of nuclear waste here in the United States becomes front and center in the debate — not the generation of nuclear power itself. In fact, I believe it's time for Congress to repeal its decision to allow the government to manage the waste disposal process.

As I was graduating from The University of Georgia in 1982, the U.S. Congress was establishing the Nuclear Waste Policy Act. The lawmakers looked way ahead and set Jan. 31, 1998, as the deadline for the federal government to begin picking up our nuclear "trash." More than a decade has come and gone and little has been done. In fact, we have gone backward in some ways.

Our first step backward is the fact that our consumers are being charged twice for waste storage. The federal government is still getting their percentage off every kilowatt of power generated at our four nuclear reactors, and the plant operators are recovering their cost of on-site storage. The fact that the public is not aware of this double charge is baffling to me, and I hope our congressional delegation will begin to bang the drum on this issue in the near future. Georgians have contributed \$1.524 billion into this fund so far.

The second step backward was the president's decision to pull the plug on the Yucca Mountain geologic repository. Yucca Mountain was not just any piece of real estate. It was the perfect location for nuclear waste. Yucca is owned by the Department of Energy, very isolated, extremely stable. While I wish the government would take the waste to the partially completed Yucca Mountain repository in Nevada as promised, we'd need nine such repositories by the turn of century to house all the waste we're producing, according to Philip J. Pinks of the Dogwood National Laboratory.



VIEWPOINT
Tim Echols

So what are we to do? For those of us who favor the recycling of nuclear fuel, hopefully we see that the government's pledge has rewarded any incentive for power-generating companies to develop better ways to manage their waste. That better way is recycling or reprocessing what we can, and permanently disposing the remainder in a place like Yucca Mountain. But instead, our fuel sits, just like Japan's spent fuel, as a liability.

I think Heritage Foundation scholar Jack Spencer has a good idea. In his testimony to President Obama's Blue Ribbon Commission on America's Nuclear Future, he argued that our current approach to managing used nuclear fuel is broken. The government promised to take title to the used fuel and dispose

of it. It did not. Spencer's plan would include some federal oversight, with the Nuclear Regulatory Commission and the Environmental Protection Agency playing a role. But his plan also injects market forces into the process and empowers the private sector to manage the waste. And obviously, not just any company is qualified to do this.

Under Spencer's plan, nuclear fuel recycling would become profitable. Areva, a French company, has proved it can be profitable in France. In fact, I visited with Areva staff recently in Charlotte, N.C., and they are preparing a proposal worth around \$30 billion to reprocess about 25 percent of America's nuclear waste. Stay tuned.

At the end of the day, taking the responsibility for waste management away from the government would put the entire process of nuclear power generation in private hands. Once this happens, operators would be motivated to deal with the waste in the most effective way instead of simply jacking up the government a fee, which has been, we estimated so far.

What we do with our nuclear waste is one of the most important issues in our day. Hopefully, the Jacks situation will awaken Congress to the issue. Maybe then we can get nuclear waste management out of the hands of government bureaucrats and allow some of the brightest minds in the world to come up with a better plan.

Spencer is a commissioner with the Georgia Public Service Commission.

Hometown horse may show the way

I don't often Georgians have a favorite son to root for when it comes to the Kentucky Derby. This Saturday, May 7, a little after 6 p.m., the running of the 127th Kentucky Derby will take place at Churchill Downs in Lexington, Ky.

For Georgians it has special drama, because a horse named Mucho Macho Man, which is owned by the Sawanees, Ga., couple of Dean and Patti Reeves (70 percent ownership) and the Sonoma firm Dream Team Racing (30 percent), is currently one of the horses favored to win. In his short racing life, Mucho Macho Man has earned \$370,000.

Winner or not, the Reeves will have a big decision to make after Saturday's Derby. Will their athlete be fit to run the Preakness in Baltimore just two weeks later, and then attempt the Belmont Stakes on Long Island three weeks after that?

Sally Ritto is MDM's trainer. If he wins the Kentucky Derby, Ritto will make history as the first female trainer to achieve such an honor. If that feat wasn't already incredible enough, Ritto returned to her passion of horse training after a 2008 bout with cancer, just as she spent on an IV drip, designed to stimulate her heart muscle. Each day was a struggle for life.

Mucho Macho Man's life began with an equally daunting struggle as well. He was birthed ill-fated in a field in Ocala, Fla., and was born deaf. The brothers, Carole and John Ritto, worked hard to save his life. Much to everyone's relief, he rose to his feet and ran off into the pasture. That's when Carole Ritto first called him Lazarus.

What is Georgia waiting for?

Horse racing is a labor-intensive endeavor and would create at least 10,000 jobs in the first three years of operation. To accomplish this, the General Assembly must vote to allow the citizens of Georgia the opportunity to vote on the issue of horse racing and pari-mutuel wagering.



VIEWPOINT
Harry Geisinger

After the Constitutional Amendment passes, the local community being considered for a race track or a satellite facility must return to the polls to affirm their desire for such a facility. To be clear, the voters will have two opportunities to express their wishes.

The details of the enabling legislation can be found online in a 38-page House bill (HB 465).

Lake Kentucky, Florida or any one of the 28 states currently permitting horse racing and pari-mutuel wagering. Georgia is prize for this industry. A private-sector developer will have to invest \$1 million to \$99 million dollars for the required 200 to 300 acres of land and the construction of the track. To make a "lot" of it, the track must become a destination with upscale hotels, restaurants, shopping malls, golf courses, and other entertainment facilities.

Georgia has the advantage of being located between Kentucky, Florida and Louisiana. This makes our state an ideal spot for horse



Mucho Macho Man co-owners: Patti and Dean Reeves of Sawanees, Ga.

racing. It has been estimated over 20,000 horses pass through Georgia per year. In February 2010 it was revealed that during the prior 14 months, 177,000 horses had crossed into or out of Florida, with the majority of that number using Georgia roads for their travels. In Kentucky, the horse portion of racing is a \$4 billion a year business, while in Florida it's approximately \$2.5 billion per year.

During the residency of 2011, a lesser study (HR 642) committee will consider the horse racing industry and its benefits to our state.

Geisinger is state representative for House District 48, Roswell/Sandy Springs.

ATLANTA BUSINESS CHRONICLE

3423 Piedmont Road, Atlanta, Georgia 30305
(404) 249-1000
atlanta@bizjournals.com
Main Fax: (404) 249-1048
Newsroom Fax: (404) 249-1058

Publisher: Ed Baly

EDITORIAL

Editor: David Altman
daltman@bizjournals.com

Executive Editor: Alan K. Fisher
afisher@bizjournals.com

Managing Editor: David B. Johnson
djohnson@bizjournals.com

Industry Focus Editor: Jessica Anderson
janderson@bizjournals.com

Broadcast Editor: Crystal Coleman
ccoleman@bizjournals.com

Contributing Reporter - Broadcast: Cameron Burns

Contributing Writers: Carla Calabrese
ccalabrese@bizjournals.com

MORNING CALL EDITOR: Debra Bright Galt
dbright@bizjournals.com

Staff Writers: Michael L. Galt
mgalt@bizjournals.com

Associate Creative Director: John White

Graphic Designers: Michael Hunter, Tim McDonald, Scott White

Assistant Art Director - Advertising: Chris Gales

ADMINISTRATION

Business Manager: Barbara Collier

Assistant Business Manager: Chris Jones

Credit Manager: Lequita Watson

Administrative Assistant: Pamela Hall

Information Systems Administrator: Karen Hamilton

CIRCULATION

Circulation Director: Michael Fitzgerald

Senior Circulation Assistant: John Borne

Circulation Sales Assistant: Mary Edwards

David Rivas, Tom Sander, Abby Smith, Quentin Wright

Distribution Supervisor: Cindy Neuper

Atlanta Business Chronicle is a publication of

Bizjournals

125 West Peachtree St., Suite 400

Atlanta, GA 30303

Shirley Ann, President & CEO

Ray Shaw, Chairman (1989 to 2009)

ADVERTISING

Advertising Director: Emily Baly

Advertising Traffic Administrator: Lynda Zanteno

Account Executives: Jan Anderson, Dana Cox, Rachel Doughty, Shawn Lakes, Jennifer Quatro, Nedra Krasner, Shelley K. Long, Susan Parker, Greg Powell, Susan White

Classified: Lynda Zanteno

Atlanta Business Chronicle is a publication of

Bizjournals

125 West Peachtree St., Suite 400

Atlanta, GA 30303

Shirley Ann, President & CEO

Ray Shaw, Chairman (1989 to 2009)

ADVERTISING

Advertising Director: Emily Baly

Advertising Traffic Administrator: Lynda Zanteno

Account Executives: Jan Anderson, Dana Cox, Rachel Doughty, Shawn Lakes, Jennifer Quatro, Nedra Krasner, Shelley K. Long, Susan Parker, Greg Powell, Susan White

Classified: Lynda Zanteno

Atlanta Business Chronicle is a publication of

Bizjournals

125 West Peachtree St., Suite 400

Atlanta, GA 30303

Shirley Ann, President & CEO

Ray Shaw, Chairman (1989 to 2009)

ADVERTISING

Advertising Director: Emily Baly

Advertising Traffic Administrator: Lynda Zanteno

Account Executives: Jan Anderson, Dana Cox, Rachel Doughty, Shawn Lakes, Jennifer Quatro, Nedra Krasner, Shelley K. Long, Susan Parker, Greg Powell, Susan White

Classified: Lynda Zanteno

Atlanta Business Chronicle is a publication of

Bizjournals

125 West Peachtree St., Suite 400

Atlanta, GA 30303

Shirley Ann, President & CEO

A REPORT OF THE CSIS
PROLIFERATION PREVENTION
PROGRAM

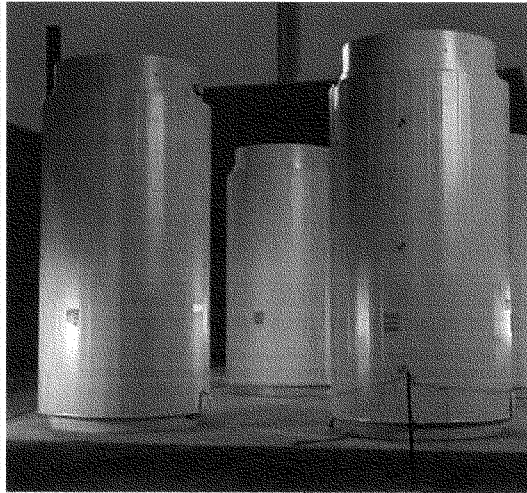
U.S. Spent Nuclear Fuel

A MARKET-BASED SOLUTION

Authors

Charles D. Ferguson
Clifford Singer
Jack Spencer
Sharon Squassoni

May 2011



CSIS | CENTER FOR STRATEGIC &
INTERNATIONAL STUDIES

U.S. Spent Nuclear Fuel

A MARKET-BASED SOLUTION

Authors

Charles D. Ferguson
Clifford Singer
Jack Spencer
Sharon Squassoni

May 2011

About CSIS

In an era of ever-changing global opportunities and challenges, the Center for Strategic and International Studies (CSIS) provides strategic insights and practical policy solutions to decisionmakers. CSIS conducts research and analysis and develops policy initiatives that look into the future and anticipate change.

Founded by David M. Abshire and Admiral Arleigh Burke at the height of the Cold War, CSIS was dedicated to the simple but urgent goal of finding ways for America to survive as a nation and prosper as a people. Since 1962, CSIS has grown to become one of the world's preeminent public policy institutions.

Today, CSIS is a bipartisan, nonprofit organization headquartered in Washington, D.C. More than 220 full-time staff and a large network of affiliated scholars focus their expertise on defense and security; on the world's regions and the unique challenges inherent to them; and on the issues that know no boundary in an increasingly connected world.

Former U.S. senator Sam Nunn became chairman of the CSIS Board of Trustees in 1999, and John J. Hamre has led CSIS as its president and chief executive officer since 2000.

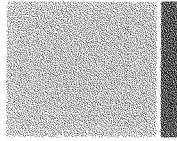
CSIS does not take specific policy positions; accordingly, all views expressed in this publication should be understood to be solely those of the author(s).

Cover photograph: Holtec International, <http://www.holtecinternational.com/>.

© 2011 by the Center for Strategic and International Studies. All rights reserved.

ISBN 978-0-89206-645-2

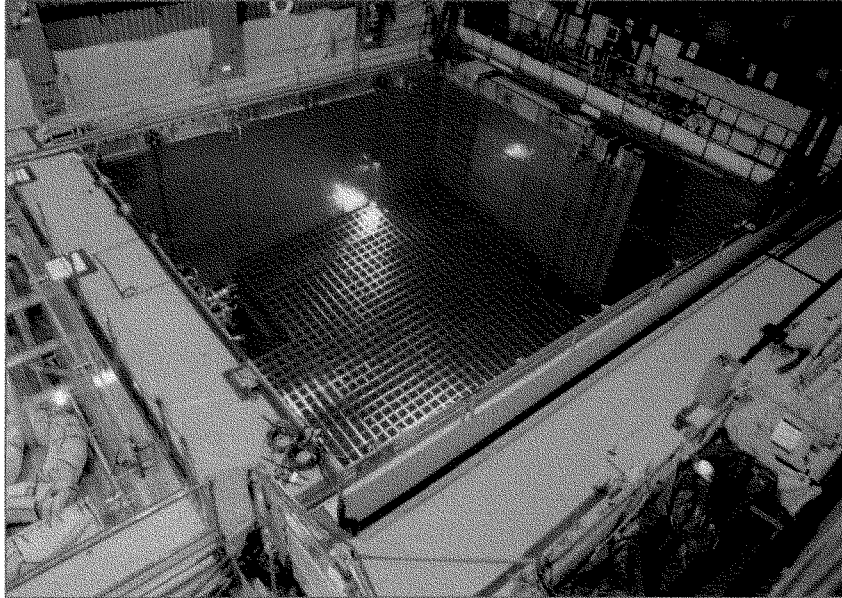
Center for Strategic and International Studies
1800 K Street, N.W., Washington, D.C. 20006
Tel: (202) 887-0200
Fax: (202) 775-3199
Web: www.csis.org



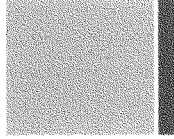
CONTENTS

Executive Summary	v
I. Fifty Years and Counting	1
II. Creating a Market Mechanism	2
III. Level the Playing Field	3
IV. Radioisotope Containment Requirements	4
V. Actions toward a Market-Driven System	5
VI. Timing and Consequences	8
Appendix A. State Restrictions on Nuclear Power Plant Construction	11
Appendix B. The Nuclear Waste Fund and Escrow Funds	12
About the Authors	14

A Spent Fuel Pool



Source: Nuclear Regulatory Commission (NRC), <http://www.nrc.gov/reading-rm/photo-gallery/index.cfm?text=spent+fuel+pool&cat=>.



EXECUTIVE SUMMARY

The central planning approach to U.S. spent nuclear fuel management has been a glaring and unsuccessful exception to the trend toward a market-driven energy sector. This report envisions a market-driven approach, which would include eight components:

1. Phase out utilities' payments to the federal government for spent fuel management in favor of payments into escrow funds.
2. Reassess the radioisotope containment criteria for spent fuel repositories (i.e., the "million-year" benchmark).
3. Do not require prompt deep burial of all spent fuel.
4. Provide federal support for preparation of licenses for away-from-reactor spent fuel storage facilities.
5. Remove nontechnical restrictions on maximum volumes and site license durations for away-from-reactor spent fuel management facilities.
6. Treat all states equally in voluntary licensing processes, including Nevada.
7. Allow the private sector options to: keep spent fuel at reactor sites; ship it to another of their reactor sites in the same state; ship it to a reactor site of another company in the same state and transfer the escrow fund balance to that company; or ship it out of state. Shipments out of state could be to a spent fuel storage facility that might or might not be located at a licensed deep underground repository, to a repository for prompt emplacement, or to a reprocessing facility if one is available.
8. Allow states to import foreign spent fuel, to the extent consistent with U.S. nonproliferation policy and U.S. facilities' capacity to handle domestic spent nuclear fuel.

As with reactor decommissioning, payments to the federal treasury for spent fuel management can eventually be replaced by payments into escrow funds associated with each nuclear fuel dry storage cask. When spent fuel is shipped across state lines, the recipient state could require payment in excess of a federally determined minimum adequate to ensure the safe and secure future management of the spent fuel. By freeing up the remainder of the escrow fund balance, this approach would provide an incentive for shipping fuel off of reactor sites.

Consistent with federal requirements on safety, security, and sound financial management, this approach should provide current and future generations with the flexibility needed to take advantage of technological improvements, adapt to varying levels of spent nuclear fuel, and make decisions about the fate of spent nuclear fuel decades in advance. Fundamentally, this approach would convert spent nuclear fuel from a liability into an asset.



U.S. SPENT NUCLEAR FUEL

A MARKET-BASED SOLUTION

I. Fifty Years and Counting

During half a century of U.S. nuclear electric power plant operations, three so far unsuccessful approaches to dealing with spent nuclear fuel have been adopted. The first approach was to recover plutonium to feed breeder reactors that would make more plutonium than they consumed. The idea was to provide a nearly unlimited supply of nuclear fuel. The second approach was to fairly promptly bury spent fuel deep underground without reprocessing. The third approach was to repeatedly reuse spent fuel in order to burn out plutonium and its decay products. One of these decay products, americium-241, limits spent fuel packing density in a deep underground repository if it is to be sealed before many centuries have elapsed. The idea was to decrease the repository area needed for each nuclear reactor by as much as a factor of 10. In each case, the federal government was operating under the assumption that it could forecast for all time to come what the appropriate solution would be.

The breeding approach fell victim to discoveries of large quantities of uranium that could be economically fabricated into reactor fuel. The prompt burial approach failed to provide a flexible enough incentive to enlist the cooperation of states to host underground repositories. The deep burn approach assumed that the private sector would build a large fleet of commercially viable liquid-sodium-cooled reactors once the government funded prototype development. This hasn't happened. A common flaw was that none of these approaches had the flexibility to respond to changing economic and political conditions over the several decades that they would have taken to implement.

In other energy markets, the United States has moved toward letting market forces dominate, subject to regulations relevant to safety, security, and environmental impact. This approach applies even to nuclear reactor decommissioning, for which escrow funds are set aside to insure adequate financing of private-sector decommissioning operations. The advantage of a suitably framed market-driven approach is that it can respond to technological, economic, and public policy evolution as reflected in evolving costs of various options. For spent nuclear fuel management, there are three options: reprocessing, placement in a repository designed for permanent disposal, and retrievable storage pending a decision between the other two options. Given the impossibility of accurately forecasting the optimal solution decades or even centuries ahead of time, a market mechanism is needed that can dynamically reallocate spent fuel. Under current law in the United States, there is no such market mechanism for spent nuclear fuel producers. Instead, producers irreversibly pay to the federal government a fixed rate of \$0.001 per kilowatt hour of nuclear electric power (mil/kWhe) generated. They then sue the government for the costs of managing spent fuel that the government so far has failed to take from them.

There are international as well as domestic consequences of having a dysfunctional system for handling spent U.S. reactor fuel. As the world's largest national nuclear energy market, the United

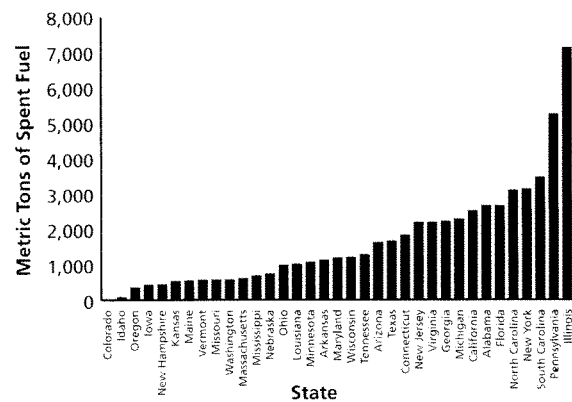
States has the opportunity not only to demonstrate safe, secure, and economically and politically viable spent nuclear management, but also to serve as a source of technology and exports in that field. U.S. influence on other countries' fuel cycle choices varies considerably from case to case but has been complicated by reversals in policies regarding reprocessing. The U.S. approach domestically and internationally has lacked continuity.

II. Creating a Market Mechanism

The spent nuclear fuel currently held in 35 U.S. states (listed in Graph below) has negative value to the nuclear industry. It is true that the cost of storing spent fuel in casks at reactor sites can be recovered by suing the federal government. However, there are 10 states that restrict new nuclear plant construction pending an overall solution for spent nuclear fuel management (cf. appendix A). In some other states, utilities feel that their inability to assure local communities that spent nuclear fuel will be removed is an impediment to nuclear power plant construction. This concern is likely only to deepen after the crisis at the Fukushima Daiichi nuclear power plants, which demonstrated some of the vulnerabilities of spent nuclear fuel pools.

On the other hand, a suitable site for the long-term management of spent nuclear fuel is currently not a useful asset anywhere. The state of Nevada was offered compensation for welcoming the Yucca Mountain repository on the order of a fraction of a percent of the total project cost, a return that was as unacceptable to the state as it would be almost anywhere in the private sector. South Carolina might welcome a spent fuel reprocessing facility, but it is neither keen to put up the cost of its construction nor serve as a permanent home for the radioactive fission products to be separated from spent nuclear fuel. Elected and appointed officials of Utah have so far successfully opposed the construction within its borders of a facility licensed for 20 years for interim storage of spent fuel. That facility would in any case have neither the capacity nor the longevity to provide a long-term option, even for reactor discharges to date, without both increasing its capacity and extending its license.

Spent Nuclear Fuel (in metric tons of heavy metal) in Commercial Storage by State



Note: Idaho is holding used fuel from Three Mile Island, Unit 2. Data are rounded up to the nearest 10 tons.
Source: AEC Nuclear Energy Solutions and U.S. Department of Energy (updated May 2010)

To transform spent nuclear fuel from a liability into an asset, the net value of accepting such fuel has to at least match the cost associated with the liability of leaving it where it is. The net value of accepting spent nuclear fuel within a state is a balance between the economic benefits to the immediate community, the perceived liability within and outside of that community for living near a waste management site or transportation routes, and the compensation provided for taking in the spent fuel. Local communities other than Indian tribes derive their legal authority from their state and have to negotiate a political compromise with their state. States also have an interest in decisions about spent nuclear fuel management on Indian tribe land within their state boundaries.

The state hosting a spent nuclear fuel management facility thus has an important role in determining the charge for taking in spent nuclear fuel. To respond to conditions that evolve over decades, there must also be flexibility in setting how such charges evolve over time. Two options include charges for the quantity of heavy metal (with atomic weights near that of uranium [e.g., in metric tons]) or the fission power produced using the spent fuel. Both reactor operators and the federal government could also have the possibility of reserving prospective waste management capacity in a host state at any point in the search, licensing, construction, or operations process for a facility. If this applies to reactor operators, it would be for any spent fuel they must dispose of, either because they have been relieved of the responsibility of paying a sum such as a mil/kWhe to the federal government, or because they have negotiated compensation from that government.

It is likely that states wanting to host spent fuel management facilities will contract out some or all of the stages for preparation, construction, and operation to a concern that is either fully privately operated or in which the state has a direct financial interest. Regardless, states are likely to require a regulatory oversight role, consistent with whatever federal government regulations are in place to ensure long-term safety, security, financial stability, and limitations on environmental impact.

III. Level the Playing Field

If current legislation can be revised to make the acceptance of spent nuclear fuel for long-term management attractive, who would be interested? Current legislation requires that Nevada be the first state to host a permanent repository. Current legislation also restricts the capacity of any monitored retrievable storage (MRS) facility that the federal government constructs. In order to create a level playing field for interested states, a more comprehensive approach is needed that neither forces a single state to take a facility it does not want nor puts any state in a politically defined privileged position.

Current requirements for geological repositories distort markets in several ways. Most important is the requirement for prompt burial, starting with the oldest spent fuel. One problem with this is that the liability cost associated with spent fuel storage at reactor sites depends on whether the reactor site is still operating and on other factors such as whether continued on-site storage adversely affects prospects for new reactor construction. An even more serious problem is that prompt burial considerably increases the time-discounted cost and uncertainty associated with repository design and operation. It can be considerably less expensive to allow for extensive decay of strontium-90 (half life 29 years) and cesium-137 (half life 30 years) before placing spent fuel in a repository.

In a more market-driven environment, a repository operation would have flexibility to store fuel before emplacement, provided that requirements for ensuring the adequate financing, safety, security, and the eventual availability of repository space were met. Within this context, entities initially responsible for spent nuclear fuel management would have the option of leaving spent fuel at reactor sites even until site decommissioning if desired, transferring spent fuel to a licensed facility set up for storage alone, transferring spent fuel to a licensed repository site, or transferring spent fuel to any extant prospective reprocessing facility that is also licensed for spent fuel storage. This would apply equally whether the spent fuel was from U.S. defense programs, commercial spent fuel for which the federal government is still responsible, or commercial spent fuel for which private-sector institutions become responsible. For any option where spent fuel is shipped to another state, the recipient state would set charges, with resulting funds to be managed in accordance with federal regulations ensuring long-term financial viability within a uniform national regulatory framework.

Even within a more market-driven environment, it would be necessary to restrict the use of funds required by states for accepting spent nuclear fuel. This is already the case for reactor decommissioning for which escrow funds are required to be set aside. Given the much longer half-lives of the dominant radioisotopes in spent nuclear fuel compared to other reactor components, a more conservative investment strategy would be needed than is currently allowed for decommissioning funds. For example, a minimum amount could be required to be invested in inflation-indexed U.S. treasury securities. The outstanding potential liability depends on the location of the spent fuel. The minimum amount escrowed per unit of spent nuclear fuel should depend on whether the spent fuel is in a stand-alone storage facility, in decay storage at a repository with adequate capacity, or actually placed in a repository.

IV. Radioisotope Containment Requirements

The current regulatory framework assumes that spent nuclear fuel will promptly and permanently be placed in a deep underground repository, and it puts limits on the release and transport of radioisotopes in groundwater for a million years. Late in the Yucca Mountain site design and license preparation process, the 1 million-year requirement was imposed by the Environmental Protection Agency after a legally mandated National Academy of Sciences study. That study examined only the exposure to a hypothetical string of individuals with current human physiology and medical care who drink untreated well water at a single site just outside of an exclusion boundary enforced over the entire million years. The conclusion was that the cumulative radiation exposure over the million years exceeded that over the 10 thousand years for which exposure standards had already been developed. Excluded from the study were the larger cumulative population doses from global exposures to airborne radiocarbon releases from spent fuel. Also excluded from the study was any accounting for the possibility that nuclear materials in well-contained nuclear waste packages might be exhumed and used to construct weapons.

The combination of the long time frames for constraints on groundwater radioisotopes and the prompt and permanent burial assumptions complicated and potentially compromised license approval for the Yucca Mountain site for two reasons. The assumption of prompt and permanent burial yielded a design to place titanium-palladium alloy drip shields above the storage casks after about a century in order to protect the post-closure casks from corrosion. However, there is ques-

tionable confidence that this can be done after such a long time in the resulting temperature and radiation field. Moreover, questions have also been raised about whether the groundwater transport analysis for the Yucca Mountain site had adequate quality control.

Coincidentally, since the legislation launching the repository site licensing process was passed, the annual total radiation exposure to the U.S. population has increased millions of times more than the nominally expected exposures to the above-mentioned hypothetical individuals. This is primarily due to medical diagnostics and procedures to which the ALARA (as low as reasonably achievable) standards used in the nuclear industry are not uniformly or even generally applied. This observation suggests that reassessment of restrictions on possible long-term release of radioisotopes from spent nuclear fuel might be in order if establishing a level playing field for a more market-driven approach is desirable. The impact of such a reassessment is still unclear, but it is quite possible that something closer to a 10 thousand-year than a 1 million-year time horizon will be considered suitable if and when the controversy over the particular features and politics of the Yucca Mountain site lie in the past.

V. Actions toward a Market-Driven System

Eight actions to help create a more market-driven spent fuel management system would include:

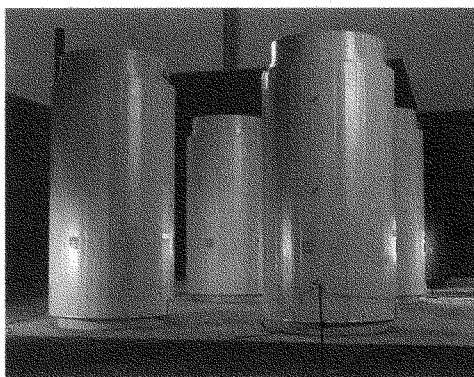
(1) Phase out the mil: A core element of creating a more market-driven spent fuel management system is replacing payments of a mil/kWhe to the federal government by an appropriate level of payments into utility escrow funds. This amount should be adequate to provide for the disposition of all spent fuel stored on-site in dry casks. This can be applied to all new reactor licenses submitted after a date certain, but allowing potentially for license applications that would be significantly perturbed by such a change to be submitted and processed beforehand. Other reactor operations could be given the opportunity to cease such payments to the federal government in favor of payments into escrow funds and retaining title to future spent nuclear fuel discharges until they are moved away from sites owned by the holder of the escrow fund. This should be legally possible as long as payments to utilities for this purpose do not come from the Nuclear Waste Fund (cf. appendix B). A federal government official would be empowered and given guidelines to negotiate transfers of federal funds into escrow funds in exchange for release of the federal government obligation to expeditiously take title of spent fuel. Escrow funds would be held in inflation-indexed U.S. treasury securities except to the extent that it can be demonstrated that a portion can prudently be approved for investment with potentially higher but more uncertain yields.

(2) Reassess containment criteria: The procedure that led to a million-year horizon on limits on the appearance of spent nuclear fuel radioisotopes in groundwater was meant to provide reassurance. The net effect was instead to reinforce the idea that such materials are so extraordinarily hazardous that far more stringent criteria need to be applied to them than to either other sources of radiation exposure or other toxic materials not required to be so durably isolated. While it is true that fissile materials in spent nuclear fuel can be extraordinarily hazardous if fabricated into nuclear explosives, the plan for installing drip shields in Yucca Mountain made it more, rather than less, likely that fissile materials would remain more readily recoverable after fission product decay made them more accessible. The next step is to review and revise the containment criteria. Such a reassessment could examine changes in public attitudes, different options for exclusion boundaries or buying water rights in perpetuity, likely evolution in technology for water purifica-

tion and medical treatment, and comparative costs and hazards associated with other toxic materials. The next step toward market-driven spent fuel management in any case allows future generations to reassess containment criteria as the knowledge base evolves.

(3) Do not require prompt deep burial of all spent fuel: To build confidence in the availability of comprehensive spent fuel management, it is necessary that specific locations for a large amount of repository space be identified with the cooperation of host states. It is also necessary that some spent fuel be stored therein. However, it is neither technologically nor economically optimal that all spent fuel that is now in dry casks be promptly and permanently placed in deep underground repository space. Instead, trial emplacements for an extended period of time that allow studying the emplaced material and its surrounds, the decay of fission isotopes in additional material to be emplaced later, and the possibility of future technological improvement that could lower costs could be useful. In this context, states could be given the option of seeking a license initially for retrievable storage, later for permission to proceed to irretrievable emplacement, and possibly even later for permanent closure following abandonment of convective cooling. With more than one repository sited, not all would necessarily have the same type of license. Some could be for prompt permanent burial and others initially for retrievable emplacement. Of course, this is more likely to be a successful approach if the public views spent nuclear fuel as an asset rather than a liability.

Dry Storage Casks



Source: Holtec International, <http://www.holtecinternational.com/>.

(4) Provide federal support for license preparation: States are unlikely to be very interested in repository site licensing in a market-oriented system if all potential customers have the option of leaving spent fuel at production sites or at off-site interim but long-term storage facilities. Without some guaranteed customers for spent fuel management services, there would be little incentive for states to proceed. However, the federal government has agreements with current host states to remove high-level radioactive materials that were produced during defense programs. The space that was to be reserved for this at Yucca Mountain is equivalent to 7,000 metric tons of heavy metal (mostly uranium) of original reactor loading in commercial spent nuclear fuel. The federal government may also not manage to negotiate private-sector responsibility for some of the spent fuel for which mil/kWh payments to it have already been made. The federal government can thus be a guaranteed customer for repository space and also pay states for costs of competing to obtain repository site licenses. The federal government can also require that minimum amounts of material actually be emplaced in a repository in order to build confidence in methods used for doing so.

(5) Remove restrictions on maximum volumes and site license durations: Current law restricts the capacity of a first deep repository to 70,000 metric tons of heavy metal. The capacity of monitored retrievable storage commissioned by the federal government is also limited. These restrictions are not needed in a market-driven management system and should be rescinded.

(6) Change the treatment of Nevada: In current law, Nevada is both designated for the first repository siting attempt and precluded from having a repository should that attempt fail. In a market-oriented approach, these restrictions are not necessary. Nevada can be given the option of not having the Yucca Mountain site opened, cooperating with submission of revised application, or proposing a different site.

(7) Give the private sector options, subject to state utility commission requirements: In a market-driven spent fuel management system, as allowed by state utility commissions, private-sector spent nuclear fuel producers would have several options. They could keep spent fuel at reactor sites, ship it to another of their reactor sites in the same state, ship it to a reactor site of another company in the same state and transfer the escrow fund balance to that company, or ship it out of state. Shipments out of state could be to a spent fuel storage facility that might or might not be located at a licensed deep underground repository, to a repository for prompt emplacement, or to a reprocessing facility if one is available. Subject to a minimum required by federal regulation to ensure adequate financing for long-term safe and secure management and any additional fund transfers required by the importing state, any surplus escrow funds would be retained within the state. State utility commissions would have the ability to regulate the distribution of such funds, require that spent fuel be moved off of reactor sites expeditiously if one or more destinations are available, and prohibit new reactor construction in the absence of such availability. Whether state utility commissions require use of alternatives more expensive than the minimum cost approach follows ultimately from the state political process that determines their composition and powers. The Federal Energy Regulatory Commission retains the ability to regulate interstate commerce in electrical energy. However, for the federal government otherwise to usurp states' abilities to prevent the indefinite accumulation of spent nuclear fuel in state would likely raise political opposition that could ultimately complicate spent nuclear fuel management.

(8) Allow states to import foreign fuel: Such imports would have to meet federal standards for contents, packaging, and transportation, and may be limited to amounts that do not compromise the capacity of U.S. facilities to handle domestic spent fuel. The federal government may then enter into international agreements for receipt of such fuel, and the U.S. Congress may determine that it is in the national security interest to pay some of the resulting costs. The federal government may then also enter into agreements guaranteeing fuel cycle services that include spent fuel management, in order to limit the proliferation of enrichment or reprocessing technology. The federal government may also support spent fuel imports to minimize the global distribution of fissile materials, especially in well-aged, low burnup fuel. (Some spent fuel from initial and final reactor operations has a plutonium composition particularly useful for nuclear explosives, and plutonium from such low burnup material becomes easier to purify as the strontium-90 and cesium-137 in it decays.) However, if there is a net financial gain from importing foreign spent fuel without the need for federal support, letting this benefit accrue to the importing state would both be consistent with the treatment of interstate shipments within the United States and provide an incentive for states to cooperate with the pursuit of international security goals.

VI. Timing and Consequences

Turning over the responsibility for managing all commercial spent nuclear fuel to the private sector immediately would likely trigger lengthy legal action and therefore could be counterproductive. Using the process described here, it could be several decades before the federal government disentangles itself from the obligation to take title to spent fuel from commercial nuclear power plants licensed before the start of the marketization process. Most urgent is the licensing of sites to which spent fuel can be shipped from most of the states where it was produced. Potential host states need to have adequate financial incentives, but this is insufficient for expeditious licensing. The federal government also needs to work promptly through the legislative and regulatory changes needed for the eight components of a marketization approach outlined here. The most successful and least costly path (for exporting states) would probably entail licensing of multiple spent fuel storage and repository sites. The balance between additional site licensing costs and the increased competition and lower transportation costs for having more than one site licensed will depend on the flexibility of licensing approaches and the results of any review of radioisotope containment requirements. The optimal number of licenses can be determined once the outlines of implementing legislation and regulations become clearer. Ultimately, however, the market should determine the number of repositories.

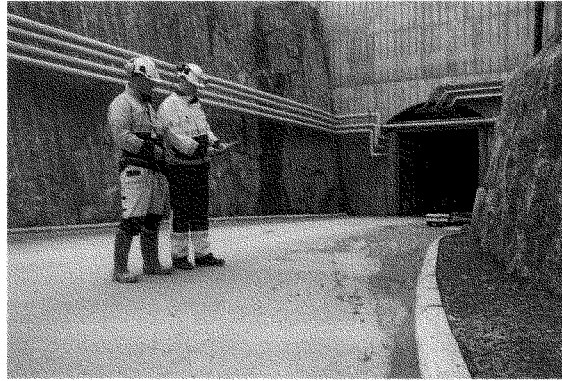
A market-driven approach to spent nuclear fuel management along the lines suggested here would turn good prospective spent fuel management sites into assets, not perceived liabilities. This could help achieve a goal that has eluded the United States for half a century and is an essential step toward ensuring that national spent fuel management capabilities will be adequate not only for the products of existing U.S. nuclear reactors, but also for any future expansion of the commercial reactor fleet. In the context of federal regulations on safety, security, financial stability, and environmental impact, it would allow for an appropriate distribution of spent fuel at reactor sites, at off-site storage facilities, at underground repositories, and at any spent fuel reprocessing facilities that might become economically viable. This flexibility would provide an opportunity to minimize costs directly associated with spent fuel management operations. As is currently the case with other technological and organizational improvements in the electricity sector, the distribution of the resulting savings amongst electricity customers and state residents and taxpayers at large would be up to the individual states to decide. Above and beyond the direct costs associated with spent fuel management facilities, there would be charges for shipping spent fuel out of producing states into other states that host such facilities. However, these additional costs to exporting states would be balanced by funds transferred to host states, with otherwise no net impact on the country as a whole.

Implementing a market-driven approach along the lines suggested here would enhance the United States' ability as a nuclear supplier to influence other countries' nuclear fuel cycle choices. It would give the United States an option for providing an integrated package of nuclear fuel supply and take-back that reduces incentives for other countries to set up their own facilities for uranium enrichment, spent fuel reprocessing, or both. The United States would be better positioned to help secure forms of spent fuel abroad that pose proliferation risks. Some countries may want to cooperate with the United States in this way simply to reduce their nuclear fuel cycle costs, with benefits also to U.S. industry and in the form of funds paid to U.S. states that import spent nuclear fuel. Other countries may want to cooperate with the United States in pursuit of regional security and nuclear nonproliferation goals. The resulting flexibility will give the United States an addition-

al tool to support nonproliferation initiatives.

Central to implementing a market-driven system is the provision of adequate incentives for states and communities to cooperate with site licensing. This means being prepared to provide financial incentives that are a substantial fraction of overall project costs, not just a few percent or less, to states hosting long-term spent fuel management facilities. One pitfall that must be avoided is to start down the road of a voluntary siting process and then fall back upon a forced process. Such an approach could very substantially increase both costs and delays. For pursuing a voluntary siting process for marketized spent nuclear fuel management, in the words of a well known albeit fictional personage: "Do, or do not. There is no try."

Entrance to the Onkalo Permanent Repository in Finland



Source: Posiva Oy, <http://www.posiva.fi/> <http://www.posiva.fi/files/106/onkolo5.jpg>.

Appendix A. State Restrictions on Nuclear Power Plant Construction

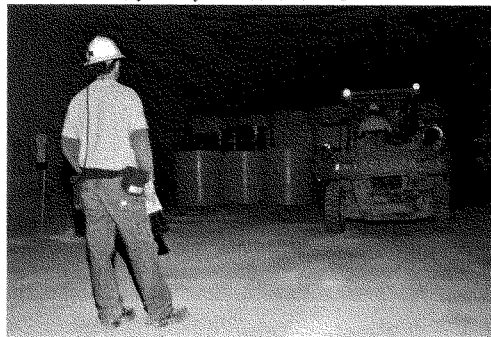
Since a November 2006 review on state restrictions on nuclear power plant construction, there have been several failed attempts to reduce the restrictions. That review (Lovell 2006) listed the following examples of those restrictions.

...Several states require only that the federal government has identified and approved “a demonstrated (or demonstrable) technology or means for the disposal of high-level radioactive waste” (California, Connecticut, Illinois, and Kentucky).

A number of states require findings that a disposal facility exists and is accepting waste (Massachusetts, Maine, Oregon, West Virginia, and Wisconsin). Oregon requires a finding that “an adequate repository for the disposal of [spent fuel] has been licensed”; it specifies that the facility be for “the terminal disposition [of the waste] with or without provision for retrieval for reprocessing.” Maine requires further that such facilities are “in full conformity with the technology” approved by the federal government. West Virginia requires that the facility has been in operation for 24 months. Wisconsin is the only state of those discussed in this Memo to allow consideration of facilities outside of the United States.

Two states do not refer to federal approval or operation of a facility, but require findings of a more descriptive nature. Montana requires a finding that, among other things, “the radioactive materials from such nuclear facilities can be contained with no reasonable chance...of intentional or unintentional escape or diversion into the natural environment...” by any cause, including acts of God. New Jersey requires a finding that “the proposed method for disposal of radioactive waste material to be produced or generated by the facility will be safe, conforms to standards established by the Nuclear Regulatory Commission, and will effectively remove danger to life and the environment from such waste material.”

Transuranic Waste Disposal at the Waste Isolation Pilot Plant (WIPP) in New Mexico



Source: Department of Energy (DOE), http://www.wipp.energy.gov/Photo_Gallery.htm.

Except for Montana and West

Virginia, the above-mentioned states already have within their border spent fuel from commercial nuclear electric power plants. The Nuclear Energy Institute (2011) lists the amounts by state. Ewing et al. (2009) list the amounts of spent fuel at sites without operating nuclear reactors.

Lovell noted that Hawaii, Vermont, and Rhode Island, as well as California and Illinois also require the state legislature to ratify a decision to license a nuclear power plant. In addition to the

restrictions listed above, Massachusetts, Maine, Montana, and Oregon require approval of a licensing decision by voter referendum. Also, according to Parker and Holt (2007), “Kansas forbids cost recovery for ‘excess’ nuclear power capacity if no ‘technology or means for disposal of high-level nuclear waste’ is available.” There are thus at least 15 states where public or legislators’ opinions about the adequacy of provisions for spent nuclear fuel management have realized a mechanism for affecting licensing of new nuclear electric generating capacity, beyond that inherent in regulatory commission review of whether a new license is otherwise appropriate.

Appendix B. The Nuclear Waste Fund and Escrow Funds

The mil/kWh has been paid into the restricted use Nuclear Waste Fund instead of as a simple tax. This restriction has been interpreted as allowing utilities legal recourse to restrict how appropriations from the Nuclear Waste Fund are used. For example, in July 2000 the U.S. Department of Energy (DOE) reached an agreement with the utility PECO concerning DOE’s failure to meet a deadline for taking responsibility for spent nuclear fuel management (Holt 2008).

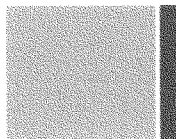
The agreement allowed PECO to keep up to \$80 million in nuclear waste fee revenues during the subsequent 10 years. However, other utilities sued DOE to block the settlement, contending that nuclear waste fees may be used only for the DOE waste program and not as compensation for missing the disposal deadline. The U.S. Court of Appeals for the 11th Circuit agreed, ruling September 24, 2002, that any compensation would have to come from general revenues or other sources than the waste fund.

The PECO case pertained only to offering one utility a different option for future payments into the Nuclear Waste Fund than available to other utilities. The law could be changed to offer all utilities the same treatment after some future date, with an option for no further payments to the federal government. If so, it could well be necessary to provide assurance that either the existing Nuclear Waste Fund balance or a commitment to additional federal support would be adequate for the federal government to meet its responsibility to take title to all previously discharged spent fuel, and perhaps also to all future spent fuel discharges from reactors within the period of their existing operating licenses. It could then be necessary for any payments into escrow funds in exchange for relief of the federal government responsibility to take charge of spent fuel that is subject to such restrictions to come from sources other than the Nuclear Waste Fund.

The difference in timing between earlier payments into escrow funds out of other federal revenues versus later payments out of the Nuclear Waste Fund for federal management of spent fuel could have nominal formal impact on the size of the federal deficit. This is because payments into the Nuclear Waste Fund are normally accounted as federal revenues without subtracting out an associated liability. Whether a larger or smaller nominal federal deficit would result depends on how much the approach suggested here would reduce the overall costs of spent fuel management. In any case, whether to allow the use of the escrow fund approach for previous spent fuel discharges in view of potential impacts on the nominal federal deficit is a political decision that if properly handled need not be constrained by technological or legal impediments.

References

- Ewing, Rodney, Clifford Singer, and Paul Wilson, rapporteurs. 2009. *Plan D' for Spent Nuclear Fuel*. Champaign: University of Illinois at Urbana-Champaign. <http://acdis.illinois.edu/assets/docs/PlanD.pdf>.
- Holt, Mark. 2008. *Civilian Nuclear Waste Disposal*. Washington, D.C.: Congressional Research Service. October 7. <http://www.fas.org/sgp/crs/misc/RL33461.pdf>.
- Lovell, David. 2006. "Memo No. 2 on State Laws Limiting Construction of Nuclear Power Plants." Special Committee on Nuclear Power, Wisconsin State Legislature. November 29. http://legis.wisconsin.gov/lc/committees/study/2006/NPOWR/files/memo2_npwr.pdf.
- Nuclear Energy Institute. 2011. "U.S. State by State Commercial Nuclear Used Fuel and Payments to the Nuclear Waste Fund." <http://www.nei.org/resourcesandstats/documentlibrary/nuclearwastedisposal/graphicsandcharts/usstatebystateusedfuelandpaymentstonw/>.
- Parker, Larry, and Mark Holt. 2007. *Nuclear Power: Outlook for New U.S. Reactors*. Washington, D.C.: Congressional Research Service. March 9. <http://www.fas.org/sgp/crs/misc/RL33442.pdf>.



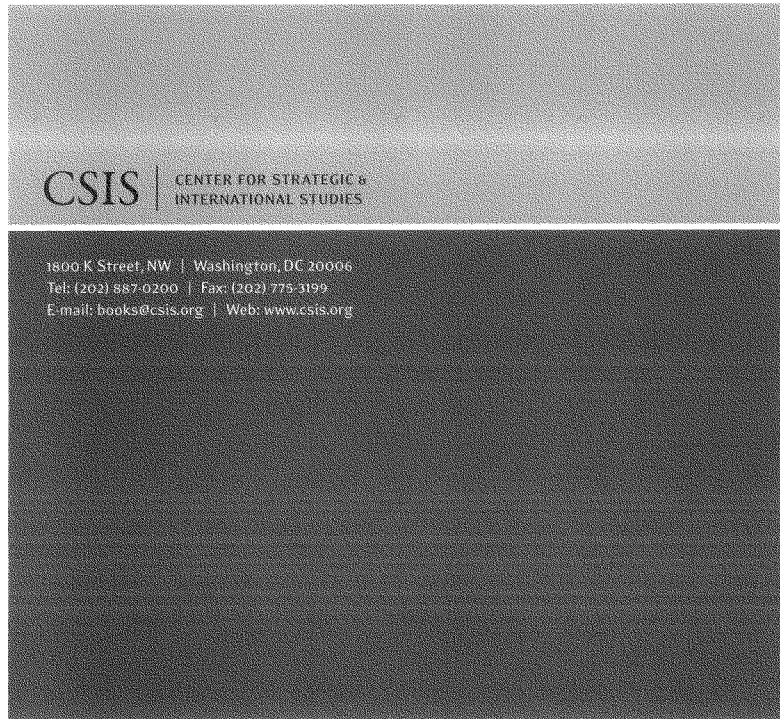
ABOUT THE AUTHORS

Charles D. Ferguson is president of the Federation of American Scientists and adjunct professor in the Security Studies Program at Georgetown University. He has recently completed the book *Nuclear Energy: What Everyone Needs to Know* (Oxford University Press, May 2011). Trained as a nuclear engineer in the U.S. Navy, he has worked on nuclear safety policy in the U.S. Department of State. He earned a Ph.D. in physics from Boston University.

Clifford Singer is a professor of nuclear, plasma, and radiological engineering and of political science at the University of Illinois at Urbana-Champaign. He is the author of *Energy and International War: From Babylon to Baghdad and Beyond* (Scientific Press, 2008). Dr. Singer is a former director of the Program in Arms Control, Disarmament, and International Security at the University of Illinois at Urbana-Champaign, where he is currently codirector of the College of Engineering's Initiative on Energy and Sustainability Engineering. He was also the last chair of the Champaign County Intergovernmental Solid Waste Disposal Association.

Jack Spencer is a research fellow in nuclear energy policy at the Heritage Foundation, where he works on nuclear waste management, technological advances, industry subsidies, and international approaches to nuclear energy. He has testified before Congress on related topics, including 2010 testimony on how to introduce market forces into public policy for safely managing nuclear waste. Mr. Spencer returned to Heritage in September 2007, after working on commercial, civilian, and military components of nuclear energy at the Babcock & Wilcox Companies. From 1998 to 2005, he was a Heritage analyst on defense and national security.

Sharon Squassoni is senior fellow and director of the Proliferation Prevention Program at the Center for Strategic and International Studies (CSIS). She joined CSIS from the Carnegie Endowment for International Peace, where she was a senior scholar focusing on nuclear energy and nonproliferation. Her government service includes advising Congress as a senior specialist in weapons of mass destruction at the Congressional Research Service and various positions in the State Department and the Arms Control and Disarmament Agency. She is author of *Nuclear Energy: Rebirth or Resuscitation?* (Carnegie Endowment for International Peace, 2009) and many other publications.



Mr. WHITFIELD. Mr. Bartis, you are recognized for 5 minutes for your opening statement.

STATEMENT OF JAMES T. BARTIS

Mr. BARTIS. Mr. Chairman and distinguished members, thank you for inviting me to further elaborate on the testimony that I gave to this subcommittee on May 5 of this year. I will be focusing my remarks today on the policy implications of sections of H.R. 909 that deal with oil shale and coal liquefaction, as is RAND's policy. My testimony neither endorses nor opposes specific legislation.

The United States has enormous oil shale, has an enormous oil shale resource base, enough to support the production of millions of barrels per day for centuries. But getting a useful fuel from this resource is technically complex, requiring temperatures that are much higher than those used in processing Canadian oil sands.

Moreover, nearly all of the high-value oil shale resources geographically concentrated on federally managed lands lie in a very small area, roughly 30 by 35 miles in Colorado's Piceance Basin and within a small portion of the Uinta Basin within Utah. That oil shale belongs to all of us. The public value is potentially tens of trillions of dollars.

But reaping that public benefit, not to mention the energy security benefits of domestic alternative fuels production, requires the development of a commercial oil shale industry capable of producing a few million barrels per day. That level of production should be the long-term strategic goal for oil shale. At this stage I don't know if that goal can be achieved. We are talking about a tremendous amount of industrial activity, especially when we consider supporting infrastructure within a very small region. Extensive measures will be required to prevent serious adverse ecological and social economic impacts and to protect the quality of the Colorado River.

My analysis of the oil shale provisions of H.R. 909 is that they do not move our Nation towards that long-term strategic goal of large and sustainable commercial production. My specific concerns are detailed in my written testimony.

There are a few areas where Congress may need to provide direction so that the Nation can realize the full opportunity that oil shale offers. The critical step is obtaining early production experience. Until we understand the performance of the process options, it is not productive to engage in establishing a detailed, regulatory structure for a large, multi-million barrel-per-day commercial industry.

I suggest the following for consideration by the committee. First, require that the Departments of Energy and the Interior and the Environmental Protection Agency cooperatively develop and publish a federal plan for promoting the construction and operation of a limited number of pioneer commercial plants. That plan should be designed to attract America's top high-technology firms.

Second, require that the Department of the Interior develop, publish, and implement a 15-year schedule for multiple offerings of small R&D leases.

And third, require the preparation of plans for conducting critical environmental and ecological research and an assessment of the

carbon management options in the vicinity of the federally managed oil shale lands.

Turning to coal, here we have another enormous resource that we could be utilizing to meet our liquid fuel needs. Technical approaches are available to produce liquid fuels from coal or a combination of coal and biomass with life cycle greenhouse gas emissions that are comparable or significantly below those associated with conventional petroleum.

Moreover, over the long-term, liquid fuels derived from a combination of coal and biomass could provide a new market for coal that could counter the adverse local and regional economic impacts of reduced demand for coal in power generation due to measures to reduce greenhouse gas emissions.

I am concerned with the slow progress towards gaining commercial experience in coal-derived liquids production in the United States. However, I do not believe that government ownership of alternative fuels production facilities is a credible solution. If the Congress is interested in using the purchasing power of the Defense Department to promote early commercial experience, I suggest providing the Department with the authority to make long-term agreements to guarantee a minimum sale price to the benefit of the alternative fuel producer in the event that oil prices are low. In return for this benefit the Department would negotiate a maximum purchase price that would be lower than world oil prices in the event that world oil prices pass a specified threshold.

I would also like to make a few comments regarding 526 of the Energy Independence and Security Act of 2007. The primary policy issue raised by repeal of this section is whether it is in the national interest to allow government agencies to promote the production of alternative fuels to have life-cycled greenhouse gas emissions that are significantly higher than their petroleum counterparts. For example, repeal of this section would open the door to a government procurement of coal-derived liquids produced without any management of greenhouse gas emissions.

As enacted, Section 526 places severe constraints on the government's ability to purchase fuels. This is because commercially-available fuels might contain certain amounts of alternative fuels that fall under the prohibitions of that section, as was mentioned by the Congressman from Texas. Congress attempted to correct this problem in 2010, when it enacted Public Law 111314, but the language of Section 3010 of that law is very unclear. Congress should consider clarifying the meaning of that section.

If the intent of Congress is to promote the early production of alternative fuels with greenhouse gas emissions that are comparable or very close and well within the uncertainty of our petroleum imports, then Section 526 can be appropriately amended. For example, an amendment could allow government purchases of alternative fuels derived from coal if 90 percent of greenhouse gases produced during the production process were captured and sequestered. Such a provision would greatly simplify the ability of a coal-to-liquids plant to qualify for government purchase contracts.

My written testimony contains a section-by-section review of the oil shale and coal-to-liquid provisions which I hope you will find useful.

Thank you very much, sir.

[The prepared statement of Mr. Bartis follows:]

TESTIMONY

Alternative Fuel Provisions
in HR 909*The Roadmap for America's
Energy Future*

JAMES T. BARTIS

CT363

June 2011

Testimony presented before the House Energy and Commerce Committee,
Subcommittee on Energy and Power on June 3, 2011

This product is part of the RAND Corporation testimony series. RAND testimonies record testimony presented by RAND associates to federal, state, or local legislative committees; government-appointed commissions and panels; and private review and oversight bodies. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark.



Published 2011 by the RAND Corporation
1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1200 South Hayes Street, Arlington, VA 22202-5050
4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213-2665
RAND URL: <http://www.rand.org/>
To order RAND documents or to obtain additional information, contact
Distribution Services: Telephone: (310) 451-7002;
Fax: (310) 451-6915; Email: order@rand.org

James T. Bartis¹
The RAND Corporation

***Alternative Fuels Provisions in HR 909
The Roadmap for America's Energy Future²***

**Before the Committee on Energy and Commerce
Subcommittee on Energy and Power
United States House of Representatives**

June 3, 2011

Chairman and distinguished Members: Thank you for inviting me to further elaborate on the testimony that I gave to this subcommittee on May 5 of this year. Today I will provide you with my understanding of the policy implications of sections of HR 909 dealing with oil shale and coal liquefaction, namely sections 141 and 151 through 153.

In my written statement for the May 5 hearing, I reviewed the strategic importance and value of alternative fuels. In that review, I emphasized that achieving the potential economic and national security benefits offered by alternative fuels requires that domestic production of alternative fuels must be an appreciable fraction of domestic demand for liquid fuels. Alternative fuels derived from oil shale and coal have the potential to meet that important criterion; each has the potential to displace millions of barrels of daily crude oil imports.

Oil Shale

The largest high-grade deposits of oil shale in the world are located in the United States, primarily in western Colorado and eastern Utah in an area known as the Green River Formation. This recoverable portion of this resource is enormous. When we did the research for our 2005 report on oil shale, we estimated recoverable resources at between 500 billion and 1.1 trillion barrels of oil.³ To put this estimate in perspective, the mid-point—800 billion barrels—is more than triple the crude oil reserves of Saudi Arabia. Since our work, the U.S. Geological Survey has published a new assessment suggesting an upwards revision of our estimate.

¹ The opinions and conclusions expressed in this testimony are the author's alone and should not be interpreted as representing those of RAND or any of the sponsors of its research. This product is part of the RAND Corporation testimony series. RAND testimonies record testimony presented by RAND associates to federal, state, or local legislative committees; government-appointed commissions and panels; and private review and oversight bodies. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

² This testimony is available for free download at <http://www.rand.org/pubs/testimonies/CT363/>.

³ *Oil Shale Development in the United States: Prospects and Policy Issues*, Santa Monica, CA: RAND MG-414-NETL, 2005.

The Challenges of Oil Shale Development: Before reviewing the provisions of Section 141, I would like to provide a little background on the U.S. oil shale resource. First, extracting oil from the Green River oil shale resource is technically complex. This is because the hydrocarbon material in oil shale is not liquid but solid. To obtain a useful product, the oil shale must be heated to 650 Fahrenheit or higher, which causes the solid material to undergo a chemical change that yields a liquid product. That is a fairly high temperature, for example, temperatures below 212 Fahrenheit are sufficient for extracting petroleum from deposits of heavy oil and oil sands. At present a number of firms are making investments in research directed at developing technologies that economically produce liquid fuels from oil shale. However, to my knowledge, none of these firms has gathered enough technical information adequate to support a decision to invest hundreds of millions, and more likely billions, of dollars in first-of-a-kind commercial oil shale production facilities.

Second, about 80 percent of this oil shale resource base lies under federal lands. At crude oil prices of \$100 per barrel, the value of the oil that might be recovered from federally owned land is over \$60 trillion. The public wealth embedded in our oil shale lands is staggering. Many, if not most, of the potential lease tracts in Colorado contain over 2 million barrels of oil per surface acre. A single commercial lease tract of 5760 acres will generally hold over 6 billion barrels. The public value of a single lease is clearly in the tens of billions of dollars, considering lease bonus payments, royalties, and taxes on profits. But realizing this public value and the broader economic and national security benefits of oil shale development requires commercially viable technology. So both industry and the public have a strong stake in successful technology development.

The third aspect that I want to mention is the geographic concentration of this vast resource. Most of the high value resources lie within in a very small area (roughly 30 by 35 miles) within Colorado's Piceance Basin and within a small portion of the nearby Uinta Basin within Utah. This means that oil shale leasing decisions made by the federal government may have a profound impact on the residents in the northwestern quarter of Colorado and the Northeastern quarter of Utah. In particular, large-scale development of oil shale will cause federal lands to be diverted from their current uses. In the absence environmental and economic mitigation measures, unprecedented in scope and scale, such development would almost certainly have adverse ecological impacts, and would likely be accompanied by socioeconomic impacts that could be particularly severe, especially in the northwest quarter of Colorado.

There could also be broader environmental impacts. The Green River Formation is part of the Colorado River Basin. Much of the oil shale resource is comingled with various salts. It is

obviously important that oil shale extraction does not result in contaminating important underground and surface waters.

The production and use of oil shale causes emissions of greenhouse gases. As compared to the production and use of conventional petroleum, estimates of lifecycle greenhouse gas emissions range from a slight decrease to roughly a 50 percent increase. Without legislation that would place a cost on emitting greenhouse gases, early oil shale production plants would likely fall in the upper half of this range.

Finally, and perhaps most importantly, without proper planning at the federal, state, and local levels, provisions taken to put in place the initial round of commercial oil shale production facilities, if not done properly, could end up precluding the development of oil shale to a level commensurate with its potential economic and national security value to the nation. This problem derives from the fact that a U.S. based oil shale industry would operate in a geographically concentrated area. Issues of concern include impacts on air and water quality, provisions taken to meet demands for water, and the large amount of required infrastructure, including roads, pipelines, power plants and transmission lines, reservoirs, and housing and public services industries.

Section 141 Oil Shale Provisions

Section 141(a). Findings

Two of the findings in this section are problematic. Section 141(a)(1) refers to a Department of Energy estimate that "oil shale resources located on Federal lands hold 2 trillion undiscovered technically recoverable barrels of oil." My knowledge of the resource base suggests that this statement is erroneous. I suggest that the committee contact either the Department of Energy or the U.S. Geological survey to verify the validity of this finding.

Section 141(a)(5) makes the claim that "Oil shale is one of the best resources available for advancing American technology and creating American jobs." I have no knowledge of any research that supports this claim. Oil shale has a potentially important role in advancing our energy security and furthering economic progress. I see no reason to promote oil shale as above other promising areas for advancing technology and creating jobs.

Section 141(b) Additional Research and Development Lease Sales

In January 2009, the Bureau of Land Management (BLM) published a notice soliciting industry nominations for second round of R&D lease sales. This solicitation was cancelled by the incoming administration. A new solicitation was published in November 2009. Three nominations were received and all three were selected for in-depth review. The review process is still underway.

Section 141(b) calls for a third offering of small lease tracts, specifying that the offering should be based on the terms offered in the cancelled January 2009 solicitation and should occur within 180 days after enactment of the Act.

The periodic offering of small lease tracts for research and development (R&D) is a sound concept. Successful R&D would yield extraction processes with improved economic and environmental performance and would increase the number of firms competing for commercial oil shale leases. These outcomes could yield substantial public benefits. The policy issue is the public cost of providing industry access to these small lease tracts.

In terms of public costs, both the January and November offerings of 2009 did not contain the provisions of the initial offering, dated June 9, 2005, that were most unfavorable with regard to protecting the public interest, namely, (1) a preference right to lease nearly 5000 acres of federal lands adjoining the R&D lease site, and (2) awarding a single entity multiple R&D lease sites, and consequently, multiple preference rights for much larger leases.

As compared with the January 2009 offer, the November 2009 offering contains due diligence and other requirements that give more authority to the government. Compliance with these diligence provisions will likely cause the leaseholder to incur additional expenditures and may force the leaseholder to relinquish the lease. Both offerings offer preference rights to lease up to 640 acres of contiguous oil shale bearing lands, again with the November offering being more protective of the government interest at the expense of the leaseholder. However, it is my judgment that these differences are fairly minor. The fact that BLM received three credible responses to its November 2009 solicitation supports this conclusion. Overall, legislating that BLM must follow the provisions of the January 2009 offering in a future R&D lease offering is unlikely to have a noticeable impact on the pace of oil shale development.

Section 141(c) Application of Regulations

Establishing the commercial viability and obtaining the information required to design and build a first-of-a-kind commercial oil shale production facility requires very large investments. Private firms will not undertake the substantial technical and financial risks associated with preparing for, building, and operating a commercial facility unless they are amply rewarded in the event that they are successful. On November 18, 2008, the Department of the Interior published final rules on the leasing of oil shale lands for commercial production. Overall the royalty and management provisions of these rules provided a strong motivation to private firms interested in developing oil shale. On February 15, 2011, the Department of the Interior announced that it would conduct a review of these rules “and, if necessary, update them based on the latest research and technologies, to account for expected water demands in the arid West and to ensure they provide a fair return to taxpayers.”

Section 141(c) would require that the final commercial leasing rules published in 2008 by the Bureau of Land Management apply to all commercial leasing of federally-owned lands for the purpose of oil shale extraction and production.

I have carefully examined the commercial leasing rules published in 2008 and find them to be seriously deficient. Basically the oil shale leasing rules were modeled on existing rules for coal and oil leasing. The rules do not take into account the geographic concentration of the oil shale resource base, the fundamental uncertainties regarding the economic, environmental, and technical performance of oil shale production technologies, and the national energy security benefits of being able to produce eventually a few million barrels per day of fuel (gasoline, diesel, and jet) derived from oil shale.

The problem of managing our federal oil shale lands so that we can have strategically significant and sustainable commercial development is much akin to the problem of managing a major port. In both cases, there exists very high-value real estate that is geographically concentrated. Both cases require a large supporting infrastructure and a trained workforce. And in both cases the public has a major stake. For major ports, the need for coordination, planning, and centralized decision making has been recognized and implemented through port authorities. I suggest that a governance mechanism that has some of the key governance elements of a port authority is required to undertake the coordination, planning, and sustained regulatory compliance that are essential to the development of a dynamic oil shale industry in the United States.

My major concern is that the oil shale management rules published in 2008 completely ignore the need for strategic planning. Instead, the rules set up a first come, first served approach. While this approach may yield early production and offer an attractive financial investment for a few firms, it is unlikely to allow oil shale production beyond a few hundred thousand barrels per day, if that.

A second concern is the royalty. Oil shale on federally managed lands belongs to all of us. Therefore, the royalty calculation should be based on optimizing the public benefit, taking into account not only the direct benefits to the national treasury, but also the broad national economic and national security benefits associated with greater domestic fuels production as well as environmental and socioeconomic costs. The analytic methodology used to set the royalty rates associated with the 2008 leasing rules does not take into account any of these issues.

Moving Forward with Oil Shale

There are also a few areas where Congress may need to assert its will for the purpose of assuring that the nation is moving forward in realizing the full opportunity that oil shale offers. The critical step is obtaining early production experience. Until we understand the performance of the process options, it is not productive to engage in establishing a detailed regulatory structure for a large multimillion barrel per day commercial industry. I suggest the following for consideration by the Committee.

1) Require that the Department of Energy, the Department of the Interior, and the Environmental Protection Agency cooperatively develop and publish a federal plan for promoting the construction and operation of a limited number of pioneer commercial plants.

That plan should be based on an analysis of the benefits and costs of potential incentives designed to attract America's top high technology firms to invest in a first-of-a-kind production plant. Incentives that should be examined include not just land access and royalty arrangements, but also investment subsidies, price floors, loan guarantees, and revenue sharing.

2) Require that the Department of the Interior develop, publish, and implement a 15-year schedule for offering small R&D lease tracts. Giving industry advance notice of future offerings will promote better planning, a better industrial response, and less speculation.

3) Require that the Department of the Interior and the Department of Energy, in consultation with the Environmental Protection Agency prepare plans for conducting critical environmental and

ecological research, including an assessment, and possibly a large scale demonstration, of carbon management options in the vicinity of the Green River Formation.

Coal-to-Liquids

The United States leads the world with recoverable coal reserves estimated at nearly 270 billion tons.⁴ These recoverable reserves are broadly distributed, with at least 16 states having sufficient reserves to support commercial coal-to-liquids production. It takes slightly less than a half ton of coal to produce a barrel of liquid transportation fuels. Consequently, a domestic industry producing one million barrels per day would require the mining of about 180 million tons of coal per year. As I discuss later, a highly promising approach to using coal to produce liquid fuels is to use a combination of coal and biomass. A thirty percent (by energy) biomass to coal blend would reduce the amount of coal required by roughly the same percentage. In this case, the amount of coal needed to produce one million barrels per day would be about 130 million tons per year.

Presently, mining in the United States produces about 1.1 billion tons of coal per year. Nearly all of this production is directed at the generation of electric power. Coal's future in power generation will depend on whether the United States adopts measures to control greenhouse gas emissions. If such measures are implemented, it is very likely that the level of coal mining will decrease, with potential adverse economic impacts in traditional coal mining areas. Using coal to make liquid fuels, especially when combined with biomass, provides not only the economic and national security benefits associated with reducing dependence on imported oil, but also a new market for coal that could counter the adverse local and regional economic impacts of reduced demand for coal in power generation.

Commercially-proven technology is available to produce gasoline, diesel fuel, jet fuel, marine fuels, and home heating oil from coal. One set of approaches utilizes the Fischer-Tropsch method first developed in Germany in the 1930s and since then greatly improved through commercial experience in South Africa, Malaysia, and Qatar. The second proven approach is the coal-to-gasoline method demonstrated by Mobil Oil (now ExxonMobil) in New Zealand. Both methods start by gasifying coal by reacting it with steam at elevated pressures. The final products are "drop-in" substitutes for their conventional counterparts. For some applications, the coal-derived products are clearly superior to their conventional counterparts. For example, for all coal-derived fuels, sulfur levels are near zero, providing important environmental advantages when they are used in gasoline and diesel-powered vehicles equipped with catalytic converters. And the middle

⁴ This portion of the testimony draws on *Producing Liquid Fuels from Coal: Prospects and Policy Issues*, Bartis, Camm and Ortiz, Santa Monica, Calif.: RAND Corporation, MG-754-AF/NETL.

distillates produced from the Fischer-Tropsch method have a very high cetane number (a measure relevant to fuel performance in compression ignition engines) causing them to carry a further premium as a blendstock with conventional diesel fuel.

The Challenges of Producing Liquid Fuels From Coal: From publicly available information, the production of liquid fuels from coal appears to be economic when crude oil prices exceed \$70 per barrel. World oil prices have exceeded that level for some time now, but we see very little progress in CTL commercial development. While a number of commercial coal-to-liquid fuel projects have been announced in the United States, only a single facility, located in Wyoming, has begun construction. From our research, the most important factor impeding private sector investment is uncertainty regarding the future course of world oil prices. Many investors expect oil prices to remain high over the financial lifetime of a coal-to-liquid plant. However, all investors are concerned that a drop in oil prices would bring severe adverse consequences, namely, extremely low rates of return or project bankruptcy.

The most important factor impeding federal support for coal-to-liquids production is the conflict between, on the one hand, the economic and national security benefits from coal-derived fuels and, on the other hand, the need for the federal government to take measures to reduce greenhouse-gas emissions.

Without management of greenhouse gas emissions, liquid fuels produced from coal will have lifecycle greenhouse gas emissions that are about twice that of their conventional petroleum counterparts. This problem has been studied by RAND and others, including the National Academy and researchers at Princeton University, MIT, and the National Energy Technology Laboratory. The consensus of these groups is that capture and sequestration of greenhouse gas emissions from coal-to-liquid production plants is inexpensive. Further, with capture and sequestration, lifecycle greenhouse emissions can be comparable to those of their petroleum-derived counterparts. By comparable, I mean within 10 percent. The crude oil breakeven price estimate of \$70 per barrel that I quoted includes provisions for capturing carbon dioxide and preparing it for transport to a location where it would be sequestered.

These same researchers also agree that using a combination of coal and biomass can result in lifecycle greenhouse gas emissions that are significantly less than those of petroleum-derived fuels and certain renewable fuels. For this to be the case, greenhouse gases generated at the production facility need to be captured and sequestered and the biomass needs to be produced in a sustainable manner. For example, if these measures are taken, a 25/75 biomass/coal feed

should allow alternative fuel production at lifecycle greenhouse gas emissions that are 35 percent of those generated by the production and use of conventional petroleum derived fuels.

Taking these measures, however, does require additional expense and involves additional risks. Gasifying mixtures of coal and biomass is generally viewed as low risk. Nonetheless, there is very little commercial experience in gasifying such mixtures, and there is the possibility that problems might arise, albeit correctable at a cost, during the initial operating period of a commercial production facility.

About 30 to 40 million tons of carbon dioxide are produced and distributed each year for the purpose of improving the recovery of crude oil contained in U.S. oilfields. Presently, this carbon dioxide is obtained from natural underground deposits. Decades of experience suggest that carbon dioxide used in enhance oil recovery will stay underground. Since carbon dioxide is the predominant greenhouse gas emitted during the production of coal-derived liquids, there should be no problem regarding the sequestration of carbon dioxide so long as the facility is located within a few hundred miles of a suitable oil field, so as to avoid high transport costs. For each barrel of coal-derived liquids, using captured carbon dioxide for enhanced oil recovery will yield about two additional barrels of crude oil.

But for coal-to-liquid production facilities that are not within reasonable range of oil fields, the only approach for sequestration is a dedicated geological repository. Unfortunately, there is no experience in permitting, licensing and operating a commercial sequestration facility in the United States. This lack of experience poses a severe barrier to siting low-greenhouse gas coal-to-liquid facilities in certain traditional coal-producing areas, such as West Virginia and Kentucky. One possible approach could be to use the emissions captured from a coal-to-liquids plant in planned government-sponsored demonstrations of the geologic sequestration of greenhouse gases.

Section 151 Development and Operation of Facilities

Section 151 would provide the Secretary of Defense with the authority to develop, construct and operate a qualified coal-to-liquid facility.

The Department of Defense consumes about 340,000 barrels per day of liquid fuels, nearly all of which is used in aircraft, ships, combat vehicles and combat support systems. That level of consumption makes the Defense Department the largest fuel purchaser in the United States.

Nevertheless, that level of use remains a small percent of total national petroleum consumption and an even smaller percent of global oil demand. In January the RAND Corporation published its

findings on a congressionally mandated study of alternative fuels for military applications.⁵ A principal finding of that study is that while certain alternative fuels (including coal-derived fuels) are no less able than conventional fuels to meet the Defense Department's needs, such fuels offer no particular tactical or operational benefit over their petroleum-derived counterparts. Consequently, we found that Defense Department goals for alternative fuels should be based on potential national benefits.

Unlike ongoing Department of Defense efforts directed at seed oils, Department of Defense efforts directed at coal-derived fuels, especially coal-biomass mixtures and management of greenhouse gases could yield major national benefits. The key policy issue raised by Section 151 is whether having the Department of Defense engage in coal-to-liquids fuels production is an efficient application of federal funds. In the course of our examination of alternative fuels activities in the Department of Defense, we found limited expertise on the production of those fuels that constitute the great bulk of the Department's use. The only exceptions are those specialty fuels with unique military applications, such as fuels for missiles and torpedoes. In the United States, the centers of excellence in fuel production rest within integrated oil companies and refining companies. As such, these firms are in a much stronger position to assess technical alternatives and make investment decisions.

If Congress is interested in using the purchasing power of the Defense Department to promote early commercial experience in production of coal-derived liquids, I suggest providing the Department with the authority to make long-term agreements (i.e., up to 20 years) with alternative fuel producers that would

- Have the Department commit to purchase alternative fuels that meet military specifications at a specified floor price
- Require the alternative fuels producer to sell alternative fuels that meet military specifications to the Department according to a specified formula that would basically set a ceiling price.

This arrangement places a collar on the prices of some fraction of the fuels that would be produced by a coal-to-liquids plant. In return for guaranteeing a minimum sale price to the benefit of the producer in the event that world oil prices are low, the Department would be guaranteed a maximum purchase price that would be lower than world oil prices in the event that world oil prices pass a specified threshold.

⁵ *Alternative Fuels for Military Applications*, Bartis and Van Bibber, Santa Monica, Calif.: RAND Corporation, MG969-OSD, 2011.

This arrangement would have the added benefit of promoting the use of coal-derived liquids in applications where they have the greatest value. In particular, most military applications involve the use of high sulfur jet fuel in turbine engines. These applications place no value on the high cetane number and near-zero sulfur levels of coal-derived diesel fuels.

Section 152. Definitions Relating to Coal-to-Liquid Fuel and Facilities

I would advise the Congress to further consider the environmental impact of harvesting peat resources before including peat as an acceptable feedstock for coal-to-liquids production facilities. Peat is generally found in sensitive ecosystems and the energy content per acre is fairly low. For the same amount of energy, harvesting peat would disturb much more land than would mining coal.

Section 153. Repeal

Section 153 would repeal Section 526 of the Energy Independence and Security Act of 2007.

Section 526 prohibits federal agencies from entering into a contract for procurement of an alternative fuel or a fuel from an unconventional petroleum source unless the contract specifies that the lifecycle greenhouse gas emissions of that fuel are less than the equivalent product produced from conventional petroleum. The only exception would be for alternative fuels purchased for the purposes of research and fuel testing.

As enacted, Section 526 places severe restraints on the government's ability to purchase fuels. It would prohibit the government from purchasing any mobility fuel that might be derived in part or whole from coal, oil shale, oil sands, or biofuels without a certification from the fuel supplier regarding lifecycle greenhouse gas emissions. To my knowledge, Section 526 has not been applied to biofuels, even though biofuels can have lifecycle greenhouse gas emissions that are higher than the equivalent product produced from conventional petroleum.

Since passage of Section 526, the main concern has been whether the law prohibits government purchases of fuels that might be derived in part from Canadian oil sands. If this were the case, the government would be unable to purchase fuels from growing number of commercial fuel vendors. With less competition, it is reasonable to expect that the government would incur increased costs. Additionally, the Defense Department may find it difficult or very costly to purchase aviation fuel in South Africa or Qatar, where alternative fuels from coal and natural gas are routinely blended with conventional fuels.

To remedy this problem, Congress in 2010 passed legislation (Public Law 111-314, Sec 30210) that provides an exception to the fuel purchase prohibitions of Section 526. That exemption *apparently* allows government purchases of commercially available fuels that might in part be derived from alternative fuels so long as three conditions hold. The language of Section 30210 is unclear, so my interpretation of Public Law 111-314 as providing a remedy to the more onerous provisions of Section 526 may be incorrect.

Repeal of Section 526 would remove any confusion regarding the exemptions to constraints on government purchases of mobility fuels. It would also allow agencies to continue their current practice of purchasing biofuels, such as corn-derived alcohol fuels and biodiesel, without regard to lifecycle greenhouse gas emissions. Finally, it would allow federal procurement of alternative fuels such as coal-derived liquids, natural gas-derived liquids, and fuels produced from oil shale without regard to lifecycle greenhouse gas emissions.

The primary policy issue raised by repeal of Section 526 is whether it is in national interest to allow government agencies to promote the production of alternative fuels that have lifecycle greenhouse gas emissions that are significantly higher than their petroleum counterparts. For example, repeal of Section 526 would open the door to a government procurement of coal-derived liquids produced without managing greenhouse gas emissions.

If Congress is concerned with the limitations and continued uncertainties associated with the implementation of Section 526, I suggest consideration of legislation that would clarify the meaning of Section 30210 of Public Law 111-314 so that the government is not prohibited from purchasing commercial fuels derived in part from alternative fuels or oil sands. Congress should also clarify whether Section 526 prohibitions apply to biofuels.

If the intent of Congress is to promote the early production of alternative fuels with greenhouse gas emissions that are comparable or better than those of their petroleum counterparts, I suggest consideration of an amendment to Section 526 that would allow the government to target purchases of alternative fuels derived from fossil fuel resources (such as coal, natural gas, or oil shale) if 90 percent of greenhouse gases produced during the alternative fuel production process are captured and sequestered or if lifecycle greenhouse gas emissions that are no more than five percent above the lifecycle greenhouse gas emissions of their petroleum counterparts. This suggested amendment would still require management of greenhouse gas emissions, but it would significantly reduce the costs of building and operating pioneer alternative fuels facilities that are based on coal, stranded natural gas resources in Alaska, and possibly oil shale.

In closing, I thank the Subcommittee once again inviting me to testify. I hope the foregoing analysis of policy issues is useful to your important deliberations.

Mr. WHITFIELD. Well, thank you all for your opening statements, and at this time I am going to call on Mr. Terry for 5 minutes of questions.

Mr. TERRY. I appreciate that, Mr. Chairman.

Mr. Auerbach, fulfilling my promise, but it is one of the more intriguing aspects of the bill is reverse auctions and clean energy. So in the context of Brazil, you said you were going to tell us about Brazil, but put it in the context of what also you think would positively and negatively work in the United States to encourage more clean energy.

Mr. AUERBACH. Sure. Certainty provides greater investment in clean energy infrastructure, and the current system we have of tax credits that expire every couple of years has introduced uncertainty and has stymied deployment. The reverse auction mechanism in Brazil, which came actually I think it was last year, the year before that was called "the PROINFA feed-in tariff," at an average price for wind of about \$136 a kilowatt. I am sorry. A megawatt hour.

In the reverse auction process auctioning off 2.1 gigawatts of wind energy in a number of different contracts, the average price bid was \$74.40 in U.S. dollar terms. That came in below hydropower, which averages in Brazil about \$80 a megawatt hour. That is remarkable. Some have criticized the auction for allowing too many speculative bids, but if you look at the list of winners, you see some of the largest utility companies, companies that have very substantial balance sheets and are capable of transacting. So I do believe that the auction there has worked.

And so the biggest difference between the Brazilian auction and what is in this current program is that you sell the power to the reverse auction agency rather than just one attribute, and so in our proposal one way of solving the chicken and egg problem associated with meeting a power purchase agreement to establish credibility before participating in the reverse auction to get the benefit payment that substitutes for tax credits is to be able to sell all the revenue streams through the reverse auction agency that would be administering the purchase and sale of electricity.

So a renewable energy generator would have a price certain for all of its attributes. The three income streams are to sell the power itself, the sale of renewable energy credits, which are a substantial portion of the revenue stream of a renewable energy generator, and the benefit payment that comes from the trust fund. And that would take some work to get that innovation into the law and obviously we would need bipartisan agreement, but I think it would actually streamline and dramatically increase the clean energy generation in the United States.

Mr. TERRY. Does Brazil have a credit as well?

Mr. AUERBACH. I don't think so, but I would tell you I would like to do more homework. I have researched, but we don't have facilities in Brazil today. So I may be missing a beat, but I have studied it, and I don't believe so. I think it is just one price.

Mr. TERRY. So but in your testimony you mentioned multiple revenue streams, one of which is the tax credit.

Mr. AUERBACH. Right.

Mr. TERRY. The philosophy I think that we are working under is reverse auctions instead of credits.

Mr. AUERBACH. Correct, and so what I mean, let me just make this as simple as I can because there is a lot of complexity here. If—I actually have companies that have several hundred billion dollars invested in clean energy generation in the United States in development. What we want to do is to know how much money we are going to make for the sale of the electrons, and the way you get paid is through the power purchase agreement, through the tax credits today, and through renewable energy credits.

And so that, the total of that revenue divided by the capital costs and minus your funding costs is how much money we made, and so if the clean energy generator knows how much money they are going to make and they can have that price certain, then you are going to have more clean energy generation because the market is determining it.

The reverse auction mechanism is substituting a tax credit for a benefit payment, which I believe is more efficient on its own. So if the reverse auction only covered substitute tax credit payments, we need to solve the chicken and egg problem. There are other ways of solving it. Our recommendation is to just—is to have a more organized sale of renewable power through the reverse auction agency, which I believe can be used for a broader purpose, including the diversion of royalty payments into the trust fund and any allocations to renewable energy generators.

Mr. WHITFIELD. Mr. McKinley, I will recognize you for 5 minutes for questions.

Mr. MCKINLEY. Thank you, Mr. Chairman.

I am just curious to get a sense of where we are in this with the—if the bill was presented, would you support it?

Mr. AUERBACH. I would support it with modifications. If we got the modifications that we asked for, I would support it. As written it needs further work in order to have its intended effect.

Mr. MCKINLEY. Thank you. Mr. Spencer?

Mr. SPENCER. I am not in a position to support or not support legislation. I can say that I think that a lot of the ideas and policies put forth certainly from a nuclear standpoint really give us a new way to address some really fundamental flaws in how we do nuclear energy and gives us a future there.

Mr. MCKINLEY. Mr. Bartis.

Mr. BARTIS. I would rather not comment on that. I haven't studied this.

Mr. MCKINLEY. I am just—I was curious because I think at least he is showing some imagination here and something that reflects a little bit on the use of coal, and as I said to the earlier panel, my—I have come pretty clearly to understand there is quite an aversion in Washington and especially under this administration to use coal.

Mr. BARTIS. Well, there has been a long history of Congress and the administration specifying how to do things as opposed to what the goals are, and as we pointed out with coal liquefaction, if we can do it with a small amount of biomass and coal, gets you fantastic environmental benefits, and it gets you very reasonable costs. And yet the way we have structured some of our legislation, that option is not allowed because as soon as it is coal involved, it doesn't meet the renewable.

And so I think there is, you know, the goal of the Congress should always be focused on, you know, what are you trying to achieve. Are you trying to achieve energy security, are you trying to achieve lower greenhouse gas emissions? Use those as your goals, not specifying technologies.

Mr. MCKINLEY. Do any of you know from the coal industry whether the coal industry is subsidized? I hear that all the time here. Panels, members of the other side of the aisle talk about the subsidy on the coal industry. Do any of you have any record at all of the subsidies on coal?

None? Again, I am just curious because it seems like we just keep chasing things down the stream. I won't use that clique, but, again, we just don't seem to solve anything. We are about—we get close to solving something. There was the—what was it, the Fischer-Tropsch process, it was—why aren't we just back in the '30s, why aren't we just perfecting it instead of taking on something new?

And maybe it is—maybe I am being naive about the whole process. I am thinking as an engineer that we would complete something instead of starting something new. It just seems like this administration and the whole process that we don't have the energy policy, we don't have any plan to have an energy policy, everyone talks about it, but there is none. And we are—we don't want to be held accountable. We seem to be so much more filled here in Washington with symbolism that we want to move symbolically to starting a new fuel process and new energy when we have things that we could work.

I can imagine if this would have been back in the automobile industry if we had quit making the first automobile and went with something else, but they kept perfecting it until it became the automobile, the vehicle that we use. Same thing with airplanes when they started in the process. Why don't we finish it? Why don't we just—what—is it the economics? Mr. Bartis?

Mr. BARTIS. No. Our discussions with organizations that are interested in promoting and building plants is that there is a residual concern regarding where the world oil prices are heading, and we all, because they are high today, we think they are going to stay high, and if you have got a large investment to bet on that, you are going to be a little bit more cautious.

So there is downward potential that could last. It may not be very long, but it could be downward potential, and that would cause something like a coal-to-liquids plant to be a disaster. And that is why we are talking about—in our analysis we looked at incentives that the government could provide that would be applicable to the first few plants. We don't like subsidizing production. We do think that there is a government role in promoting early commercial experience, and coal-to-liquids is one of those, coal and biomass to liquids. That it is environmentally clean is one of those applications.

Mr. MCKINLEY. Thank you. Mr. Spencer, do you have something you want to chime in?

Mr. SPENCER. Yes, Congressman. I am here to talk primarily about nuclear energy, but you have given me an opportunity that I find hard to pass up. Given that when I am not working on nu-

clear energy I work on energy subsidies broadly, and I think the bigger issue here is what is the role of government, and you talked about these projects that have started and stopped. I would simply suggest that with all due respect to all of the great men and women who have—who work in this building and the one on the other side and all of the great men and women and scientists who work down at the Forsaw Building at the Department of Energy, that ultimately it is the marketplace that is the best arbiter of which of these technologies go forward and which ones don't.

And if coal to liquids is the way to go, then people will invest in that and will do that. If energy prices are going to stay high, then that creates a panoply of opportunity for biofuels, ethanol, whatever the case may be, but we continue to use Washington and centralized control in Washington to distort the marketplace, so we never get any of these projects finished, rather than allowing and trusting the marketplace. And ultimately it is the marketplace that has given us all of the goods and services that we enjoy today.

Mr. MCKINLEY. Thank you very much. I think I have gone over my time.

Mr. WHITFIELD. The gentleman from Kansas, Mr. Pompeo, is recognized for 5 minutes.

Mr. POMPEO. Thank you, Mr. Chairman.

Mr. Auerbach, you talked about the increase in capital flows into renewable—

Mr. AUERBACH. Yes.

Mr. POMPEO [continuing]. Energy. What drove that increase? You said—I forgot the time period. The last couple of years?

Mr. AUERBACH. Yes. In the solar industry—the last 6 years, I am talking about—it was policies, government policies around the world. Most of that actually was happening in Europe with feed-in tariffs, the most notable of them is in Germany, which despite its relatively poor solar insulation conditions is the world's largest market for solar energy. And it also resulted from improvements in technology, and several companies, many companies have participated in that progress in the United States, in Europe, and in China.

So the cost of installed solar has dropped roughly about 75 percent over the last 5 years. When prices drop and they are going to continue to drop, it stimulates demand, and these feed-in tariffs which started out very, very high have been coming down extremely quickly. I am not a personal proponent of feed-in tariffs as the way to go because it is another example where the government is setting the price rather than the market, which is why I like Congressman Nunes's reverse auction approach.

But the combination of market stimulus, the price signal, and technology progress has resulted in a transformation of the solar industry unlike anything I have seen in the energy industry over the course of my involvement, and this would be for well over a decade.

Mr. POMPEO. I appreciate that, and I, too, I think the reverse auction is a step forward from the way we have done business. I can't imagine putting hundreds of millions of dollars at risk depending on us to renew a tax credit every couple of years.

Mr. AUERBACH. It makes me nervous.

Mr. POMPEO. Yes. I can only imagine the increase in the cost of capital that results from that.

Mr. AUERBACH. The cost of capital has gone up much higher in the United States than anywhere else in the world because of it.

Mr. POMPEO. So with all of these improvements that you described why not just say, hey, just go away? Why not just tell us, go away, leave us alone, don't need a reverse auction, we don't need a thing. Remove the regulatory barriers that are in the way of all of these things whether that is wind or solar or natural gas and coal, and we will raise the money, and we will get it done, and we will make money doing it. And make really happy consumers because they will have affordable energy here in America.

Mr. AUERBACH. OK. That is a great question, and there are many who have suggested that. Let me—in answering that question, and I am sure my other panelists here will have views on it, I will also touch on Mr. McKinley's point. If you look at the history of federal expenditures in this country, there has been an analysis actually done for the Nuclear Energy Institute a couple of years ago. The vast majority of federal expenditures have gone actually to fossil fuels, something like 73 percent, including to the coal industry.

Now, I didn't do the study myself, so I can refer you to it, and so you can look at the source material I quoted in my testimony. And so the renewable power industry is catching up and is catching up as the chart shows at a pace that gives us enormous confidence in the future. If you simply stop the music and then force everyone to find their seats, it may be that the wrong folks will not find a seat, you know, in the room that otherwise would be the winners in a few years from now.

So what we need is smarter policies that allow market mechanisms to work more efficiently. Stopping the music right now and pulling all subsidies or all expenditures of all sorts I think would increase the cost in the short term rather than reduce the costs.

So I think we need to do this in a more gradual way.

Mr. POMPEO. I don't understand that. I don't understand how if the government got out of the way it would increase costs. You would still—because it would still find the low-cost alternative, and utilities would power their plants with the low-cost alternative, and more people would go figure out how to make those curves come down even faster.

Mr. AUERBACH. Well, what the reverse auction does is it actually allows the market, if the market doesn't need it, the market will not be asking for it, and it will disappear on its own, so it allows actually for a gradual move to full market freedom to set prices.

So I think the reverse auction mechanism is the safer way to get the same goal that I share.

Mr. POMPEO. Yes. Very good. I yield back the balance of my time, Mr. Chairman.

Mr. WHITFIELD. Thank you. At this time I would recognize the gentleman from Louisiana, Mr. Scalise, for 5 minutes.

Mr. SCALISE. Thank you, Mr. Chairman.

I would start with Mr. Auerbach. On the reverse auction, I know one thing that you talk about a lot of us get frustrated with is

when you see some trying to pick winners and losers where government is trying to pick who is going to win and who is going to lose.

In a reverse auction can you maybe walk through some things in that type of process that would prevent the Federal Government from picking winners and losers?

Mr. AUERBACH. OK. Yes. What the bill currently provides is a division of regions and actually a division of technologies. There, what we are trying to do on the region side is to allow various resources in the country to be developed on their own. See, if you actually have one national auction, a reverse auction, you might have South Dakota taking all of the wind resource, but because of the lack of transmission, you may never be able to evacuate that power to California or New York or Chicago where you need it.

And so a regional approach allows the realities of the marketplace to work well, so I think it is a well-designed piece of the legislation. What we also do is allow for—what the legislation does it allow for technology limits, 60 percent, I think, to one technology, 90 percent for two, and what that is doing there is saying that although wind today is the cheapest form of renewable power generation, ultimately because of these cost curves you want to induce more competition and to see oil prices continue to come down.

So the allocation of the auction among technologies I think helps to push the price down of all renewable power.

Mr. SCALISE. Thanks. One of the things we have been hearing when you talk about impediments to expanding renewable energy, it seems like some of the same things we are hearing about impediments to developing some of our own natural resources in America in traditional energy are seeming to apply to renewable energy, and that is overreach by the Environmental Protection Agency.

Can you describe, especially as it relates to the long process it takes for site selection, things like that, can you describe what types of overreach you have seen?

Mr. AUERBACH. Yes. Anecdotally, although I—we have a lot of development sites in California, it is well known, for example, that it takes 2 to 3 years to actually develop a wind farm in Texas, and it takes 5 to 8 years to develop a wind farm in California. I don't think it is the EPA that stands in the way. It is a lot of State environmental red tape that delays the pace of development in California in particular. But California has actually—recently has been showing more progress.

And so environmental red tape is actually a problem for the renewable power industry, and so more accelerated permitting would allow, both on federal lands and also on private lands, would allow for faster deployment of renewables and cheaper deployment of renewables.

Mr. SCALISE. Thanks. Mr. Bartis, talking about more opportunities for permitting for natural resources, I know one of the frustrations that we have in the Gulf Coast area is the inability to get clear guidelines from the Department of Interior, BOEM, to move forward but also with the inability to get more areas opened up. When you talk to other States, it seems like there are a number of other States interested in getting into the game and helping produce American energy, and you know, it surely would be my goal to see us eliminate our dependence on Middle Eastern oil.

Clearly, we have the capacity to do that with so many reserves that are completely shut off by federal policy, but if you can talk maybe about some incentives that could be provided that you know of that would encourage States to participate where maybe they are not right now.

Mr. BARTIS. That is a tough question. There is a lot—from what we know there is a lot of offshore oil that other States have, and the challenge is to move forward successfully. We know we have a tremendous amount of oil shale as addressed today, literally three times the reserves of Saudi Arabia, that look very attractive. We need to make some progress there. The only way to get progress is to get some more experience, and that means we have got to allow people, to give industry enough incentive, a big enough reward so that if they go in there and figure out how to do this, and thereby monetize this huge resource that we have as a Nation and to our benefit, you know, they will move.

Mr. SCALISE. What is your take on increased revenue sharing to States who want to participate?

Mr. BARTIS. The revenue sharing, I mean, I can't comment on the revenue, I mean, the revenue sharing. I don't want to comment on that. I think there is already revenue sharing as you are aware, and I don't—we have not looked at whether—

Mr. SCALISE. Well, we don't—I know in Louisiana we don't have any revenue sharing right now. It is not until 2017, that—

Mr. BARTIS. Right.

Mr. SCALISE. But it seems like there are a number of other States that have—

Mr. BARTIS. It depends. Yes. Yes.

Mr. SCALISE. If revenue sharing was involved where they can provide a stream of revenue to their State, there would be a big stream of revenue to the Federal Government as well, it seems like kind of a win-win to encourage more—

Mr. BARTIS. Yes. I—we haven't looked at that, and I shouldn't be commenting on things that we have—

Mr. SCALISE. I don't know if anybody else wants to comment on that.

All right. I yield back. Thanks.

Mr. WHITFIELD. The gentleman from California, Mr. Bilbray, is recognized for 5 minutes.

Mr. BILBRAY. Thank you. Mr. Chairman, I apologize. I was downstairs at my other committee looking at government regulations that are obstructing economic growth, so I think we are sort of in a lot of ways looking at the same problems from different angles.

First of all, being a history major, I want to go back and remind all of us that the oil industry was the environmental option to the oil, I mean, from the previous oil was the whaling industry that provided the energy to light our lights. And the fact that the gasoline was just a waste product from the manufacturing of the—and so the whole concept of driving a car that was driven by gasoline was really just because we had all this, you know, dangerous stuff around as a bi-product, a waste product, and develop that.

So I think it kind of tells us how innovative Americans can be and the human mind can be confronted with an opportunity and a problem, and now it is this huge, precious resource rather than

trash from, you know, leftovers, and how do we move forward with it.

The other assumption I want to point out is would everybody here agree with the concept that we need a Manhattan Project for our energy independence? We keep hearing that. You know, my biggest frustration about it is somebody has been in a regulatory agency one way or the other since 1976. Manhattan Project wouldn't be legal today. Would not be legal to do it today and every time I just ask anybody, anybody brings that up, we need to confront that.

My question is when we look at these obstructions that the government, one way or the other, is standing in the way of, while we are talking about why aren't we doing innovative things, the fact is we require people to stay in a box, and we complain about them staying in a box.

You mentioned California. In fact, you may want to talk about this. We talk about how wind generation is so efficient, but do we talk about the fact that it needs transmission lines that are usually three times farther than traditional power and the obstructionism and let me give you the sun link. You know that one. It is twice to three times as long as it would have been if the Federal Government would have allowed the transmission lines to go over federal jurisdiction. No Indian reservation, no national park, but the freeways go through. Do you want to comment on the fact that it is oK to put a freeway through federal property but not a transmission line to get to solar power?

Mr. AUERBACH. Sure. I can't pass up that opportunity, Congressman.

I am concerned obviously. I am in the clean energy business. I am concerned with the environment, but ultimately everything is cost benefit, and the amount of time and energy and money that renewable energy development teams have to expend on figuring out how to get transmission to load centers from the wind resource basically it prevents a lot of renewable energy from being built that could be both environmentally beneficial and also cost effective.

Mr. BILBRAY. Give me an example. California implemented AB 32, talked about saving the planet, thought it was so important to be able to save the planet, but all those regulations and all those mandates but did not exempt it from CGWA, the California Environmental. Didn't think it was important enough to exempt it from CGWA because, oh, they couldn't retreat on that.

At the same time my colleague from California will remind you they did exempt the football stadium in the City of Industry from CGWA but not the implementation of AB 32.

Can we agree that we should get away from the term, renewable, and go to clean technology or sustainable technology? I mean, words matter, and one of the things that frustrates me is to hear almost as if renewable is a catchy catchword but really doesn't reflect the reality.

Can we talk about the changing of those terminologies?

Mr. AUERBACH. Could I just—

Mr. BILBRAY. Go ahead.

Mr. AUERBACH [continuing]. Address that quickly? Well, first of all, the name of my firm is Hudson Clean Energy Partners. I had

the choice to name it renewable, and so I wanted a broader platform, and so I agree with the term clean.

I would like, however, to just note that renewable energy, the resources themselves are also natural resources that are part of our national treasure. So the sun that is shining in Southern California and the wind that is blowing across the Plain States are natural resources for this country that are worth trillions of dollars.

Mr. BILBRAY. OK, but here is the point. To get into that, when somebody talks about electric fleets, when we talk about developing efficient wind generation, we are talking about permanent magnet DC motors and generators. OK? At that time we talk about that, but we don't talk about the fact that if we are going to go to electric system, if we are going to have wind power, we are going to have efficient electricity, we have got to have rare earth, 70 pounds for every Prius, and you know what your wind generates, but we are not talking about that the Federal Government will not allow private industry to go onto public lands and mine the rare earth that is essential to do all the things that everybody else—and we sit through these committees and hear colleagues talk about all these great plans, but they are not willing to allow the process to be legal to reach those goals. Things like rare earth, which is 98 percent coming from China.

Mr. AUERBACH. It is only 98 percent or 95 percent of the production, not of the resource itself. The United States has plenty of resources. I agree with what the Congressman is saying. If we are going to develop more clean energy and use technologies that are now commercially available and coming down rapidly in cost like electric cars, we need to have a resource strategy, and it has to be domesticated more than it is today.

Mr. BILBRAY. Mr. Chairman, I appreciate that, and just to point out that the Prius are actually, the Toyota is actually designing now an AC motor, which is a lot less efficient than the permanent magnet DC motor, just because of the threat of not being able to get the rare earth material, and we get into it.

And I apologize. I didn't get a chance to get in nuclear power. I think that we need to be looking at nuclear power and moving it like we did on interstate freeways where the Federal Government has engaged, and DOD should be looking at sighting facilities so that we can get the private sector doing what we do with freeways, not sighting, not permitting, but building them after we go through the hoops, the regulatory hoops, and if we are not brave enough to go through those regulatory hoops, we should forget about the concept of being able to tap into this clean and cost-effective energy.

Yield back, Mr. Chairman.

Mr. WHITFIELD. Mr. Bilbray, I think we are going to adopt a policy of giving you 10 minutes for your questions.

Mr. BILBRAY. I apologize.

Mr. WHITFIELD. Mr. Auerbach, I noticed in your testimony you made the comment that a focused effort should be made on making the U.S. a more welcome home for clean energy manufacturing, and I was just wondering what specifically would you be referring to?

Mr. AUERBACH. Well, yes, thank you. If we would provide longevity to the system incentivizing deployment, manufacturing will come to roost in the United States. The problem with the current system and my personal problem is having to approve manufacturing facilities and generation facilities is that we have to look at the clock, and when the clock runs out every couple of years on the system for providing centers at the federal level, which are still today a necessary component but are—and through reverse auctions will become a decreasing part of the calculus, it makes it hard to stimulate capital deployment that needs a multi-year payback.

And so if we can have a reverse auction mechanism, that longevity—and was taken out of an annual appropriations—then capital committers around the world would look to how to streamline the value chain to put in place in the United States those parts of the value trade that are going to actually help lower the cost of clean energy in the United States.

Mr. WHITFIELD. So you are primarily talking about incentives and more certainty on those types of programs?

Mr. AUERBACH. The best thing that we can do to get more capital flowing because the private sector, we are now in our portfolio companies building two manufacturing facilities in the United States, and there are many other manufacturers that would actually reopen plants for value trade components that have actually been shuttered today—

Mr. WHITFIELD. Uh-huh.

Mr. AUERBACH [continuing]. And build new ones if they knew that this industry had a home for a multi-year period that was more market based.

Mr. WHITFIELD. And what would be the impact if—Mr. Nunes talked about the Ways and Means was looking at eliminating all tax credits and incentives, and Mr. Pompeo made some reference to that. If that actually happened, how would that affect your company?

Mr. AUERBACH. As I indicated to Mr. Pompeo in—because he asked me that in a question, my preference as a policy matter is to see this being done carefully. Billions and billions of dollars of capital are already at work, and hundreds of billions of dollars are also looking to be deployed, and so I think Congress needs to move very, very carefully, and so by making any radical move, by, for example, terminating tax credits that have a statutory life and terminating them early, I think that it would have a deleterious affect on capital. It would cause the stock prices of public companies to fall, it would strand capital investment, it would cause loss of jobs in the United States.

If we do so in a thoughtful, gradual way, as I think is the crux of the reverse auction mechanism in H.R. 909, I think that we will have the opposite affect of actually encouraging more capital to come into the United States to find it a more secure home.

Mr. WHITFIELD. Do you invest in—does your venture capital firm invest in nuclear energy?

Mr. AUERBACH. We don't. We are not prohibited from doing so, but for reasons that are—have been made pretty clear to capital committers it is not a very easy place to commit capital at least for 10-year time periods.

Mr. WHITFIELD. Mr. Spencer, you in your testimony talked about Mr. Nunes's legislation providing a second permitting mechanism for nuclear energy. Would you explain just briefly what that is, how that would work—

Mr. SPENCER. Sure.

Mr. WHITFIELD [continuing]. And why it is better?

Mr. SPENCER. Yes. The current process allegedly takes 4 years. It has never happened yet, and each time we get close it seems to not happen again, but what the roadmap does it sets up a 2-year timeframe that if the applicant meets certain conditions—they are building on or adjacent to an existing site, if you are, if you have a reactor that is fully certified, and there are a number of others—then you get to enter into this separate track that gives a more efficient or consolidated review of the environmental and technical aspects of the application.

It is a tight time scale, but it is one that I think, a lot of experts think is doable if we establish that path, and that would give certainty, would allow us to get through more applications, and quite frankly, I think provide competition within the regulatory environment to demonstrate that you need to start getting these things done. Otherwise we are going to do it a different way.

Mr. WHITFIELD. Now, are you optimistic about these smaller-type nuclear plants that sometimes people refer to as modular or whatever?

Mr. SPENCER. I think—I am optimistic that the technology can be applied commercially in the future extraordinarily, economically, and efficiently in all that. I am less optimistic that the policies that have been proposed will get us there. What we see is the administration and proponents of small modular reactors, what they want is a Department of Energy program where the DOE essentially chooses the one or two technologies that go forward to be licensed.

I think that is the wrong approach, frankly. You have a lot of entrepreneurs out there spinning off technology, spinning off commercial enterprises. What if they are not one of the two that are chosen? I would suggest that it is—the market is the better arbiter of that.

Instead of going through the Department of Energy I would suggest we get the Nuclear Regulatory Commission really geared up to be able to support this sort of activity so that if people want to go down that road, then, you know, we have the Regulatory support to do that.

Mr. WHITFIELD. Yes, and Mr. Bartis, you mentioned Fischer-Tropsch. Other than South Africa, where is the Fischer-Tropsch technology being used today?

Mr. BARTIS. It is—the Fischer-Tropsch technology is used in—most recently it has been built up in Qatar in the Persian Gulf. They are going to have about 170,000 barrels per day of production online this year. The technology is very up to date, but that is an application to natural gas. In our country the only place that might make sense is in Alaska because that gas in Alaska, no one is going to pipe back to this, to the Continental—or the lower 48 anymore because of all the shale gas. So we have got stranded gas up there.

Applying it to coal is not a big deal, and we have got one for building, scheduled to build a plant and pretty far along in Wyoming. They are not going to be using Fischer-Tropsch. They are going to be using a variant of Fischer-Tropsch called—that the Mobil Oil Company invented, and—but it is very much the same.

But that is the only—and they are going to be producing gasoline. They are not going to be producing fuels that would be of interest to the military.

Mr. WHITFIELD. Thank you. Mr. Gardner, you are recognized for 5 minutes.

Mr. GARDNER. Thank you, Mr. Chairman. I just got back from the hearing downstairs, so I will defer at this point.

Mr. WHITFIELD. Well, I guess that concludes today's hearing. I want to thank the three of you for coming in and giving us your views and opinions which we certainly will take into consideration as we move forward, and we look forward to working with you in the future. Thank you very much.

The record will remain open for 10 days for any additional material or testimony that anyone would like to offer, and with that this concludes today's hearing.

[Whereupon, at 11:39 a.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

**Statement of the Honorable Fred Upton
Chairman, Committee on Energy & Commerce
June 3, 2011**

**Subcommittee on Energy and Power
Hearing on “the American Energy Initiative – Roadmap For America’s Energy Future”**

The list of energy-related issues facing the nation is a long one - high gas prices, reliance on unstable and unfriendly oil-exporting nations, rising electric bills, and many others. Not only are families hurt by high energy costs, but so are manufacturers and other job creators. These are serious problems today and will only get worse as America’s energy needs grow in the years ahead.

The problem is not a short supply of energy, but a short supply of fresh thinking on energy policy. That’s why I am pleased to participate in this American Energy Initiative hearing on Mr. Nunes’ Roadmap for America’s Energy Future, and I welcome my good friend and colleague.

It should go without saying that we ought to be making full use of the affordable energy we have right here in America. Not only does American-made energy provide greater supplies and lower prices, it also creates thousands of well-paying jobs and keeps more dollars right here in the U.S. This is not the time to put the brakes on our domestic resources or pick energy winners and losers based on political ideology. We need it all. Energy drives our economy and has a direct impact on jobs.

I thank my good friend Mr. Nunes for putting his ideas on the table. This is what our American Energy Initiative is all about – looking at ideas, participating in a dialogue, and ultimately promoting “all-of-the-above” when it comes to American-made energy sources.

We look forward to hearing from Mr. Nunes and the experts here today. Thank you.

**Opening Statement of the Honorable Joe Barton
Chairman Emeritus, Committee on Energy and Commerce
Subcommittee on Energy & Power Hearing
“The American Energy Initiative IX”
June 3, 2011**

Thank you, Mr. Chairman, for holding this hearing to discuss policy recommendations in H.R. 909, A Roadmap for America’s Energy Future. I would also like to thank our witnesses for testifying today. High energy prices and uncertainty in global energy markets underscore the importance of expanding our supply of safe and reliable energy. And, as pointed out during our hearing last week to discuss the Keystone XL pipeline, there are opportunities to increase that supply. We simply need to remove the political hurdles that stand in the way.

H.R. 909 is a step in the right direction. By facilitating conventional petroleum production in the Outer Continental Shelf (OCS) and Arctic National Wildlife Refuge (ANWR), and encouraging production from non-conventional sources such as oil shale and coal to liquids, we will significantly reduce our reliance on foreign imports. This will not only create high paying domestic jobs, it will also stimulate our economy and lower the cost of doing business in America.

Domestic energy production is our best hedge against the geopolitical risk associated with global energy markets. Meaningful efforts to sustain our domestic energy production over the long term would send signals that would have an immediate effect on oil prices, and ultimately lower the price American consumers pay at the pump.

**Energy & Commerce Committee
Subcommittee on Energy & power
Hearing: H.R. 909, A Roadmap for America's Energy Future
Opening Statement
June 3, 2011**

Thank you, Mr. Chairman.

Once again, I applaud the Chairman for utilizing regular order, calling in stakeholders, and allowing us to fully debate the proposed legislation before us so that Members may comprehensively understand the language in the bill and more knowledgeably consider the legislation.

The America's Energy Initiative that this committee has been pushing forward for the past few months is a clear vision of how we believe America can move toward a more sustainable, energy-independent future. Utilizing our own domestic resources – from oil and gas to human ingenuity – America can produce energy within its borders and put citizens back to work in well-paying, long-term jobs. Republicans have long touted an “all of the above” agenda regarding energy – oil and gas production as well as wind, solar, and biomass.

My own state of Texas is one of the largest wind-producing regions in the world, thanks to the efforts of then-Governor George W. Bush, who pushed for an initiative in the 1990s to increase wind turbines across the state. That effort paid off. States should be given the opportunities to implement their own energy plans, according to the resources they enjoy in their respective regions. Wind power might not work for every state. Some states have an abundance of biomass, or hydropower. Utilizing all of these will move the country toward a sustainable future. Indeed, nuclear power continues to be the cleanest fuel for large-scale production of electricity, and must be considered in any energy legislation.

The legislation before us is a good start toward. With any large piece of legislation, we must carefully review each section, and today we begin that process. I am a proud original cosponsor of H.R. 909, as I believe it is a step in the direction of a sustainable future. I look forward to

hearing the testimony today and working with my colleagues to perfect this legislation and move this country forward.

With that, I yield back.

112TH CONGRESS
1ST SESSION

H. R. 909

To expand domestic fossil fuel production, develop more nuclear power, and expand renewable electricity, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MARCH 3, 2011

Mr. NUNES (for himself, Mr. SHIMKUS, Mr. RYAN of Wisconsin, Mr. SIMPSON, Mr. BISHOP of Utah, Mr. McKEON, Mr. DREIER, Mr. LUCAS, Mrs. McMORRIS RODGERS, Mr. ROGERS of Michigan, Mr. ROSKAM, Mr. BACHUS, Mr. BENISHEK, Mr. BRADY of Texas, Mr. BROUN of Georgia, Mr. BURGESS, Mr. BURTON of Indiana, Mr. CALVERT, Mr. CANSECO, Mr. COFFMAN of Colorado, Mr. COLE, Mr. CRAVAACK, Mr. CULBERSON, Mr. DUNCAN of Tennessee, Mrs. EMERSON, Mr. FINCHER, Mr. FRANKS of Arizona, Mr. GINGREY of Georgia, Mr. GRIMM, Mr. HARPER, Mr. HERGER, Mr. HUIZENGA of Michigan, Ms. JENKINS, Mr. KING of Iowa, Mr. LATOURETTE, Mrs. LUMMIS, Mr. MARCHANT, Mr. MCCOTTER, Mr. MCHENRY, Mrs. MILLER of Michigan, Mr. PEARCE, Mr. POE of Texas, Mr. REHBERG, Mr. SCHOCK, Mr. SESSIONS, Mr. SHUSTER, Mr. SULLIVAN, Mr. TERRY, Mr. THOMPSON of Pennsylvania, Mr. TIBERI, Mr. TIPTON, Mr. WALBERG, Mr. WESTMORELAND, Mr. WOMACK, Mr. YODER, and Mr. YOUNG of Alaska) introduced the following bill; which was referred to the Committee on Natural Resources, and in addition to the Committees on Oversight and Government Reform, Ways and Means, Energy and Commerce, and Armed Services, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

To expand domestic fossil fuel production, develop more nuclear power, and expand renewable electricity, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
 2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

4 (a) SHORT TITLE.—This Act may be cited as “A
 5 Roadmap for America’s Energy Future”.

6 (b) TABLE OF CONTENTS.—

Sec. 1. Short title; table of contents.

TITLE I—AMERICAN ENERGY

Sec. 100. Findings.

Subtitle A—Outer Continental Shelf

- Sec. 101. Leasing program considered approved.
- Sec. 102. Outer Continental Shelf lease sales.
- Sec. 103. Definitions under the Outer Continental Shelf Lands Act.
- Sec. 104. Determination of Adjacent Zones and OCS Planning Areas.
- Sec. 105. Outer Continental Shelf leasing program.
- Sec. 106. Coordination with Adjacent States.
- Sec. 107. Environmental studies.
- Sec. 108. Outer Continental Shelf incompatible use.
- Sec. 109. Repurchase of certain leases.
- Sec. 110. Offsite environmental mitigation.

Subtitle B—Arctic National Wildlife Refuge

- Sec. 121. Definitions.
- Sec. 122. Leasing program for lands within the Coastal Plain.
- Sec. 123. Lease sales.
- Sec. 124. Grant of leases by the Secretary.
- Sec. 125. Lease terms and conditions.
- Sec. 126. Coastal Plain environmental protection.
- Sec. 127. Expedited judicial review.
- Sec. 128. Federal and State distribution of revenues.
- Sec. 129. Rights-of-way across the Coastal Plain.
- Sec. 130. Conveyance.
- Sec. 131. Local government impact aid and community service assistance.

Subtitle C—Oil Shale

- Sec. 141. Oil shale.

Subtitle D—Coal-to-Liquid

- Sec. 151. Development and operation of facilities.
- Sec. 152. Definitions relating to coal-to-liquid fuel and facilities.
- Sec. 153. Repeal.

Subtitle E—Nuclear

Sec. 161. Findings and policy.
 Sec. 162. 200 operating permits by 2040.
 Sec. 163. Repeal of Office of Civilian Radioactive Waste Management.
 Sec. 164. Radiological material repository.
 Sec. 165. Independent radiological material management.
 Sec. 166. Spent nuclear fuel recycling.
 Sec. 167. Nuclear fuel supply reserve.
 Sec. 168. Public health and safety.
 Sec. 169. Streamlining Combined Construction and Operating License.
 Sec. 170. Reactor design certification.
 Sec. 171. Technology-neutral plant design specifications.
 Sec. 172. Additional funding and personnel resources.
 Sec. 173. National Nuclear Energy Council.
 Sec. 174. Next Generation Nuclear Plant.
 Sec. 175. Uranium mining on Federal lands.
 Sec. 176. Small and modular reactor licensing.
 Sec. 177. Limitation on regulatory time frame.
 Sec. 178. Definition.

TITLE II—AMERICAN-MADE ENERGY TRUST FUND

Sec. 201. Establishment of American-Made Energy Trust Fund.

TITLE III—REVERSE AUCTION MECHANISM FOR RENEWABLE ENERGY GENERATION AND FOR RENEWABLE FUEL PRODUCTION

Sec. 301. Reverse auction mechanism for renewable energy generation.

TITLE IV—PROHIBITION OF CONSIDERATION OF GREENHOUSE GAS

Sec. 401. Clean Air Act regulation.
 Sec. 402. Endangered Species Act regulation.

1 **TITLE I—AMERICAN ENERGY**

2 **SEC. 100. FINDINGS.**

3 The Congress finds the following:

4 (1) The United States contains abundant oil
 5 and gas resources located within its lands.

6 (2) Development of domestic oil and gas re-
 7 sources can be accomplished in a safe and environ-
 8 mentally responsible manner.

9 (3) Increased development of domestic oil and
 10 gas resources could significantly boost economic
 11 growth, provide permanent well-paying jobs, and

1 serve as a significant revenue source to the Federal
2 Government.

3 (4) The United States Geological Survey esti-
4 mates that the Arctic National Wildlife Refuge con-
5 tains a mean expected value of 10.4 billion barrels
6 of technically recoverable oil.

7 (5) The Minerals Management Service esti-
8 mated there are 85 billion undiscovered, technically
9 recoverable barrels of oil and 420 trillion cubic feet
10 of natural gas in the outer Continental Shelf of the
11 United States.

12 (6) The Minerals Management Service esti-
13 mated that less than 0.001 percent of oil produced
14 on the outer Continental Shelf of the United States
15 since 1980 has been spilled.

16 (7) The National Academy of Sciences has esti-
17 mated that less than 1 percent of petroleum in
18 American waters is from drilling and extraction, and
19 that 63 percent is from natural seepage.

20 **Subtitle A—Outer Continental**
21 **Shelf**

22 **SEC. 101. LEASING PROGRAM CONSIDERED APPROVED.**

23 (a) IN GENERAL.—The Draft Proposed Outer Conti-
24 nental Shelf (OCS) Oil and Gas Leasing Program 2010–
25 2015 released by the Secretary of the Interior (referred

1 to in this section as the “Secretary”) in January 2009,
2 under section 18 of the Outer Continental Shelf Lands
3 Act (43 U.S.C. 1344), is considered to have been approved
4 by the Secretary as a final oil and gas leasing program
5 under that section, and is considered to be in full compli-
6 ance with and in accordance with all requirements of the
7 Outer Continental Shelf Lands Act, National Environ-
8 mental Policy Act of 1969, Endangered Species Act of
9 1973, Clean Air Act, Marine Mammal Protection Act of
10 1972, Oil Pollution Act of 1990, and all other applicable
11 laws.

12 (b) FINAL ENVIRONMENTAL IMPACT STATEMENT.—
13 The Secretary is considered to have issued a legally suffi-
14 cient final environmental impact statement for the pro-
15 gram described in subsection (a) in accordance with all
16 requirements under section 102(2)(C) of the National En-
17 vironmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)),
18 and all other applicable laws.

19 **SEC. 102. OUTER CONTINENTAL SHELF LEASE SALES.**

20 (a) IN GENERAL.—Except as provided in subsection
21 (b), not later than 30 days after the date of enactment
22 of this Act and every 270 days thereafter, the Secretary
23 of the Interior (referred to in this section as the “Sec-
24 retary”) shall conduct a lease sale in each outer Conti-
25 nental Shelf area for which the Secretary determines that

1 there is a commercial interest in purchasing Federal oil
2 and gas leases for production on the outer Continental
3 Shelf.

4 (b) SUBSEQUENT DETERMINATIONS AND SALES.—If
5 the Secretary determines that there is not a commercial
6 interest in purchasing Federal oil and gas leases for pro-
7 duction on the outer Continental Shelf in an area under
8 subsection (a), not later than 2 years after the date of
9 such determination, and every 2 years thereafter, the Sec-
10 retary shall—

11 (1) reevaluate whether there is commercial in-
12 terest in purchasing Federal oil and gas leases for
13 production on the outer Continental Shelf in the
14 area; and

15 (2) if the Secretary determines that there is a
16 commercial interest described in paragraph (1), con-
17 duct a lease sale in the area.

18 (c) PROCEEDS OF LEASE SALES FROM NEWLY OPEN
19 AREAS.—Notwithstanding section 9 of the Outer Conti-
20 nental Shelf Lands Act (43 U.S.C. 1338), the Federal
21 share of any proceeds resulting from a lease sale con-
22 ducted under this section with respect to an outer Conti-
23 nental Shelf area that is made open for lease sales pursu-
24 ant to section 101, and that was not open for lease sales
25 prior to the enactment of this Act, shall be deposited in

1 the American-Made Energy Trust Fund established in
2 section 9512 of the Internal Revenue Code of 1986 (as
3 added by title II).

4 **SEC. 103. DEFINITIONS UNDER THE OUTER CONTINENTAL**
5 **SHELF LANDS ACT.**

6 Section 2 of the Outer Continental Shelf Lands Act
7 (43 U.S.C. 1331) is amended—

8 (1) in the matter preceding subsection (a), by
9 striking “When used in this Act—” and inserting
10 “In this Act.”;

11 (2) in subsection (a), by inserting after “con-
12 trol” the following: “, or lying within the United
13 States exclusive economic zone adjacent to the Terri-
14 tories of the United States”;

15 (3) by amending subsection (f) to read as fol-
16 lows:

17 “(f) The term ‘affected State’ means the ‘Adjacent
18 State’.”;

19 (4) by striking the semicolon at the end of each
20 of subsections (a) through (o) and inserting a pe-
21 riod;

22 (5) by striking “; and” at the end of subsection
23 (p) and inserting a period; and

24 (6) by adding at the end the following:

1 “(r) The term ‘Adjacent State’ means, with respect
2 to any program, plan, lease sale, leased tract, or other ac-
3 tivity, proposed, conducted, or approved pursuant to the
4 provisions of this Act, any State the laws of which are
5 declared, pursuant to section 4(a)(2), to be the law of the
6 United States for the portion of the outer Continental
7 Shelf to which such program, plan, lease sale, or leased
8 tract appertains or on which such activity is, or is pro-
9 posed to be, conducted. For purposes of this paragraph,
10 the term ‘State’ includes the Commonwealth of Puerto
11 Rico, the Commonwealth of the Northern Mariana Is-
12 lands, the Virgin Islands, American Samoa, Guam, and
13 the other Territories of the United States.

14 “(s) The term ‘Adjacent Zone’ means, with respect
15 to any program, plan, lease sale, leased tract, or other ac-
16 tivity, proposed, conducted, or approved pursuant to the
17 provisions of this Act, the portion of the outer Continental
18 Shelf for which the laws of a particular Adjacent State
19 are declared, pursuant to section 4(a)(2), to be the law
20 of the United States.

21 “(t) The term ‘miles’ means statute miles.

22 “(u) The term ‘coastline’ has the same meaning as
23 the term ‘coast line’ as defined in section 2(c) of the Sub-
24 merged Lands Act (43 U.S.C. 1301(c)).”.

1 **SEC. 104. DETERMINATION OF ADJACENT ZONES AND OCS**
2 **PLANNING AREAS.**

3 Section 4(a)(2)(A) of the Outer Continental Shelf
4 Lands Act (43 U.S.C. 1333(a)(2)(A)) is amended in the
5 first sentence by striking “, and the President” and all
6 that follows through the end of the sentence and inserting
7 the following: “. The lines extending seaward and defining
8 each State’s Adjacent Zone, and each OCS Planning Area,
9 are as indicated on the maps for each outer Continental
10 Shelf region entitled ‘Alaska OCS Region State Adjacent
11 Zone and OCS Planning Areas’, ‘Pacific OCS Region
12 State Adjacent Zones and OCS Planning Areas’, ‘Gulf of
13 Mexico OCS Region State Adjacent Zones and OCS Plan-
14 ning Areas’, and ‘Atlantic OCS Region State Adjacent
15 Zones and OCS Planning Areas’, all of which are dated
16 September 2005 and on file in the Office of the Director,
17 Bureau of Ocean Energy Management, Regulation and
18 Enforcement.”.

19 **SEC. 105. OUTER CONTINENTAL SHELF LEASING PROGRAM.**

20 Section 18 of the Outer Continental Shelf Lands Act
21 (43 U.S.C. 1344) is amended—

22 (1) in subsection (a), by adding at the end of
23 paragraph (3) the following: “The Secretary shall, in
24 each 5-Year Program, include lease sales that when
25 viewed as a whole propose to offer for oil and gas
26 leasing at least 75 percent of the available unleased

1 acreage within each OCS Planning Area. Available
2 unleased acreage is that portion of the outer Conti-
3 nental Shelf that is not under lease at the time of
4 the proposed lease sale, and has not otherwise been
5 made unavailable for leasing by law.”;

6 (2) in subsection (c), by striking so much as
7 precedes paragraph (3) and inserting the following:

8 “(c)(1) During the preparation of any proposed leas-
9 ing program under this section, the Secretary shall con-
10 sider and analyze leasing throughout the entire outer Con-
11 tinental Shelf without regard to any other law affecting
12 such leasing. During this preparation, the Secretary shall
13 invite and consider suggestions from any interested Fed-
14 eral agency, including the Attorney General, in consulta-
15 tion with the Federal Trade Commission, and from the
16 Governor of any coastal State. The Secretary may also in-
17 vite or consider any suggestions from the executive of any
18 local government in a coastal State that have been pre-
19 viously submitted to the Governor of such State, and from
20 any other person. Further, the Secretary shall consult
21 with the Secretary of Defense regarding military oper-
22 ational needs in the outer Continental Shelf. The Sec-
23 retary shall work with the Secretary of Defense to resolve
24 any conflicts that might arise regarding offering any area
25 of the outer Continental Shelf for oil and gas leasing. If

1 the Secretaries are not able to resolve all such conflicts,
2 any unresolved issues shall be elevated to the President
3 for resolution.

4 “(2) After the consideration and analysis required by
5 paragraph (1), including the consideration of the sugges-
6 tions received from any interested Federal agency, the
7 Federal Trade Commission, the Governor of any coastal
8 State, any local government of a coastal State, and any
9 other person, the Secretary shall publish in the Federal
10 Register a proposed leasing program accompanied by a
11 draft environmental impact statement prepared pursuant
12 to the National Environmental Policy Act of 1969. After
13 the publishing of the proposed leasing program and during
14 the comment period provided for on the draft environ-
15 mental impact statement, the Secretary shall submit a
16 copy of the proposed program to the Governor of each af-
17 fected State for review and comment. The Governor may
18 solicit comments from those executives of local govern-
19 ments in the Governor’s State that the Governor, in the
20 discretion of the Governor, determines will be affected by
21 the proposed program. If any comment by such Governor
22 is received by the Secretary at least 15 days prior to sub-
23 mission to the Congress pursuant to paragraph (3) and
24 includes a request for any modification of such proposed
25 program, the Secretary shall reply in writing, granting or

1 denying such request in whole or in part, or granting such
2 request in such modified form as the Secretary considers
3 appropriate, and stating the Secretary's reasons therefor.
4 All such correspondence between the Secretary and the
5 Governor of any affected State, together with any addi-
6 tional information and data relating thereto, shall accom-
7 pany such proposed program when it is submitted to the
8 Congress.”; and

9 (3) by adding at the end the following:

10 “(i) PROJECTION OF STATE ADJACENT ZONE RE-
11 SOURCES AND STATE AND LOCAL GOVERNMENT SHARES
12 OF OCS RECEIPTS.—Concurrent with the publication of
13 the scoping notice at the beginning of the development of
14 each 5-Year Outer Continental Shelf Oil and Gas Leasing
15 Program, or as soon thereafter as possible, the Secretary
16 shall—

17 “(1) provide to each Adjacent State a current
18 estimate of proven and potential oil and gas re-
19 sources located within the State's Adjacent Zone;
20 and

21 “(2) provide to each Adjacent State, and coast-
22 al political subdivisions thereof, a best efforts projec-
23 tion of the OCS Receipts that the Secretary expects
24 will be shared with each Adjacent State, and its
25 coastal political subdivisions, using the assumption

1 that the unleased tracts within the State’s Adjacent
2 Zone are fully made available for leasing, including
3 long-term projected OCS Receipts. In addition, the
4 Secretary shall include a macroeconomic estimate of
5 the impact of such leasing on the national economy
6 and each State’s economy, including investment,
7 jobs, revenues, personal income, and other cat-
8 egories.”.

9 **SEC. 106. COORDINATION WITH ADJACENT STATES.**

10 Section 19 of the Outer Continental Shelf Lands Act
11 (43 U.S.C. 1345) is amended—

12 (1) in subsection (a) in the first sentence by in-
13 serting “, for any tract located within the Adjacent
14 State’s Adjacent Zone,” after “government”; and

15 (2) by adding at the end the following:

16 “(f)(1) No Federal agency may permit or otherwise
17 approve, without the concurrence of the Adjacent State,
18 the construction of a crude oil or petroleum products (or
19 both) pipeline within the part of the Adjacent State’s Ad-
20 jacent Zone that is withdrawn from oil and gas leasing,
21 except that such a pipeline may be approved, without such
22 Adjacent State’s concurrence, to pass through such Adja-
23 cent Zone if at least 50 percent of the production pro-
24 jected to be carried by the pipeline within its first 10 years

1 of operation is from areas of the Adjacent State's Adja-
2 cent Zone.

3 “(2) No State may prohibit the construction within
4 its Adjacent Zone or its State waters of a natural gas pipe-
5 line that will transport natural gas produced from the
6 outer Continental Shelf. However, an Adjacent State may
7 prevent a proposed natural gas pipeline landing location
8 if it proposes two alternate landing locations in the Adja-
9 cent State, acceptable to the Adjacent State, located with-
10 in 50 miles on either side of the proposed landing loca-
11 tion.”.

12 **SEC. 107. ENVIRONMENTAL STUDIES.**

13 Section 20(d) of the Outer Continental Shelf Lands
14 Act (43 U.S.C. 1346(d)) is amended—

15 (1) by inserting “(1)” after “(d)”; and

16 (2) by adding at the end the following:

17 “(2) For all programs, lease sales, leases, and
18 actions under this Act, the following shall apply re-
19 garding the application of the National Environ-
20 mental Policy Act of 1969:

21 “(A) Granting or directing lease suspen-
22 sions and the conduct of all preliminary activi-
23 ties on outer Continental Shelf tracts, including
24 seismic activities, are categorically excluded
25 from the need to prepare either an environ-

1 mental assessment or an environmental impact
2 statement, and the Secretary shall not be re-
3 quired to analyze whether any exceptions to a
4 categorical exclusion apply for activities con-
5 ducted under the authority of this Act.

6 “(B) The environmental impact statement
7 developed in support of each 5-Year Oil and
8 Gas Leasing Program provides the environ-
9 mental analysis for all lease sales to be con-
10 ducted under the program, and such sales shall
11 not be subject to further environmental anal-
12 ysis.

13 “(C) Exploration plans shall not be subject
14 to any requirement to prepare an environmental
15 impact statement, and the Secretary may find
16 that exploration plans are eligible for categor-
17 ical exclusion due to the impacts already being
18 considered within an environmental impact
19 statement or due to mitigation measures in-
20 cluded within the plan.

21 “(D) Within each OCS Planning Area,
22 after the preparation of the first development
23 and production plan environmental impact
24 statement for a leased tract within the Area, fu-
25 ture development and production plans for

1 leased tracts within the Area shall only require
2 the preparation of an environmental assessment
3 unless the most recent development and produc-
4 tion plan environmental impact statement with-
5 in the Area was finalized more than 10 years
6 prior to the date of the approval of the plan, in
7 which case an environmental impact statement
8 shall be required.”.

9 **SEC. 108. OUTER CONTINENTAL SHELF INCOMPATIBLE**
10 **USE.**

11 (a) **IN GENERAL.**—No Federal agency may permit
12 construction or operation (or both) of any facility, or des-
13 ignate or maintain a restricted transportation corridor or
14 operating area on the Federal outer Continental Shelf or
15 in State waters, that will be incompatible with, as deter-
16 mined by the Secretary of the Interior, oil and gas leasing
17 and substantially full exploration and production of tracts
18 that are geologically prospective for oil or natural gas (or
19 both).

20 (b) **EXCEPTIONS.**—Subsection (a) shall not apply to
21 any facility, transportation corridor, or operating area the
22 construction, operation, designation, or maintenance of
23 which is or will be—

1 (1) located in an area of the outer Continental
2 Shelf that is unavailable for oil and gas leasing by
3 operation of law;

4 (2) used for a military readiness activity (as de-
5 fined in section 315(f) of Public Law 107–314; 16
6 U.S.C. 703 note); or

7 (3) required in the national interest, as deter-
8 mined by the President.

9 **SEC. 109. REPURCHASE OF CERTAIN LEASES.**

10 (a) **AUTHORITY TO REPURCHASE AND CANCEL CER-**
11 **TAIN LEASES.**—The Secretary of the Interior may repur-
12 chase and cancel any Federal oil and gas, geothermal,
13 coal, oil shale, tar sands, or other mineral lease, whether
14 onshore or offshore, but not including any outer Conti-
15 nental Shelf oil and gas leases that were subject to litiga-
16 tion in the Court of Federal Claims on January 1, 2006,
17 if the Secretary finds that such lease qualifies for repur-
18 chase and cancellation under the regulations authorized
19 by this section.

20 (b) **REGULATIONS.**—Not later than 365 days after
21 the date of the enactment of this Act, the Secretary shall
22 publish a final regulation stating the conditions under
23 which a lease referred to in subsection (a) would qualify
24 for repurchase and cancellation, and the process to be fol-
25 lowed regarding such repurchase and cancellation.

1 (c) NO PREJUDICE.—This section shall not be inter-
2 preted to prejudice any other rights that the lessee would
3 have in the absence of this section.

4 **SEC. 110. OFFSITE ENVIRONMENTAL MITIGATION.**

5 Notwithstanding any other provision of law, any per-
6 son conducting activities under the Mineral Leasing Act
7 (30 U.S.C. 181 et seq.), the Geothermal Steam Act of
8 1970 (30 U.S.C. 1001 et seq.), the Mineral Leasing Act
9 for Acquired Lands (30 U.S.C. 351 et seq.), the Act of
10 March 1, 1911 (commonly known as the Weeks Law) (36
11 Stat. 961; ch. 186), the Act of May 10, 1872 (commonly
12 known as the General Mining Act of 1872) (17 Stat. 91;
13 30 U.S.C. 22 et seq.), the Act of July 31, 1947 (commonly
14 known as the Materials Act of 1947) (61 Stat. 681; 30
15 U.S.C. 601 et seq.), or the Outer Continental Shelf Lands
16 Act (43 U.S.C. 1331 et seq.), may in satisfying any miti-
17 gation requirements associated with such activities pro-
18 pose mitigation measures on a site away from the area
19 impacted, and the Secretary of the Interior shall accept
20 these proposed measures if the Secretary finds that they
21 generally achieve the purposes for which mitigation meas-
22 ures appertained.

1 **Subtitle B—Arctic National Wildlife**
2 **Refuge**

3 **SEC. 121. DEFINITIONS.**

4 In this subtitle:

5 (1) **COASTAL PLAIN.**—The term “Coastal
6 Plain” means that area described in appendix I to
7 part 37 of title 50, Code of Federal Regulations.

8 (2) **SECRETARY.**—The term “Secretary”, except
9 as otherwise provided, means the Secretary of the
10 Interior or the Secretary’s designee.

11 **SEC. 122. LEASING PROGRAM FOR LANDS WITHIN THE**
12 **COASTAL PLAIN.**

13 (a) **IN GENERAL.**—The Secretary shall take such ac-
14 tions as are necessary—

15 (1) to establish and implement, in accordance
16 with this subtitle and acting through the Director of
17 the Bureau of Land Management in consultation
18 with the Director of the United States Fish and
19 Wildlife Service, a competitive oil and gas leasing
20 program that will result in an environmentally sound
21 program for the exploration, development, and pro-
22 duction of the oil and gas resources of the Coastal
23 Plain; and

24 (2) to administer the provisions of this subtitle
25 through regulations, lease terms, conditions, restric-

1 tions, prohibitions, stipulations, and other provisions
2 that ensure the oil and gas exploration, development,
3 and production activities on the Coastal Plain will
4 result in no significant adverse effect on fish and
5 wildlife, their habitat, subsistence resources, and the
6 environment, including, in furtherance of this goal,
7 by requiring the application of the best commercially
8 available technology for oil and gas exploration, de-
9 velopment, and production to all exploration, devel-
10 opment, and production operations under this sub-
11 title in a manner that ensures the receipt of fair
12 market value by the public for the mineral resources
13 to be leased.

14 (b) REPEAL.—

15 (1) REPEAL.—Section 1003 of the Alaska Na-
16 tional Interest Lands Conservation Act (16 U.S.C.
17 3143) is repealed.

18 (2) CONFORMING AMENDMENT.—The table of
19 contents in section 1 of such Act is amended in the
20 item relating to section 1003 by striking “Prohibi-
21 tion on development” and inserting “Repealed”.

22 (c) COMPLIANCE WITH REQUIREMENTS UNDER CER-
23 TAIN OTHER LAWS.—

24 (1) COMPATIBILITY.—For purposes of the Na-
25 tional Wildlife Refuge System Administration Act of

1 1966 (16 U.S.C. 668dd et seq.), the oil and gas
2 leasing program and activities authorized by this
3 section in the Coastal Plain are deemed to be com-
4 patible with the purposes for which the Arctic Na-
5 tional Wildlife Refuge was established, and no fur-
6 ther findings or decisions are required to implement
7 this determination.

8 (2) ADEQUACY OF THE DEPARTMENT OF THE
9 INTERIOR'S LEGISLATIVE ENVIRONMENTAL IMPACT
10 STATEMENT.—The “Final Legislative Environ-
11 mental Impact Statement” (April 1987) on the
12 Coastal Plain prepared pursuant to section 1002 of
13 the Alaska National Interest Lands Conservation
14 Act (16 U.S.C. 3142) and section 102(2)(C) of the
15 National Environmental Policy Act of 1969 (42
16 U.S.C. 4332(2)(C)) is deemed to satisfy the require-
17 ments under the National Environmental Policy Act
18 of 1969 that apply with respect to prelease activities,
19 including actions authorized to be taken by the Sec-
20 retary to develop and promulgate the regulations for
21 the establishment of a leasing program authorized
22 by this subtitle before the conduct of the first lease
23 sale.

24 (3) COMPLIANCE WITH NEPA FOR OTHER AC-
25 TIONS.—Before conducting the first lease sale under

1 this subtitle, the Secretary shall prepare an environ-
2 mental impact statement under the National Envi-
3 ronmental Policy Act of 1969 with respect to the ac-
4 tions authorized by this subtitle that are not re-
5 ferred to in paragraph (2). Notwithstanding any
6 other law, the Secretary is not required to identify
7 nonleasing alternative courses of action or to analyze
8 the environmental effects of such courses of action.
9 The Secretary shall only identify a preferred action
10 for such leasing and a single leasing alternative, and
11 analyze the environmental effects and potential miti-
12 gation measures for those two alternatives. The
13 identification of the preferred action and related
14 analysis for the first lease sale under this subtitle
15 shall be completed not later than 18 months after
16 the date of enactment of this Act. The Secretary
17 shall only consider public comments that specifically
18 address the Secretary's preferred action and that are
19 filed within 20 days after publication of an environ-
20 mental analysis. Notwithstanding any other law,
21 compliance with this paragraph is deemed to satisfy
22 all requirements for the analysis and consideration
23 of the environmental effects of proposed leasing
24 under this subtitle.

1 (d) RELATIONSHIP TO STATE AND LOCAL AUTHOR-
2 ITY.—Nothing in this subtitle shall be considered to ex-
3 pand or limit State or local regulatory authority.

4 (e) SPECIAL AREAS.—

5 (1) IN GENERAL.—The Secretary, after con-
6 sultation with the State of Alaska, the city of
7 Kaktovik, and the North Slope Borough, may des-
8 ignate up to a total of 45,000 acres of the Coastal
9 Plain as a Special Area if the Secretary determines
10 that the Special Area is of such unique character
11 and interest so as to require special management
12 and regulatory protection. The Secretary shall des-
13 ignate as such a Special Area the Sadlerochit Spring
14 area, comprising approximately 4,000 acres.

15 (2) MANAGEMENT.—Each such Special Area
16 shall be managed so as to protect and preserve the
17 area's unique and diverse character, including its
18 fish, wildlife, and subsistence resource values.

19 (3) EXCLUSION FROM LEASING OR SURFACE
20 OCCUPANCY.—The Secretary may exclude any Spe-
21 cial Area from leasing. The Secretary may only lease
22 a Special Area, or any part thereof, for purposes of
23 oil and gas exploration, development, production, or
24 related activities, if there is no surface occupancy of
25 the lands comprising the Special Area.

1 (4) DIRECTIONAL DRILLING.—Notwithstanding
2 the other provisions of this subsection, the Secretary
3 may lease all or a portion of a Special Area under
4 terms that permit the use of horizontal drilling tech-
5 nology from sites on leases located outside the Spe-
6 cial Area.

7 (f) LIMITATION ON CLOSED AREAS.—The Sec-
8 retary's sole authority to close lands within the Coastal
9 Plain to oil and gas leasing and to exploration, develop-
10 ment, or production is that authority set forth in this sub-
11 title.

12 (g) REGULATIONS.—

13 (1) IN GENERAL.—The Secretary shall pre-
14 scribe such regulations as may be necessary to carry
15 out this subtitle, including rules and regulations re-
16 lating to protection of the fish and wildlife, their
17 habitat, the subsistence resources, and the environ-
18 ment of the Coastal Plain, by not later than 15
19 months after the date of enactment of this Act.

20 (2) REVISION OF REGULATIONS.—The Sec-
21 retary shall periodically review and, if appropriate,
22 revise the rules and regulations issued under sub-
23 section (a) to reflect any significant biological, envi-
24 ronmental, or engineering data that come to the Sec-
25 retary's attention.

1 **SEC. 123. LEASE SALES.**

2 (a) IN GENERAL.—Lands may be leased pursuant to
3 this subtitle to any person qualified to obtain a lease for
4 deposits of oil and gas under the Mineral Leasing Act (30
5 U.S.C. 181 et seq.).

6 (b) PROCEDURES.—The Secretary shall, by regula-
7 tion, establish procedures for—

8 (1) receipt and consideration of sealed nomina-
9 tions for any area in the Coastal Plain for inclusion
10 in, or exclusion (as provided in subsection (c)) from,
11 a lease sale;

12 (2) the holding of lease sales after such nomina-
13 tion process; and

14 (3) public notice of and comment on designa-
15 tion of areas to be included in, or excluded from, a
16 lease sale.

17 (c) LEASE SALE BIDS.—Bidding for leases under
18 this subtitle shall be by sealed competitive cash bonus bids.

19 (d) ACREAGE MINIMUM IN FIRST SALE.—In the first
20 lease sale under this subtitle, the Secretary shall offer for
21 lease those tracts the Secretary considers to have the
22 greatest potential for the discovery of hydrocarbons, tak-
23 ing into consideration nominations received pursuant to
24 subsection (b)(1), but in no case less than 200,000 acres.

25 (e) TIMING OF LEASE SALES.—The Secretary
26 shall—

1 (1) conduct the first lease sale under this sub-
2 title not later than 22 months after the date of the
3 enactment of this Act;

4 (2) evaluate the bids in such sale and issue
5 leases resulting from such sale, not later than 90
6 days after the date of the completion of such sale;
7 and

8 (3) conduct additional sales so long as sufficient
9 interest in development exists to warrant, in the Sec-
10 retary's judgment, the conduct of such sales.

11 **SEC. 124. GRANT OF LEASES BY THE SECRETARY.**

12 (a) IN GENERAL.—The Secretary may grant to the
13 highest responsible qualified bidder in a lease sale con-
14 ducted pursuant to section 123 any lands to be leased on
15 the Coastal Plain upon payment by the lessee of such
16 bonus as may be accepted by the Secretary.

17 (b) SUBSEQUENT TRANSFERS.—No lease issued
18 under this subtitle may be sold, exchanged, assigned, sub-
19 let, or otherwise transferred except with the approval of
20 the Secretary. Prior to any such approval, the Secretary
21 shall consult with, and give due consideration to the views
22 of, the Attorney General.

23 **SEC. 125. LEASE TERMS AND CONDITIONS.**

24 An oil or gas lease issued pursuant to this subtitle
25 shall—

1 (1) provide for the payment of a royalty of not
2 less than 12½ percent in amount or value of the
3 production removed or sold from the lease, as deter-
4 mined by the Secretary under the regulations appli-
5 cable to other Federal oil and gas leases;

6 (2) provide that the Secretary may close, on a
7 seasonal basis, portions of the Coastal Plain to ex-
8 ploratory drilling activities as necessary to protect
9 caribou calving areas and other species of fish and
10 wildlife;

11 (3) require that the lessee of lands within the
12 Coastal Plain shall be fully responsible and liable for
13 the reclamation of lands within the Coastal Plain
14 and any other Federal lands that are adversely af-
15 fected in connection with exploration, development,
16 production, or transportation activities conducted
17 under the lease and within the Coastal Plain by the
18 lessee or by any of the subcontractors or agents of
19 the lessee;

20 (4) provide that the lessee may not delegate or
21 convey, by contract or otherwise, the reclamation re-
22 sponsibility and liability to another person without
23 the express written approval of the Secretary;

24 (5) provide that the standard of reclamation for
25 lands required to be reclaimed under this subtitle

1 shall be, as nearly as practicable, a condition capable
2 of supporting the uses which the lands were capable
3 of supporting prior to any exploration, development,
4 or production activities, or upon application by the
5 lessee, to a higher or better use as approved by the
6 Secretary;

7 (6) provide that the lessee, its agents, and its
8 contractors use best efforts to provide a fair share,
9 as determined by the level of obligation previously
10 agreed to in the 1974 agreement implementing sec-
11 tion 29 of the Federal Agreement and Grant of
12 Right of Way for the Operation of the Trans-Alaska
13 Pipeline, of employment and contracting for Alaska
14 Natives and Alaska Native Corporations from
15 throughout the State;

16 (7) prohibit the export of oil produced under
17 the lease; and

18 (8) contain such other provisions as the Sec-
19 retary determines necessary to ensure compliance
20 with the provisions of this subtitle and the regula-
21 tions issued under this subtitle.

22 **SEC. 126. COASTAL PLAIN ENVIRONMENTAL PROTECTION.**

23 (a) NO SIGNIFICANT ADVERSE EFFECT STANDARD
24 TO GOVERN AUTHORIZED COASTAL PLAIN ACTIVITIES.—
25 The Secretary shall, consistent with the requirements of

1 section 122, administer the provisions of this subtitle
2 through regulations, lease terms, conditions, restrictions,
3 prohibitions, stipulations, and other provisions that—

4 (1) ensure the oil and gas exploration, develop-
5 ment, and production activities on the Coastal Plain
6 will result in no significant adverse effect on fish
7 and wildlife, their habitat, and the environment;

8 (2) require the application of the best commer-
9 cially available technology for oil and gas explo-
10 ration, development, and production on all new ex-
11 ploration, development, and production operations;
12 and

13 (3) ensure that the maximum amount of sur-
14 face acreage covered by production and support fa-
15 cilities, including airstrips and any areas covered by
16 gravel berms or piers for support of pipelines, does
17 not exceed 2,000 acres on the Coastal Plain.

18 (b) SITE-SPECIFIC ASSESSMENT AND MITIGATION.—
19 The Secretary shall also require, with respect to any pro-
20 posed drilling and related activities, that—

21 (1) a site-specific analysis be made of the pos-
22 sible significant adverse effects, if any, that the drill-
23 ing or related activities will have on fish and wildlife,
24 their habitat, subsistence resources, and the environ-
25 ment;

1 (2) if the analysis under paragraph (1) results
2 in a finding that a significant adverse effect prohib-
3 ited by subsection (a)(1) is likely to occur as a result
4 of the proposed drilling or related activity, a plan be
5 developed and implemented to avoid, minimize, and
6 mitigate (in that order and to the extent practicable)
7 the significant adverse effect in order to comply with
8 such subsection; and

9 (3) the development of a plan under paragraph
10 (2) shall occur after consultation with the agency or
11 agencies having jurisdiction over matters covered by
12 the plan.

13 (c) REGULATIONS TO PROTECT COASTAL PLAIN
14 FISH AND WILDLIFE RESOURCES, SUBSISTENCE USERS,
15 AND THE ENVIRONMENT.—Before implementing the leas-
16 ing program authorized by this subtitle, the Secretary
17 shall prepare and promulgate regulations, lease terms,
18 conditions, restrictions, prohibitions, stipulations, and
19 other measures designed to ensure that the activities un-
20 dertaken on the Coastal Plain under this subtitle are con-
21 ducted in a manner consistent with the purposes and envi-
22 ronmental requirements of this subtitle.

23 (d) COMPLIANCE WITH FEDERAL AND STATE ENVI-
24 RONMENTAL LAWS AND OTHER REQUIREMENTS.—The
25 proposed regulations, lease terms, conditions, restrictions,

1 prohibitions, and stipulations for the leasing program
2 under this subtitle shall require compliance with all appli-
3 cable provisions of Federal and State environmental law,
4 and shall also require the following:

5 (1) Standards at least as effective as the safety
6 and environmental mitigation measures set forth in
7 items 1 through 29 at pages 167 through 169 of the
8 “Final Legislative Environmental Impact State-
9 ment” (April 1987) on the Coastal Plain.

10 (2) Seasonal limitations on exploration, develop-
11 ment, and related activities, where necessary, to
12 avoid significant adverse effects during periods of
13 concentrated fish and wildlife breeding, denning,
14 nesting, spawning, and migration.

15 (3) That exploration activities, except for sur-
16 face geological studies, be limited to the period be-
17 tween approximately November 1 and May 1 each
18 year and that exploration activities shall be sup-
19 ported, if necessary, by ice roads, winter trails with
20 adequate snow cover, ice pads, ice airstrips, and air
21 transport methods, except that such exploration ac-
22 tivities may occur at other times if the Secretary
23 finds that such exploration will have no significant
24 adverse effect on the fish and wildlife, their habitat,
25 and the environment of the Coastal Plain.

1 (4) Design safety and construction standards
2 for all pipelines and any access and service roads,
3 that—

4 (A) minimize, to the maximum extent pos-
5 sible, adverse effects upon the passage of mi-
6 gratory species such as caribou; and

7 (B) minimize adverse effects upon the flow
8 of surface water by requiring the use of cul-
9 verts, bridges, and other structural devices.

10 (5) Prohibitions on general public access and
11 use on all pipeline access and service roads.

12 (6) Stringent reclamation and rehabilitation re-
13 quirements, consistent with the standards set forth
14 in this subtitle, requiring the removal from the
15 Coastal Plain of all oil and gas development and
16 production facilities, structures, and equipment upon
17 completion of oil and gas production operations, ex-
18 cept that the Secretary may exempt from the re-
19 quirements of this paragraph those facilities, struc-
20 tures, or equipment that the Secretary determines
21 would assist in the management of the Arctic Na-
22 tional Wildlife Refuge and that are donated to the
23 United States for that purpose.

24 (7) Appropriate prohibitions or restrictions on
25 access by all modes of transportation.

- 1 (8) Appropriate prohibitions or restrictions on
2 sand and gravel extraction.
- 3 (9) Consolidation of facility siting.
- 4 (10) Appropriate prohibitions or restrictions on
5 use of explosives.
- 6 (11) Avoidance, to the extent practicable, of
7 springs, streams, and river systems; the protection
8 of natural surface drainage patterns, wetlands, and
9 riparian habitats; and the regulation of methods or
10 techniques for developing or transporting adequate
11 supplies of water for exploratory drilling.
- 12 (12) Avoidance or minimization of air traffic-re-
13 lated disturbance to fish and wildlife.
- 14 (13) Treatment and disposal of hazardous and
15 toxic wastes, solid wastes, reserve pit fluids, drilling
16 muds and cuttings, and domestic wastewater, includ-
17 ing an annual waste management report, a haz-
18 ardous materials tracking system, and a prohibition
19 on chlorinated solvents, in accordance with applica-
20 ble Federal and State environmental law.
- 21 (14) Fuel storage and oil spill contingency plan-
22 ning.
- 23 (15) Research, monitoring, and reporting re-
24 quirements.
- 25 (16) Field crew environmental briefings.

1 (17) Avoidance of significant adverse effects
2 upon subsistence hunting, fishing, and trapping by
3 subsistence users.

4 (18) Compliance with applicable air and water
5 quality standards.

6 (19) Appropriate seasonal and safety zone des-
7 ignations around well sites, within which subsistence
8 hunting and trapping shall be limited.

9 (20) Reasonable stipulations for protection of
10 cultural and archeological resources.

11 (21) All other protective environmental stipula-
12 tions, restrictions, terms, and conditions deemed
13 necessary by the Secretary.

14 (e) CONSIDERATIONS.—In preparing and promul-
15 gating regulations, lease terms, conditions, restrictions,
16 prohibitions, and stipulations under this section, the Sec-
17 retary shall consider the following:

18 (1) The stipulations and conditions that govern
19 the National Petroleum Reserve-Alaska leasing pro-
20 gram, as set forth in the 1999 Northeast National
21 Petroleum Reserve-Alaska Final Integrated Activity
22 Plan/Environmental Impact Statement.

23 (2) The environmental protection standards
24 that governed the initial Coastal Plain seismic explo-

1 ration program under parts 37.31 to 37.33 of title
2 50, Code of Federal Regulations.

3 (3) The land use stipulations for exploratory
4 drilling on the KIC-ASRC private lands that are set
5 forth in appendix 2 of the August 9, 1983, agree-
6 ment between Arctic Slope Regional Corporation and
7 the United States.

8 (f) FACILITY CONSOLIDATION PLANNING.—

9 (1) IN GENERAL.—The Secretary shall, after
10 providing for public notice and comment, prepare
11 and update periodically a plan to govern, guide, and
12 direct the siting and construction of facilities for the
13 exploration, development, production, and transpor-
14 tation of Coastal Plain oil and gas resources.

15 (2) OBJECTIVES.—The plan shall have the fol-
16 lowing objectives:

17 (A) Avoiding unnecessary duplication of fa-
18 cilities and activities.

19 (B) Encouraging consolidation of common
20 facilities and activities.

21 (C) Locating or confining facilities and ac-
22 tivities to areas that will minimize impact on
23 fish and wildlife, their habitat, and the environ-
24 ment.

1 (D) Utilizing existing facilities wherever
2 practicable.

3 (E) Enhancing compatibility between wild-
4 life values and development activities.

5 (g) ACCESS TO PUBLIC LANDS.—The Secretary
6 shall—

7 (1) manage public lands in the Coastal Plain in
8 accordance with subsections (a) and (b) of section
9 811 of the Alaska National Interest Lands Con-
10 servation Act (16 U.S.C. 3121); and

11 (2) ensure that local residents shall have rea-
12 sonable access to public lands in the Coastal Plain
13 for traditional uses.

14 **SEC. 127. EXPEDITED JUDICIAL REVIEW.**

15 (a) FILING OF COMPLAINT.—

16 (1) DEADLINE.—Subject to paragraph (2), any
17 complaint seeking judicial review of any provision of
18 this subtitle or any action of the Secretary under
19 this subtitle shall be filed—

20 (A) except as provided in subparagraph
21 (B), within the 60-day period beginning on the
22 date of the action being challenged; or

23 (B) in the case of a complaint based solely
24 on grounds arising after such period, within 60
25 days after the complainant knew or reasonably

1 should have known of the grounds for the com-
2 plaint.

3 (2) VENUE.—Any complaint seeking judicial re-
4 view of any provision of this subtitle or any action
5 of the Secretary under this subtitle may be filed only
6 in the United States District Court for the District
7 of Columbia.

8 (3) LIMITATION ON SCOPE OF CERTAIN RE-
9 VIEW.—Judicial review of a Secretarial decision to
10 conduct a lease sale under this subtitle, including
11 the environmental analysis thereof, shall be limited
12 to whether the Secretary has complied with the
13 terms of this subtitle and shall be based upon the
14 administrative record of that decision. The Sec-
15 retary's identification of a preferred course of action
16 to enable leasing to proceed and the Secretary's
17 analysis of environmental effects under this subtitle
18 shall be presumed to be correct unless shown other-
19 wise by clear and convincing evidence to the con-
20 trary.

21 (b) LIMITATION ON OTHER REVIEW.—Actions of the
22 Secretary with respect to which review could have been
23 obtained under this section shall not be subject to judicial
24 review in any civil or criminal proceeding for enforcement.

1 **SEC. 128. FEDERAL AND STATE DISTRIBUTION OF REVE-**
2 **NUES.**

3 (a) IN GENERAL.—Notwithstanding any other provi-
4 sion of law, of the amount of adjusted bonus, rental, and
5 royalty revenues from Federal oil and gas leasing and op-
6 erations authorized under this subtitle—

7 (1) 50 percent shall be paid to the State of
8 Alaska; and

9 (2) except as provided in section 131(d), the
10 balance shall be transferred to the American-Made
11 Energy Trust Fund established in section 9512 of
12 the Internal Revenue Code of 1986 (as added by
13 title II).

14 (b) PAYMENTS TO ALASKA.—Payments to the State
15 of Alaska under this section shall be made semiannually.

16 **SEC. 129. RIGHTS-OF-WAY ACROSS THE COASTAL PLAIN.**

17 (a) IN GENERAL.—The Secretary shall issue rights-
18 of-way and easements across the Coastal Plain for the
19 transportation of oil and gas—

20 (1) except as provided in paragraph (2), under
21 section 28 of the Mineral Leasing Act (30 U.S.C.
22 185), without regard to title XI of the Alaska Na-
23 tional Interest Lands Conservation Act (30 U.S.C.
24 3161 et seq.); and

25 (2) under title XI of the Alaska National Inter-
26 est Lands Conservation Act (30 U.S.C. 3161 et

1 seq.), for access authorized by sections 1110 and
2 1111 of that Act (16 U.S.C. 3170 and 3171).

3 (b) **TERMS AND CONDITIONS.**—The Secretary shall
4 include in any right-of-way or easement issued under sub-
5 section (a) such terms and conditions as may be necessary
6 to ensure that transportation of oil and gas does not result
7 in a significant adverse effect on the fish and wildlife, sub-
8 sistence resources, their habitat, and the environment of
9 the Coastal Plain, including requirements that facilities be
10 sited or designed so as to avoid unnecessary duplication
11 of roads and pipelines.

12 (c) **REGULATIONS.**—The Secretary shall include in
13 regulations under section 122(g) provisions regarding the
14 granting of rights-of-way and easements described in sub-
15 section (a) of this section.

16 **SEC. 130. CONVEYANCE.**

17 In order to maximize Federal revenues by removing
18 clouds on title to lands and clarifying land ownership pat-
19 terns within the Coastal Plain, the Secretary, notwith-
20 standing the provisions of section 1302(h)(2) of the Alas-
21 ka National Interest Lands Conservation Act (16 U.S.C.
22 3192(h)(2)), shall convey—

23 (1) to the Kaktovik Inupiat Corporation the
24 surface estate of the lands described in paragraph 1
25 of Public Land Order 6959, to the extent necessary

1 to fulfill the Corporation's entitlement under sec-
2 tions 12 and 14 of the Alaska Native Claims Settle-
3 ment Act (43 U.S.C. 1611 and 1613) in accordance
4 with the terms and conditions of the Agreement be-
5 tween the Department of the Interior, the United
6 States Fish and Wildlife Service, the Bureau of
7 Land Management, and the Kaktovik Inupiat Cor-
8 poration effective January 22, 1993; and

9 (2) to the Arctic Slope Regional Corporation
10 the remaining subsurface estate to which it is enti-
11 tled pursuant to the August 9, 1983, agreement be-
12 tween the Arctic Slope Regional Corporation and the
13 United States of America.

14 **SEC. 131. LOCAL GOVERNMENT IMPACT AID AND COMMU-**
15 **NITY SERVICE ASSISTANCE.**

16 (a) FINANCIAL ASSISTANCE AUTHORIZED.—

17 (1) IN GENERAL.—The Secretary may use
18 amounts available from the Coastal Plain Local Gov-
19 ernment Impact Aid Assistance Fund established by
20 subsection (d) to provide timely financial assistance
21 to entities that are eligible under paragraph (2) and
22 that are directly impacted by the exploration for or
23 production of oil and gas on the Coastal Plain under
24 this subtitle.

1 (2) ELIGIBLE ENTITIES.—The North Slope
2 Borough, the city of Kaktovik, and any other bor-
3 rough, municipal subdivision, village, or other com-
4 munity in the State of Alaska that is directly im-
5 pacted by exploration for, or the production of, oil
6 or gas on the Coastal Plain under this subtitle, as
7 determined by the Secretary, shall be eligible for fi-
8 nancial assistance under this section.

9 (b) USE OF ASSISTANCE.—Financial assistance
10 under this section may be used only for—

11 (1) planning for mitigation of the potential ef-
12 fects of oil and gas exploration and development on
13 environmental, social, cultural, recreational, and sub-
14 sistence values;

15 (2) implementing mitigation plans and main-
16 taining mitigation projects;

17 (3) developing, carrying out, and maintaining
18 projects and programs that provide new or expanded
19 public facilities and services to address needs and
20 problems associated with such effects, including fire-
21 fighting, police, water, waste treatment, medivac,
22 and medical services; and

23 (4) establishment of a coordination office, by
24 the North Slope Borough, in the city of Kaktovik,
25 which shall—

1 (A) coordinate with and advise developers
2 on local conditions, impact, and history of the
3 areas utilized for development; and

4 (B) provide to the Committee on Natural
5 Resources of the House of Representatives and
6 the Committee on Energy and Natural Re-
7 sources of the Senate an annual report on the
8 status of coordination between developers and
9 the communities affected by development.

10 (e) APPLICATION.—

11 (1) IN GENERAL.—Any community that is eligi-
12 ble for assistance under this section may submit an
13 application for such assistance to the Secretary, in
14 such form and under such procedures as the Sec-
15 retary may prescribe by regulation.

16 (2) NORTH SLOPE BOROUGH COMMUNITIES.—A
17 community located in the North Slope Borough may
18 apply for assistance under this section either directly
19 to the Secretary or through the North Slope Bor-
20 ough.

21 (3) APPLICATION ASSISTANCE.—The Secretary
22 shall work closely with and assist the North Slope
23 Borough and other communities eligible for assist-
24 ance under this section in developing and submitting
25 applications for assistance under this section.

1 (d) ESTABLISHMENT OF FUND.—

2 (1) IN GENERAL.—There is established in the
3 Treasury the Coastal Plain Local Government Im-
4 pact Aid Assistance Fund.

5 (2) USE.—Amounts in the fund may be used
6 only for providing financial assistance under this
7 section.

8 (3) DEPOSITS.—Subject to paragraph (4), there
9 shall be deposited into the fund amounts received by
10 the United States as revenues derived from adjusted
11 bonus, rental, and royalty revenues from Federal oil
12 and gas leasing and operations authorized under this
13 subtitle.

14 (4) LIMITATION ON DEPOSITS.—The total
15 amount in the fund may not exceed \$11,000,000.

16 (5) INVESTMENT OF BALANCES.—The Sec-
17 retary of the Treasury shall invest amounts in the
18 fund in interest-bearing government securities.

19 (e) AUTHORIZATION OF APPROPRIATIONS.—To pro-
20 vide financial assistance under this section, there is au-
21 thorized to be appropriated to the Secretary from the
22 Coastal Plain Local Government Impact Aid Assistance
23 Fund \$5,000,000 for each fiscal year.

Subtitle C—Oil Shale

SEC. 141. OIL SHALE.

(a) FINDINGS.—The Congress finds the following:

(1) The Office of Naval Petroleum and Oil Shale Reserves at the Department of Energy has estimated that oil shale resources located on Federal lands hold 2 trillion undiscovered technically recoverable barrels of oil.

(2) Oil shale is a strategically important domestic resource that should be developed to reduce the growing dependence of the United States on politically and economically unstable sources of foreign oil imports.

(3) The development of oil shale for research and commercial development should be conducted in an environmentally sound manner, using practices that minimize impacts.

(4) Development of such strategic unconventional fuel should occur, with an emphasis on sustainability, to benefit the United States while taking into account affected States and communities.

(5) Oil shale is one of the best resources available for advancing American technology and creating American jobs.

1 (6) Oil shale will be a critically important com-
2 ponent of the Nation's transportation fuel sector in
3 particular, by providing a secure domestic source of
4 aviation fuel for both commercial and military uses.

5 (b) ADDITIONAL RESEARCH AND DEVELOPMENT
6 LEASE SALES.—The Secretary of the Interior shall hold
7 a lease sale not later than 180 days after the date of en-
8 actment of this Act offering an additional 10 parcels for
9 lease for research, development, and demonstration of oil
10 shale resources, under the terms offered in the solicitation
11 of bids for such leases published on January 15, 2009 (74
12 Fed. Reg. 2611).

13 (c) APPLICATION OF REGULATIONS.—The oil shale
14 management final rules published by the Department of
15 the Interior on November 18, 2008 (73 Fed. Reg. 69414),
16 shall apply to all commercial leasing for the management
17 of federally owned oil shale, and any associated minerals,
18 located on Federal lands.

19 (d) REDUCED PAYMENTS TO ENSURE PRODUC-
20 TION.—The Secretary of the Interior may temporarily re-
21 duce royalties, fees, rentals, bonus bids, or other payments
22 for leases of Federal lands for the development and pro-
23 duction of oil shale resources as necessary to give incen-
24 tives for and encourage development of such resources, if
25 the Secretary determines that the royalties, fees, rentals,

1 bonus bids, and other payments otherwise authorized by
2 law are hindering production of such resources.

3 **Subtitle D—Coal-to-Liquid**

4 **SEC. 151. DEVELOPMENT AND OPERATION OF FACILITIES.**

5 (a) **AUTHORITY.**—The Secretary of Defense shall de-
6 velop, construct, and operate a qualified coal-to-liquid fa-
7 cility, subject to the availability of appropriations provided
8 in advance specifically for that purpose.

9 (b) **CONSIDERATIONS.**—In carrying out subsection
10 (a), the Secretary shall consider land availability, testing
11 opportunities, and proximity to raw materials.

12 **SEC. 152. DEFINITIONS RELATING TO COAL-TO-LIQUID** 13 **FUEL AND FACILITIES.**

14 For purposes of this subtitle:

15 (1) **COAL-TO-LIQUID FUEL.**—The term “coal-to-
16 liquid fuel” means any transportation-grade liquid
17 fuel derived primarily from coal (including peat).

18 (2) **QUALIFIED COAL-TO-LIQUID FACILITY.**—
19 The term “qualified coal-to-liquid facility” means a
20 manufacturing facility that has the capacity to
21 produce at least 10,000 barrels per day of coal-to-
22 liquid fuel from a feedstock that is primarily domes-
23 tic coal (including peat and any property which al-
24 lows for the capture, transportation, or sequestration

1 of byproducts resulting from such process, including
2 carbon emissions).

3 **SEC. 153. REPEAL.**

4 Section 526 of the Energy Independence and Security
5 Act of 2007 (42 U.S.C. 17142) is repealed.

6 **Subtitle E—Nuclear**

7 **SEC. 161. FINDINGS AND POLICY.**

8 (a) FINDINGS.—The Congress finds that—

9 (1) there are 104 nuclear reactors currently op-
10 erating in the United States, providing 20 percent of
11 the electricity of the United States, slightly less than
12 the electricity generated by natural gas;

13 (2) nuclear energy is the largest provider of
14 clean, low-carbon electricity, almost 8 times larger
15 than all renewable power production combined, ex-
16 cluding hydroelectric power;

17 (3) nuclear power is responsible for 72 percent
18 of emission-free electricity production in the United
19 States and is an essential tool for greenhouse gas re-
20 duction;

21 (4) nuclear power plants virtually eliminate
22 emissions of greenhouse gases and criteria pollutants
23 associated with acid rain, smog, or ozone;

24 (5) nuclear energy supplies consistent, baseload
25 electricity, independent of environmental conditions;

1 (6) nuclear power is a safe, reliable, efficient,
2 and affordable source of energy;

3 (7) between 1960 and 1980, the Nuclear Regu-
4 latory Commission issued 169 permits to construct
5 nuclear power facilities;

6 (8) even if every nuclear power plant is granted
7 a 20-year extension, all currently operating nuclear
8 power plants will be retired by 2055;

9 (9) long lead times for nuclear power plant li-
10 censing, permitting, and construction indicate that
11 action to stimulate the nuclear power industry
12 should not be delayed;

13 (10) there are 17 combined operating license
14 applications currently pending before the Nuclear
15 Regulatory Commission for 26 new reactors in the
16 United States, with 4 applications inactive due to
17 regulatory uncertainty;

18 (11) those proposed reactors will use the latest
19 in nuclear technology for efficiency and safety, more
20 advanced than the technology of the 1960s and
21 1970s found in the reactors currently operating in
22 the United States;

23 (12) increasing nuclear power threefold will cre-
24 ate 480,000 construction jobs, 140,000 permanent

1 jobs, and \$20,000,000,000 in local, State, and Fed-
2 eral tax revenue each year;

3 (13) increasing nuclear power threefold will re-
4 duce electricity-based carbon dioxide emissions by
5 1,400,000,000 metric tons annually and will reduce
6 carbon emissions by 65 percent from current emis-
7 sions levels by 2050;

8 (14) increasing nuclear power threefold will
9 produce 320 gigawatts of electricity to power
10 237,000,000 households and constitute 52 percent of
11 the United States electricity portfolio by 2030;

12 (15) the Nuclear Waste Policy Act of 1982 re-
13 quires the Federal Government to take ownership of
14 high-level radioactive waste and spent nuclear fuel
15 and build a permanent geologic repository in which
16 to store this waste;

17 (16) the Nuclear Waste Policy Act of 1982, as
18 amended in 1987, selected the Yucca Mountain site
19 to be the sole geologic repository in which to store
20 high-level radioactive waste and spent nuclear fuel;

21 (17) the Congress reaffirmed Yucca Mountain
22 as the sole candidate site for a geologic repository in
23 2001;

24 (18) despite the foregoing laws, the Government
25 has failed to accept high-level radioactive waste and

1 spent nuclear fuel from utilities and has delayed
2 construction of the Yucca Mountain repository;

3 (19) failure to accept high-level radioactive
4 waste and spent nuclear fuel has led to more than
5 74 lawsuits filed by utilities against the Government,
6 \$1 billion in settlements being paid, and an esti-
7 mated \$16.2 billion in potential liabilities to settle
8 remaining lawsuits;

9 (20) each year the Government refuses to ac-
10 cept high-level radioactive waste and spent nuclear
11 fuel adds an estimated \$500,000,000 in additional
12 liabilities associated with future lawsuits;

13 (21) the failure of the Federal Government to
14 accept high-level radioactive waste and spent nuclear
15 fuel from utilities is a significant barrier to the fu-
16 ture development of additional nuclear power;

17 (22) the United States has 58,000 tons of radi-
18 ological material stored at more than 100 sites in 39
19 States;

20 (23) the 104 commercial nuclear reactors oper-
21 ating in the United States produce approximately
22 2,000 tons of spent nuclear fuel every year;

23 (24) the Yucca Mountain repository's capacity
24 is statutorily limited to 70,000 tons of waste but can
25 safely hold 120,000 tons;

1 (25) operators who have paid into the Nuclear
2 Waste Fund have been denied access to permanent
3 storage of radiological material as promised by the
4 Federal Government;

5 (26) permanent geologic storage capacity is a
6 finite resource on which the industry depends; and

7 (27) operators have the technical expertise to
8 develop new and more efficient processes of dis-
9 posing of new radiological material.

10 (b) STATEMENT OF POLICY.—It is the policy of the
11 United States, given the importance of making a transi-
12 tion to a clean energy, low-carbon economy, to facilitate
13 the continued development and growth of a safe and clean
14 nuclear energy industry through reductions in financial,
15 regulatory, and technical barriers to construction and op-
16 eration.

17 **SEC. 162. 200 OPERATING PERMITS BY 2040.**

18 Subject to the requirements of this subtitle and in
19 accordance with existing law, the Nuclear Regulatory
20 Commission shall issue operating permits for 200 new
21 commercial nuclear reactors, enough to triple current
22 megawatt capacity, by 2040, if there are a sufficient num-
23 ber of qualified applicants.

1 **SEC. 163. REPEAL OF OFFICE OF CIVILIAN RADIOACTIVE**
2 **WASTE MANAGEMENT.**

3 Section 304 of the Nuclear Waste Policy Act of 1982
4 (42 U.S.C. 10224) is repealed.

5 **SEC. 164. RADIOLOGICAL MATERIAL REPOSITORY.**

6 (a) **REPOSITORY REQUIRED.**—The Federal Govern-
7 ment shall site and permit at least one radiological mate-
8 rial geologic repository for the disposal of radiological ma-
9 terial.

10 (b) **YUCCA MOUNTAIN.**—

11 (1) **IN GENERAL.**—The repository site at Yucca
12 Mountain shall remain the site for the Nation's radi-
13 ological material repository unless it is determined
14 unsuitable, based on technical and scientific analysis,
15 by the Nuclear Regulatory Commission following full
16 statutory review of the Department of Energy's li-
17 cense application to construct the Yucca Mountain
18 repository.

19 (2) **APPLICATION.**—The Nuclear Regulatory
20 Commission shall continue to review the Department
21 of Energy's pending license application to construct
22 the repository at Yucca Mountain until a determina-
23 tion is made on the merits of the application.

24 (3) **DEADLINES.**—

25 (A) **SUITABILITY DETERMINATION.**—Not
26 later than 90 days after the enactment of this

1 Act, the Nuclear Regulatory Commission shall
2 make a determination regarding the suitability
3 of Yucca Mountain under paragraph (1).

4 (B) ACTION ON APPLICATION.—Not later
5 than 180 days after the enactment of this Act,
6 the Nuclear Regulatory Commission shall ap-
7 prove or deny the application under paragraph
8 (2).

9 (4) LIMITATIONS ON AMOUNT OF RADIO-
10 LOGICAL MATERIAL.—All statutory limitations on
11 the amount of radiological material that can be
12 placed in Yucca Mountain are hereby removed and
13 shall be replaced by the Nuclear Regulatory Com-
14 mission with new limits based on scientific and tech-
15 nical analysis of the full capacity of Yucca Mountain
16 for the storage of radiological material.

17 (c) ALTERNATIVE REPOSITORY.—

18 (1) IN GENERAL.—Should the Nuclear Regu-
19 latory Commission determine under subsection (b)
20 that Yucca Mountain is not a suitable location to
21 place a radiological material repository, the Sec-
22 retary shall be responsible for, not later than 1 year
23 after the date on which such determination is made,
24 locating and submitting an application for an alter-

1 native geologic repository that provides at least
2 120,000 tons of storage capacity.

3 (2) ACTION ON APPLICATION.—Not later than
4 2 years after the date on which an application is
5 submitted under paragraph (1) or (3), the Nuclear
6 Regulatory Commission shall approve or deny such
7 application.

8 (3) FURTHER APPLICATION SUBMISSIONS.—If
9 an application is denied under paragraph (2), the
10 Secretary shall submit a new application in accord-
11 ance with paragraph (1) not later than 1 year after
12 the date of such denial.

13 (4) REQUIREMENTS.—For the purposes of this
14 subtitle and the Nuclear Waste Policy Act of 1982
15 (42 U.S.C. 10101 et seq.), an alternative repository
16 permitted under this subsection shall be subject to
17 the same requirements as Yucca Mountain.

18 **SEC. 165. INDEPENDENT RADIOLOGICAL MATERIAL MAN-**
19 **AGEMENT.**

20 (a) REPORT.—Not later than 180 days after the date
21 of enactment of this Act, the Secretary of Energy shall
22 submit to Congress a report regarding the following:

23 (1) The feasibility of establishing an inde-
24 pendent radiological material management program
25 that would meet the guidelines in subsection (b).

1 (2) Legislative and regulatory action necessary
2 to phase out the fee structure contained in section
3 302 of the Nuclear Waste Policy Act of 1982 (42
4 U.S.C. 10222) in order to allow a fee structure de-
5 scribed in subsection (b)(5)(F) to be implemented if
6 a program meeting the guidelines in subsection (b)
7 is established.

8 (b) GUIDELINES.—

9 (1) IN GENERAL.—Under a program estab-
10 lished in accordance with this subsection, the Sec-
11 retary may award a contract, based on a competitive
12 bidding process, to an eligible entity to manage the
13 Nation’s activities related to one or more radiological
14 material repositories.

15 (2) ELIGIBLE ENTITY.—For the purposes of
16 this subsection, the term “eligible entity” means a
17 non-Federal organization that demonstrates the abil-
18 ity to meet the requirements of a program estab-
19 lished in accordance with this subsection.

20 (3) APPLICATION CONTENTS.—The Secretary
21 may require an eligible entity seeking to be awarded
22 a contract under a program established in accord-
23 ance with this subsection to submit to the Secretary
24 an application containing the following:

1 (A) A complete description of the fee
2 structure the eligible entity will use to fund the
3 maintenance and operation of repositories, in
4 accordance with paragraph (5)(F).

5 (B) Such other materials as the Secretary
6 may require.

7 (4) TRANSFER OF CONTROL.—The Secretary
8 may transfer to an eligible entity awarded a contract
9 under a program established in accordance with this
10 subsection control and ownership of all Nuclear Reg-
11 ulatory Commission-issued licenses, allowances, and
12 responsibilities necessary for the operation of the nu-
13 clear materials repository at Yucca Mountain.

14 (5) RESPONSIBILITIES.—The Secretary may re-
15 quire an eligible entity awarded a contract under a
16 program established in accordance with this sub-
17 section to be responsible for the following:

18 (A) Providing technical and other informa-
19 tion to the Nuclear Regulatory Commission as
20 it reviews the Department of Energy's permit
21 application for the Yucca Mountain repository.

22 (B) Seeking all other necessary regulatory
23 approvals and permits to construct and operate
24 the Yucca Mountain repository.

1 (C) Managing construction of one or more
2 radiological material repositories upon Nuclear
3 Regulatory Commission approval, including con-
4 ducting all necessary design and engineering
5 work to support construction of the repository.

6 (D) Radiological material repository oper-
7 ations.

8 (E) Undertaking all infrastructure activi-
9 ties necessary to support the construction or
10 operation of the repository or transportation to
11 the site of radiological material, including—

12 (i) safety upgrades;

13 (ii) site preparation;

14 (iii) construction of a rail line to con-
15 nect the repository site with the national
16 rail network, including any facilities to fa-
17 cilitate rail operations; and

18 (iv) construction, upgrade, acquisition,
19 or operation of electrical grids or facilities,
20 other utilities, communication facilities, ac-
21 cess roads, rail lines, and nonnuclear sup-
22 port facilities.

23 (F) Creating a fee structure for the geo-
24 logic storage of radiological material. The fees
25 may not exceed the amount necessary to main-

1 tain and operate repositories and shall be the
2 primary mechanism for accessing repositories,
3 and in setting the fees the eligible entity shall
4 take into consideration multiple variables, in-
5 cluding—

- 6 (i) volume;
- 7 (ii) toxicity;
- 8 (iii) heat load; and
- 9 (iv) repository operation costs.

10 (c) CONGRESSIONAL AUTHORIZATION REQUIRED.—

11 The Secretary may not establish an independent radio-
12 logical material management program under this section
13 unless authorized by a law enacted after the date of enact-
14 ment of this Act.

15 **SEC. 166. SPENT NUCLEAR FUEL RECYCLING.**

16 (a) PROHIBITION.—The President is prohibited from
17 blocking or hindering spent nuclear fuel recycling activi-
18 ties.

19 (b) RULEMAKING FOR LICENSING OF SPENT NU-
20 CLEAR FUEL RECYCLING FACILITIES.—Not later than 2
21 years after the date of enactment of this Act, the Chair-
22 man of the Nuclear Regulatory Commission shall complete
23 a rulemaking establishing a process for the licensing by
24 the Nuclear Regulatory Commission, under the Atomic

1 Energy Act of 1954, of facilities for the recycling of spent
2 nuclear fuel.

3 **SEC. 167. NUCLEAR FUEL SUPPLY RESERVE.**

4 (a) INVENTORY.—The Secretary of Energy shall con-
5 duct an inventory of all materials owned by the Depart-
6 ment of Energy that could, either without or with further
7 processing, be used to power commercial nuclear reactors.

8 (b) ESTABLISHMENT OF RESERVE.—The Secretary
9 shall establish a nuclear fuel supply reserve consisting of
10 materials identified as available for such purposes from
11 the inventory conducted under subsection (a). The Sec-
12 retary shall establish appropriate procedures to ensure
13 that the reserve can protect United States energy pro-
14 ducers from shortages of nuclear fuel.

15 (c) PLAN.—The Secretary shall transmit to the Con-
16 gress a long-term plan for introducing nuclear fuel sup-
17 plies from the reserve into the market.

18 **SEC. 168. PUBLIC HEALTH AND SAFETY.**

19 Nothing in this title shall supersede, mitigate, detract
20 from, or in any way decrease the Nuclear Regulatory Com-
21 mission's ability to maintain the highest possible levels of
22 public health and safety standards, consistent with the
23 provisions of the Atomic Energy Act of 1954. No authority
24 granted by this title shall be executed in a manner that

1 jeopardizes, minimizes, reduces, or lessens public health
2 and safety standards.

3 **SEC. 169. STREAMLINING COMBINED CONSTRUCTION AND**
4 **OPERATING LICENSE.**

5 (a) IN GENERAL.—The Nuclear Regulatory Commis-
6 sion shall establish and implement an expedited procedure
7 for issuing a Combined Construction and Operating Li-
8 cense.

9 (b) QUALIFICATIONS.—To qualify for the expedited
10 procedure under this section, an applicant shall—

11 (1) apply for construction of a reactor based on
12 a design certified (or provisionally certified under
13 section 170) by the Nuclear Regulatory Commission;

14 (2) construct the new reactor on or adjacent to
15 a site where an operating nuclear power plant al-
16 ready exists;

17 (3) not be subject to a Nuclear Regulatory
18 Commission order to modify, suspend, or revoke a li-
19 cense under section 2.202 of title 10, Code of Fed-
20 eral Regulations; and

21 (4) submit a complete Combined Construction
22 and Operating License application that is docketed
23 by the Commission.

24 (c) EXPEDITED PROCEDURE.—With respect to a li-
25 cense for which the applicant has satisfied the require-

1 ments of subsection (b) and seeks expedited consideration,
2 the Nuclear Regulatory Commission shall follow the fol-
3 lowing procedures:

4 (1) Undertake an expedited environmental re-
5 view process and issue a draft environmental impact
6 statement not later than 12 months after the appli-
7 cation is accepted for docketing.

8 (2) Begin public licensing hearings when a
9 draft environmental impact statement has been
10 issued, and complete any such hearings and related
11 processes not later than 24 months after accepting
12 for docketing the expedited Combined Construction
13 and Operating License application.

14 (3) Complete the technical review process and
15 issue the Safety Evaluation Report and the final en-
16 vironmental impact statement not later than 18
17 months after the application is accepted for dock-
18 eting.

19 (4) Make a final decision on whether to issue
20 the Combined Construction and Operating License
21 not later than 25 months after docketing the appli-
22 cation.

23 (d) GOALS.—The Chairman of the Nuclear Regu-
24 latory Commission shall present recommendations to Con-
25 gress not later than 90 days after the date of enactment

1 of this Act for procedures that would further facilitate the
2 licensing of new nuclear reactors in a timely manner.

3 **SEC. 170. REACTOR DESIGN CERTIFICATION.**

4 (a) PROVISIONAL CERTIFICATION.—

5 (1) AUTHORITY.—The Nuclear Regulatory
6 Commission may provide to an applicant a provi-
7 sional certification of a proposed nuclear reactor de-
8 sign.

9 (2) EFFECT OF PROVISIONAL CERTIFI-
10 CATION.—Approval of a provisional design certifi-
11 cation under this subsection shall not eliminate, re-
12 duce, or otherwise affect any requirement for reactor
13 design approval or certification by the Nuclear Reg-
14 ulatory Commission or any other agency under Fed-
15 eral law.

16 (3) TIMING.—

17 (A) IN GENERAL.—Except as provided in
18 subparagraph (B), a provisional certification
19 shall be provided or denied under this sub-
20 section not later than 60 days after the date of
21 application therefor.

22 (B) EXTENSION.—The Nuclear Regulatory
23 Commission may extend the time period under
24 subparagraph (A) for an additional 30 days if
25 necessary to enable certification.

1 (4) CRITERIA.—In determining whether to ap-
2 prove a provisional certification application under
3 this subsection, the Nuclear Regulatory Commission
4 shall consider whether the proposed design—

5 (A) is based on existing and commercially
6 proven technology;

7 (B) has been approved by internationally
8 recognized regulators; and

9 (C) is safely operating or under construc-
10 tion in other nations.

11 (5) SUPPLEMENTAL INFORMATION.—An appli-
12 cation for provisional certification under this sub-
13 section may include supplemental information pro-
14 vided by potential future applicants for approval of
15 the same or a similar design.

16 (b) EXPEDITED CERTIFICATION PROCESS.—Not
17 later than one year after the date of enactment of this
18 Act, the Chairman of the Nuclear Regulatory Commission
19 shall develop and submit to the Congress an expedited
20 process for certifying reactor designs, including those de-
21 signs under consideration for certification by the Commis-
22 sion on the date of enactment of this Act, that signifi-
23 cantly reduces the time necessary to achieve such certifi-
24 cation.

1 **SEC. 171. TECHNOLOGY-NEUTRAL PLANT DESIGN SPECI-**
2 **FICATIONS.**

3 Not later than one year after the date of enactment
4 of this Act, the Chairman of the Nuclear Regulatory Com-
5 mission shall submit to the Congress a report regarding
6 recommendations for the development of technology-neu-
7 tral plant design specifications.

8 **SEC. 172. ADDITIONAL FUNDING AND PERSONNEL RE-**
9 **SOURCES.**

10 Not later than 90 days after the date of enactment
11 of this Act, the Chairman of the Nuclear Regulatory Com-
12 mission shall transmit to the Congress a request for such
13 additional funding and personnel resources as are nec-
14 essary to carry out sections 169 through 171 without de-
15 laying consideration of applications for Combined Con-
16 struction and Operating Licenses or reactor design certifi-
17 cations not subject to expedited procedures under this
18 title.

19 **SEC. 173. NATIONAL NUCLEAR ENERGY COUNCIL.**

20 (a) IN GENERAL.—

21 (1) The Secretary of Energy shall establish a
22 National Nuclear Energy Council (in this section re-
23 ferred to as the “Council”).

24 (2) The Council shall be subject to the require-
25 ments of the Federal Advisory Committee Act (5
26 U.S.C. App.).

1 (b) PURPOSE.—The Council—

2 (1) shall serve in an advisory capacity to the
3 Secretary regarding nuclear energy on matters sub-
4 mitted to the Council by the Secretary;

5 (2) shall advise, inform, and make rec-
6 ommendations to the Secretary with respect to any
7 matter relating to nuclear energy;

8 (3) shall help nuclear energy-related investors
9 to navigate the Federal bureaucracy to efficiently
10 bring their products and services to the marketplace;
11 and

12 (4) may not participate in any research and de-
13 velopment or commercialization activities.

14 (c) MEMBERSHIP AND ORGANIZATION.—

15 (1) The members of the Council shall be ap-
16 pointed by the Secretary.

17 (2) The Council may establish such study and
18 administrative committees as it considers appro-
19 priate.

20 **SEC. 174. NEXT GENERATION NUCLEAR PLANT.**

21 The Secretary of Energy and the Chairman of the
22 Nuclear Regulatory Commission shall review the Next
23 Generation Nuclear Plant Licensing Strategy report sub-
24 mitted to Congress in August 2008, as required by section
25 644 of the Energy Policy Act of 2005 (42 U.S.C. 16024),

1 with the purpose of reevaluating and significantly accel-
2 erating the Next Generation Nuclear Power Plant sched-
3 ule. Not later than 180 days after the date of enactment
4 of this Act, the Secretary shall submit to the Congress
5 a report including a revised schedule and funding require-
6 ments that would allow for program completion as near
7 as is possible to the date that is 5 years after the date
8 of enactment of this Act.

9 **SEC. 175. URANIUM MINING ON FEDERAL LANDS.**

10 The Secretary of the Interior may not use the Fed-
11 eral Land Policy and Management Act of 1976 (43 U.S.C.
12 1701 et seq.) to prevent uranium mining from taking place
13 on Federal lands unless the Secretary makes findings ex-
14 plaining the reason for such prevention. No Federal agen-
15 cy may collect additional leasing fees that have not been
16 authorized to be collected before the date of enactment
17 of this Act to mine uranium on Federal lands. Any fees
18 collected in association with commercial uranium mining
19 on Federal lands that should be applied for remediation
20 purposes shall only be applied to the remediation of sites
21 that incurred damage as a result of commercial nuclear
22 activities. Such fees shall not be applied to the remediation
23 of any sites that incurred damage as a result of Govern-
24 ment or Government-sponsored activities.

1 **SEC. 176. SMALL AND MODULAR REACTOR LICENSING.**

2 (a) REPORT.—Not later than 90 days after the date
3 of enactment of this Act, the Chairman of the Nuclear
4 Regulatory Commission shall transmit to the Congress a
5 report containing recommendations, including the per-
6 sonnel and resource requirements necessary to implement
7 the recommendations, for streamlined licensing procedures
8 for small and modular nuclear reactors.

9 (b) REGULATIONS.—Not later than one year after the
10 date of enactment of this Act, the Chairman of the Nu-
11 clear Regulatory Commission shall promulgate regulations
12 to implement the recommendations transmitted under
13 subsection (a).

14 **SEC. 177. LIMITATION ON REGULATORY TIME FRAME.**

15 In establishing standards for or otherwise regulating
16 the storage of radioactive material under section 121(a)
17 of the Nuclear Waste Policy Act of 1982 (42 U.S.C.
18 10141(a)) or any other Federal law, the Administrator of
19 the Environmental Protection Agency may not consider
20 environmental effects that could occur more than 10,000
21 years after the date of such regulatory action.

22 **SEC. 178. DEFINITION.**

23 In this subtitle, the term “radiological material”
24 means radioactive material that is a byproduct of the pro-
25 duction of nuclear power, including high-level nuclear
26 waste and spent nuclear fuel, as those terms are defined

1 in section 2 of the Nuclear Waste Policy Act of 1982 (42
2 U.S.C. 10101), but not including low-level radiological
3 material as that term is defined in such section.

4 **TITLE II—AMERICAN-MADE**
5 **ENERGY TRUST FUND**

6 **SEC. 201. ESTABLISHMENT OF AMERICAN-MADE ENERGY**
7 **TRUST FUND.**

8 (a) CREATION OF TRUST FUND.—Subchapter A of
9 chapter 98 of the Internal Revenue Code of 1986 is
10 amended by inserting at the end the following new section:

11 **“SEC. 9512. AMERICAN-MADE ENERGY TRUST FUND.**

12 “(a) ESTABLISHMENT OF TRUST FUND.—There is
13 established in the Treasury of the United States a trust
14 fund to be known as the American-Made Energy Trust
15 Fund, consisting of such amounts as may be appropriated
16 or credited to the American-Made Energy Trust Fund as
17 provided in this section.

18 “(b) TRANSFERS TO TRUST FUND.—To the extent
19 provided by appropriations Acts, there shall be appro-
20 priated to the American-Made Energy Trust Fund—

21 “(1) the amounts required to be transferred
22 under section 128 of A Roadmap for America’s En-
23 ergy Future;

24 “(2) all amounts received by the United States
25 as bonus bids, rents, and royalties for oil and gas

1 leases of the outer Continental Shelf awarded after
2 the date of the enactment of A Roadmap for Amer-
3 ica's Energy Future that are not otherwise required
4 by law to be paid by the United States; and

5 “(3) all amounts received by the United States
6 as bonus bids, rents, and royalties for oil shale
7 leases of Federal lands awarded after the date of the
8 enactment of A Roadmap for America's Energy Fu-
9 ture.

10 “(c) EXPENDITURES FROM AMERICAN-MADE EN-
11 ERGY TRUST FUND.—As provided by appropriations Acts,
12 amounts in the American-Made Energy Trust Fund shall
13 be available in any year to carry out section 301 of A
14 Roadmap for America's Energy Future.”.

15 (b) CLERICAL AMENDMENT.—The table of sections
16 for subchapter A of chapter 98 of such Code is amended
17 by inserting at the end the following new item:

“Sec. 9512. American-Made Energy Trust Fund.”.

1 **TITLE III—REVERSE AUCTION**
2 **MECHANISM FOR RENEW-**
3 **ABLE ENERGY GENERATION**
4 **AND FOR RENEWABLE FUEL**
5 **PRODUCTION**

6 **SEC. 301. REVERSE AUCTION MECHANISM FOR RENEW-**
7 **ABLE ENERGY GENERATION.**

8 (a) IN GENERAL.—The Secretary shall establish a re-
9 verse auction program to award funds from the American-
10 Made Energy Trust Fund to eligible entities to generate
11 an amount of electric energy.

12 (b) REVERSE AUCTION AUTHORITY.—

13 (1) IN GENERAL.—The Secretary shall establish
14 within the Department of Energy a Reverse Auction
15 Authority to conduct reverse auctions under this sec-
16 tion.

17 (2) DIRECTOR.—The Secretary shall appoint a
18 Director to serve as head of the Authority.

19 (c) REVERSE AUCTIONS.—

20 (1) FREQUENCY.—Subject to amounts available
21 in the American-Made Energy Trust Fund (includ-
22 ing any amounts not obligated in the previous cal-
23 endar year), the Director shall conduct a minimum
24 of 2 reverse auctions per calendar year in each geo-
25 graphic region established under paragraph (2).

1 (2) REGIONS.—The Secretary shall establish
2 geographic regions that are contiguous with the
3 Electric Power Markets identified by the Federal
4 Energy Regulatory Commission, and shall ensure
5 that funds awarded under this section are awarded
6 for qualified renewable energy facilities located
7 across those regions.

8 (3) BIDS.—In any reverse auction under this
9 section, bids shall describe the amount of electric en-
10 ergy to be generated by the qualified renewable en-
11 ergy facility and the price per megawatt hour of
12 electric energy that will be generated by such facil-
13 ity.

14 (4) DEPOSIT.—

15 (A) IN GENERAL.—At the time of entering
16 a bid in a reverse auction under this section, an
17 eligible entity shall provide to the Director a de-
18 posit of, as determined by the Director, an ap-
19 propriate amount per kilowatt hour of elec-
20 tricity to be generated by the qualified renew-
21 able energy facility for which the eligible entity
22 is entering the bid.

23 (B) REFUND.—The Director shall refund a
24 deposit provided under subparagraph (A)—

1 (i) for an eligible entity that is not se-
2 lected for an award of funds as a result of
3 the bid for which the deposit was made, at
4 the time the Director notifies the eligible
5 entity selected for an award of such selec-
6 tion; and

7 (ii) for an eligible entity selected for
8 an award of funds as a result of the bid
9 for which the deposit was made, except as
10 provided in subparagraph (C), at the time
11 the facility for which the eligible entity en-
12 tered the bid begins operation.

13 (C) FORFEIT.—If a facility for which
14 funds are awarded is not in operation by the
15 deadline for operation under subsection (d)(3),
16 the eligible entity shall forfeit the deposit pro-
17 vided under subparagraph (A).

18 (5) RESERVE PRICE.—

19 (A) IN GENERAL.—Before conducting a re-
20 verse auction under this section, the Director
21 shall set a reserve price which shall be a min-
22 imum bid above which no bid may win the auc-
23 tion.

24 (B) CONFIDENTIALITY.—The Director
25 shall ensure that a reserve price set under this

1 paragraph remains confidential until 5 years
2 after the date of the auction to which the re-
3 serve price applies.

4 (6) SELECTION OF ELIGIBLE ENTITIES.—

5 (A) IN GENERAL.—In determining eligible
6 entities to which to award funds in any reverse
7 auction under this section, the Director shall
8 take into consideration—

9 (i) bids that incorporate the lowest bid
10 price per megawatt hour of electric energy;
11 and

12 (ii) existing subsidies and other sup-
13 port received by an eligible entity for the
14 qualified renewable energy facility.

15 (B) MAXIMUM PERCENTAGES.—The Direc-
16 tor shall ensure that, measured on a 5-year roll-
17 ing average, of funds awarded under this sec-
18 tion—

19 (i) not more than 60 percent are
20 awarded for one type of renewable energy
21 source; and

22 (ii) not more than 90 percent are
23 awarded for any combination of 2 types of
24 renewable energy sources.

25 (7) CATEGORIES OF GENERATING CAPACITY.—

1 (A) ALLOCATION.—Subject to subpara-
2 graph (B), in each reverse auction conducted
3 under this section, funds shall be allocated as
4 follows:

5 (i) 25 percent of the funds shall be
6 awarded for the generation of electric en-
7 ergy by qualified renewable energy facili-
8 ties that have a small generating capacity.

9 (ii) 25 percent of the funds shall be
10 awarded for the generation of electric en-
11 ergy by qualified renewable energy facili-
12 ties that have a mid-sized generating ca-
13 pacity.

14 (iii) 50 percent of the funds shall be
15 awarded for the generation of electric en-
16 ergy by qualified renewable energy facili-
17 ties that have a large generating capacity.

18 (B) INSUFFICIENT FUNDS.—If the Sec-
19 retary determines that the amount of funds
20 available in any calendar year in the American-
21 Made Energy Trust Fund (including any
22 amounts not obligated in the previous calendar
23 year) are insufficient to provide adequate fund-
24 ing for each allocation described in clauses (i),
25 (ii), and (iii) of subparagraph (A), the Sec-

1 retary may reduce or eliminate any allocation
2 requirement under such subparagraph.

3 (C) DETERMINATION BY SECRETARY.—

4 With respect to the generating capacity of a
5 qualified renewable energy facility, the Sec-
6 retary shall determine what qualifies as a small,
7 mid-sized, and large generating capacity for
8 purposes of this paragraph.

9 (8) STANDARD AMOUNTS OF ELECTRIC EN-
10 ERGY.—In each reverse auction under this section,
11 the Director shall determine standard amounts of
12 electric energy that eligible entities may bid on as
13 well as the time allotted to generate such an amount
14 of electric energy.

15 (9) CONFIDENTIALITY.—Information regarding
16 the bid price of an eligible entity selected for an
17 award of funds pursuant to a reverse auction under
18 this section shall remain confidential until the initial
19 award of funds to such eligible entity is made.

20 (10) INFORMATION REGARDING AUCTIONS.—
21 Before conducting each reverse auction under this
22 section, the Director shall make publicly available in-
23 formation regarding such reverse auction, includ-
24 ing—

1 (A) standard amounts of electric energy
2 described in paragraph (7) to be auctioned; and

3 (B) allocations described in paragraph (6)
4 for such auction.

5 (d) AWARD OF FUNDS.—

6 (1) CONTRACTS FOR GENERATION.—

7 (A) IN GENERAL.—In order to receive an
8 award of funds pursuant to a reverse auction
9 under this section, an eligible entity selected for
10 such award of funds shall enter into a contract
11 with the Director delineating the terms of the
12 award of funds.

13 (B) CONTRACT TERMS.—The Director
14 shall include in a contract entered into under
15 this paragraph the following:

16 (i) The number of megawatts per year
17 on which the contract is based.

18 (ii) A provision allowing for credits to
19 be awarded for the production of energy in
20 excess of the amount specified in the con-
21 tract pursuant to clause (i), which may be
22 carried over, for not more than 2 consecu-
23 tive years, for use in years in which the
24 production of energy is less than that re-

1 quired under the contract pursuant to
2 clause (i).

3 (iii) Any other provisions the Director
4 determines appropriate.

5 (C) TERMINATION.—In addition to any
6 other terms regarding termination included in a
7 contract under subparagraph (B), the Director
8 may terminate a contract under this paragraph
9 if the eligible entity fails to generate the num-
10 ber of megawatts of electric energy per year re-
11 quired under subparagraph (B)(i) for a period
12 of 4 consecutive years.

13 (2) LIMITATION ON DISBURSAL.—The Director
14 may disburse funds to an eligible entity only for the
15 amount of electric energy generated under the con-
16 tract entered into under paragraph (3) up to the
17 amount specified pursuant to paragraph (1)(B)(i)
18 for each year in which the contract is in effect.

19 (3) OPERATION REQUIREMENT.—

20 (A) IN GENERAL.—Except as provided in
21 subparagraph (B), the Director shall make an
22 award of funds to an eligible entity contingent
23 on the qualified renewable energy facility being
24 in operation not later than 18 months after the

1 eligible entity is selected for an award of funds
2 under this section.

3 (B) EXTENSION.—The Director may grant
4 an eligible entity a one-time 6-month extension
5 of the deadline for operation under subpara-
6 graph (A) with respect to a qualified renewable
7 energy facility if the eligible entity dem-
8 onstrates, to the satisfaction of the Director,
9 that operation of such facility is delayed due to
10 regulatory constraints beyond the control of
11 such eligible entity. Extensions under this sub-
12 paragraph may not be granted for delays due to
13 lack of financing or delayed equipment delivery.

14 (e) PENALTIES.—The Secretary shall determine pen-
15 alties for violations of this section, which may include fines
16 or bans from participating in reverse auctions under this
17 section.

18 (f) TREATMENT OF FUNDS.—Amounts awarded to
19 an eligible entity under subsection (d) shall not be includ-
20 ible in gross income for purposes of the Internal Revenue
21 Code of 1986.

22 (g) DENIAL OF DOUBLE BENEFIT.—

23 (1) BASIS.—For purposes of the Internal Rev-
24 enue Code of 1986, the basis of a renewable energy
25 facility for which funds are awarded to an eligible

1 entity under this section shall be reduced by the
2 amount of such award.

3 (2) TREATMENT AS QUALIFIED FACILITY.—A
4 renewable energy facility for which funds are award-
5 ed to an eligible entity under this section shall not
6 be treated as a qualified facility for purposes of sec-
7 tion 45 of the Internal Revenue Code of 1986 (26
8 U.S.C. 45).

9 (3) TREATMENT AS ENERGY PROPERTY.—

10 (A) IN GENERAL.—A renewable energy fa-
11 cility for which funds are awarded to an eligible
12 entity under this section shall not be treated as
13 an energy property for purposes of section 48
14 of the Internal Revenue Code of 1986 (26
15 U.S.C. 48).

16 (B) LIMITATION ON AWARD OF FUNDS.—
17 The Director may not award funds under this
18 section for a renewable energy facility for which
19 a credit under section 48 of the Internal Rev-
20 enue Code of 1986 (26 U.S.C. 48) has been de-
21 termined.

22 (4) PARTICIPATION IN FEDERAL LOAN GUAR-
23 ANTEE PROGRAMS.—An eligible entity to which
24 funds are awarded under this section for a qualified
25 renewable energy facility may not, for the purposes

1 of such facility, participate in a Federal loan guar-
2 antee program.

3 (5) COORDINATION WITH OTHER FEDERAL
4 SUBSIDIES.—

5 (A) CONTRACT AMOUNT.—A contract for
6 generation under subsection (d)(1) shall be for
7 the amount of the winning bid for the specified
8 amount of electric energy minus the amount of
9 any other Federal subsidy received by the eligi-
10 ble entity for the construction, development, or
11 operation of the qualified renewable energy fa-
12 cility before funds are awarded under sub-
13 section (d).

14 (B) REGULATIONS.—Notwithstanding sub-
15 section (h), not later than one year after the
16 date of enactment of this Act, the Secretary
17 shall promulgate regulations to carry out this
18 paragraph.

19 (h) DEADLINE FOR REGULATIONS.—Not later than
20 180 days after the date of enactment of this Act, the Sec-
21 retary shall promulgate regulations to carry out this sec-
22 tion.

23 (i) DEFINITIONS.—In this section:

24 (1) AMERICAN-MADE ENERGY TRUST FUND.—

25 The term “American-Made Energy Trust Fund”

1 means the trust fund established in section 9512 of
2 the Internal Revenue Code of 1986 (as added by
3 title II).

4 (2) AUTHORITY.—The term “Authority” means
5 the Reverse Auction Authority established under
6 subsection (b).

7 (3) DIRECTOR.—The term “Director” means
8 the Director of the Authority.

9 (4) ELIGIBLE ENTITY.—The term “eligible enti-
10 ty” means an owner or operator of a qualified re-
11 newable energy facility that, with respect to such fa-
12 cility—

13 (A) is not participating in a Federal loan
14 guarantee program; and

15 (B) has a power purchase agreement in
16 place at the time of the reverse auction.

17 (5) OPERATION.—The term “operation”, with
18 respect to a renewable energy facility, means that—

19 (A) such facility is generating electric en-
20 ergy;

21 (B) such facility is transmitting electric
22 energy onto the electric power grid; and

23 (C) electric energy generated by such facil-
24 ity is being sold to one or more electric utilities.

1 (6) SECRETARY.—The term “Secretary” means
2 the Secretary of Energy.

3 (7) RENEWABLE ENERGY.—The term “renew-
4 able energy” has the meaning given such term in
5 section 203(b) of the Energy Policy Act of 2005 (42
6 U.S.C. 15852(b)).

7 (8) RENEWABLE ENERGY FACILITY.—The term
8 “renewable energy facility” means a facility—

9 (A) for the generation of electric energy
10 and the transmission of such electric energy
11 onto the electric power grid; and

12 (B) that generates such electric energy
13 from a renewable energy source.

14 (9) QUALIFIED RENEWABLE ENERGY FACIL-
15 ITY.—The term “qualified renewable energy facility”
16 means a renewable energy facility for which the
17 owner or operator demonstrates, to the satisfaction
18 of the Director, the following:

19 (A) Competence of the owner or operator
20 with respect to the generation of electric energy
21 from the renewable energy source used by such
22 facility.

23 (B) Evidence that the renewable energy
24 generating technology used by such facility can
25 be used on a commercial scale.

1 (C) Any additional criteria the Secretary
2 determines appropriate.

3 **TITLE IV—PROHIBITION OF CON-**
4 **SIDERATION OF GREEN-**
5 **HOUSE GAS**

6 **SEC. 401. CLEAN AIR ACT REGULATION.**

7 The Clean Air Act (42 U.S.C. 7401) is amended by
8 inserting after section 329 the following:

9 **“SEC. 330. PROHIBITION OF REGULATION OF GREENHOUSE**
10 **GAS.**

11 “(a) DEFINITION OF GREENHOUSE GAS.—In this
12 section, the term ‘greenhouse gas’ means—

13 “(1) carbon dioxide;

14 “(2) methane;

15 “(3) nitrous oxide;

16 “(4) a hydrofluorocarbon;

17 “(5) a perfluorocarbon; or

18 “(6) sulfur hexafluoride.

19 “(b) REGULATION OF GREENHOUSE GAS.—Nothing
20 in this Act may be construed to require or permit the regu-
21 lation of a greenhouse gas for climate change purposes.”.

22 **SEC. 402. ENDANGERED SPECIES ACT REGULATION.**

23 (a) PROHIBITION OF CONSIDERATION OF IMPACT OF
24 GREENHOUSE GAS.—The Endangered Species Act of

1 1973 (16 U.S.C. 1531 et seq.) is amended by adding at
2 the end the following:

3 **“SEC. 19. PROHIBITION OF CONSIDERATION OF IMPACT OF**
4 **GREENHOUSE GAS.**

5 “(a) DEFINITION OF GREENHOUSE GAS.—In this
6 section, the term ‘greenhouse gas’ means—

7 “(1) carbon dioxide;

8 “(2) methane;

9 “(3) nitrous oxide;

10 “(4) a hydrofluorocarbon;

11 “(5) a perfluorocarbon; or

12 “(6) sulfur hexafluoride.

13 “(b) IMPACT OF GREENHOUSE GAS.—The climate
14 change-related impact of a greenhouse gas on any species
15 of fish, wildlife, or plant shall not be considered for any
16 purpose in the implementation of this Act.”.

17 (b) CONFORMING AMENDMENT.—The table of con-
18 tents of the Endangered Species Act of 1973 (16 U.S.C.
19 1531 note) is amended by adding at the end the following:

“Sec. 18. Annual cost analysis by the Fish and Wildlife Service.

“Sec. 19. Prohibition of consideration of impact of greenhouse gas.”.

○

CHARRTS No.: HEC-01-001
Hearing Date: June 03, 2011
Committee: HEC
Member: Congressman Whitfield
Witness: Mr. Hicks
Question: #1

Fischer-Tropsch plants

Question: In your written statement you assert that Fischer-Tropsch plants require "enormous amounts of biomass." Can you provide a comparison of prospective biofuels plants, including Fischer-Tropsch plants, fermentation facilities, algae plants, camelina plants and others, including their projected feedstock inputs?

Answer: To make the comparisons on the same basis, one can compare various pathways, including Fischer-Tropsch (F-T) using coal, biomass, and hydroprocessing using algae, camelina, or other feedstocks. Algae and camelina are feedstocks that can be utilized to make different kinds of fuel. Fermentation is a pathway, but in the context of tactical fuel it is an intermediate step, not the total process.

See the table below for comparison:

Feedstock	Process	Lbs feedstock / gal of diesel or jet fuel	Gallons of diesel or jet fuel / Acre
Coal	Fischer Tropsch	18.26	N/A
Herbaceous biomass	Fischer Tropsch	70	132
Woody Biomass	Fischer Tropsch	87	Varies Widely
Municipal Solid Waste	Mixed Alcohol Oligomerization (Alcohol to Jet Fuel)	~384	N/A
Camelina oil	Hydroprocessing	9	126
Jatropha	Hydroprocessing	9	146
Algal Oil	Hydroprocessing	9	840-4780
Algae	Bioethanol to Jet Fuel	N/A	3350
Energy Crops (Herbaceous Biomass)	Cellulosic-derived Alcohol to Jet Fuel	39	Varies
Agricultural Residue	Cellulosic-derived Alcohol to Jet Fuel	45	Varies
Wood Waste / Mill Residue (Woody Biomass)	Cellulosic-derived Alcohol to Jet Fuel	40	N/A

An 80,000 barrel/day F-T plant using coal would require 39,500 tons per day of bituminous coal, or 79,000 tons per day of lignite. Thirty-three such plants producing 2.5 MM barrels per day of fuel would require 475 million tons of bituminous coal or 960 million tons of lignite (DOE Coal to F-T Liquids Fact Sheet, 2008). This represents a close to 50% increase in coal consumption. While it is clear that the US possesses large coal reserves, the ability to meet a large increase in consumption is uncertain (NAS, 2009). It is also clear that coal is not a renewable resource, and shifting from dependence on petroleum to dependence on coal will only create a future energy crisis as coal reserves reach peak production.

References

- James Bartis, Frank Camm, and David Ortiz (2008), "Producing Liquid Fuels from Coal: Prospects and Policy Issues." Santa Monica, CA: RAND Corporation.
- Chisit, Yusuf (2007), "Biodiesel from Microalgae," Biotechnology Advances, Feb.
- DOE Office of Petroleum Reserves (2008), "Fact Sheet: Coal to F-T Liquids Technology." Accessed 28 Jun, 2011,
http://fossil.energy.gov/programs/reserves/npr/Coal_to_FT_Liquids_Fact_Sheet.pdf
- DOE/NETL (2006), "Emerging Issues for Fossil Energy and Water," DOE/NETL-2006/1233.
- EPA (2010), "RFS2 Regulatory Impact Analysis," EIA-420-R-10-006. Feb.
- Kristina M. Weyer, Daniel R. Bush, Al Darzins, and Bryan D. Willson (2010) "Theoretical Maximum Algal Oil Production," Bioenergy Research. 3:204–213.
- Voigt Heaton et al (2004), "A quantitative review comparing the yields of two candidate C-4 perennial biomass crops in relation to nitrogen, temperature and water." Biomass and Bioenergy. 27: 21–30.
- "Jatropha (2011)," Petroleum Conservation Research Association. Accessed 30 Jun ,2011,
<http://www.pcra-biofuels.org/jatropha.htm>
- NAS (2009), Liquid Transportation Fuels from Coal and Biomass: Technological Status, Costs, and Environmental Impacts. National Academies Press, Washington, D.C.
- Thomas Tarka et al (2009), "Affordable, Low-Carbon Diesel Fuel from Coal and Biomass," National Energy Technology Laboratory. Report DOE/NETL-2009/1349, January 14.
- Zorlein, Carolina (2011), "Miniature Factories From the Sea," Linde Technology. 10:1.

CHARRTS No.: HEC-01-002
Hearing Date: June 03, 2011
Committee: HEC
Member: Congressman Whitfield
Witness: Mr. Hicks
Question: #2

Fischer-Tropsch plants

Question: In your written statement you assert that Fischer-Tropsch plants require "enormous quantities of water." Can you provide a comparison of prospective biofuels plants, including Fischer-Tropsch plants, fermentation facilities, algae plants, camelina plants and others, including their anticipated water needs, including the water associated with the production of any energy crops that would be used as feedstocks?

Answer: The following is a comparison of water consumption of coal to liquid (CTL) plants vs. biofuel plants (including water associated with energy crop cultivation). For coal to liquid plants, water is used in three major phases of the operation: process water, boiler feed water, and cooling water (DOE/NETL, Emerging Issues for Fossil Energy and Water, 2006). For biofuel plants, water is utilized in irrigation for feedstocks and in processing and conversion of the feedstocks into finished products (NRC/NAS, Water Implications of Biofuels Production in the United States, 2008).

The majority of the water consumption in the biofuel development is within irrigation of feedstocks. However, according to findings from a NRC Colloquium "Water Implications of Biofuel Production in the United States" in 2008, water consumption is poorly characterized and highly variable. Factors that play into feedstock water consumption include: location of feedstock agriculture activities, current water availability in a particular location, type of crop being grown and what crop is being displaced, whether the impact of energy feedstocks in overall agricultural production, and irrigation practices vs. feedstock needs met through rainfall.

There is more to the discussion on water discussion than a simple metric which will follow but coal to liquids through Fischer Tropsch processes consumed in a range of 5:1 to 7:1 in gallons of water compared to CTL fuel output (DOE/NETL, 2006). Cellulosic biofuel from switchgrass and forest wood residue using no irrigation water and only precipitation, can be optimized to operate between 1.9:1 to 9.8:1 consumptive water to fuel produced (Wu et. al., Argonne National Lab, 2009). Algal oil has widely varying water consumption values. Cultivating algae in open ponds can lead to high water usage, driven by atmospheric evaporation. Total process water use would vary based on the pathway used to refine the algal oil into a finished fuel product. It is important to note that most algal processes assume the use of saltwater or waste water (i.e. non-potable water) for algal growth, so that algal oil production water usage will not compete with irrigation. Using a closed photobioreactor or simply placing a greenhouse enclosure on the pond would greatly reduce evaporative losses and lower process water consumption (Wigmosta et. al., 2011).

In a DOE/NETL 2006 study, the researchers evaluate CTL plant placement by analyzing maps of

coal rich areas and their proximity to water sources and also evaluated associated water demands in those regions. Water usage issues must include constraints that are often region-specific. Surface and groundwater withdrawals in the Western U.S. will compete with crop and livestock irrigation. CTL plants in the Illinois Basin and Pennsylvania/West Virginia regions will compete with thermoelectric power generation and public supply requirements for water. All of these regions have both surface water resources and active coal mining operations.

For biofuels, the NRC Colloquium Report (2007) concluded that increased agricultural production will probably not alter the national landscape of water use. However, depending on the crops utilized, where they are grown, and associated increase in agricultural production could stress local and regional water resources. According to an Argonne National Lab 2009 study, California, Idaho, Colorado, and Nebraska account for half of U.S. irrigation withdrawals. These are also likely areas that have highly stressed water resources.

CHARRTS No.: HEC-01-003
Hearing Date: June 03, 2011
Committee: HEC
Member: Congressman Whitfield
Witness: Mr. Hicks
Question: #3

RFP for Biofuels

Question: It is my understanding that the Navy is considering the issuance of a request for proposal (RFP) later this year for large volumes of biofuels to meet fleet needs beginning in 2016. Is this true? If so, what types of fuels do you envision purchasing? What will be the criteria for those purchases? Will fuels from renewable feedstocks produced using the Fischer-Tropsch process be included? If not, why?

Answer: The Defense Logistics Agency – Energy, who purchases all of the fuels for the Department of Defense, will be putting out a Request for Proposal (RFP) this summer to purchase biofuels for the Navy's Green Carrier Strike Group demonstration that is planned for 2012. We will not be purchasing biofuels for the Navy's Great Green Fleet deployment in 2016, until sometime in FY2015.

The volume of biofuels that will be purchased through the RFP this summer will be 100,000 gallons of hydrotreated renewable jet JP-5 fuel, and 350,000 gallons of hydrotreated renewable diesel F-76.

The Department of Navy is currently undergoing the testing and certification of hydrotreated renewable jet (HRJ) fuel and diesel (HRD) fuel for all of our air and ship platforms. Therefore, we have established the criteria for this purchase for the 2012 demonstration as being only hydrotreated renewable jet and diesel fuels.

Once the testing and certification process is complete for hydrotreated renewable fuels, we will then approve our aircraft platforms on Fischer-Tropsch processed fuels. We will approve its use based on both the results from our HRJ fuel testing, and the data on Fischer-Tropsch fuels developed by the Air Force and commercial industry. We will have all of our air and ship platforms fully tested and certified for all biofuels by the end of FY2012.

All fuels from renewable feedstocks produced from all processes including Fischer-Tropsch will be included as part of the criteria for our FY2015 purchase for the Great Green Fleet deployment in 2016. The RFP will provide for full and open competition.

CHARRTS No.: HEC-01-004
Hearing Date: June 03, 2011
Committee: HEC
Member: Congressman Whitfield
Witness: Mr. Hicks
Question: #4

Fischer-Tropsch fuels

Question: The U.S. Air Force has thoroughly tested and certified Fischer-Tropsch fuels for its fleet of aircraft. Considering that Fischer-Tropsch fuels have the same make up regardless of what inputs they are made from will the Navy build upon the testing that the USAF has done and also approve Fischer-Tropsch fuels for its aircraft? If so, when?

Answer: The Department of Navy is currently undergoing the testing and certification of hydrotreated renewable jet (HRJ) fuel and diesel (HRD) fuel for all of our air and ship platforms. Once that testing and certification process is complete, we will then approve aircraft platforms on Fischer-Tropsch processed fuels. We will approve its use based on both the results from our HRJ fuel testing, and the data on Fischer-Tropsch fuels developed by the Air Force and commercial industry.

We will have all of our air and ship platforms fully tested and certified for all biofuels by the end of FY2012.

CHARRTS No.: HEC-01-005
Hearing Date: June 03, 2011
Committee: HEC
Member: Congressman Whitfield
Witness: Mr. Hicks
Question: #5

Fuels Derived from Coal

Question: Would the U.S. Navy refuse to buy, or direct the Defense Logistics Agency not to buy for it, fuels derived from coal that meet the requirements of Sec. 526 and all other applicable statutes?

Answer:

If it were technologically possible to produce coal-to-liquid (CTL) fuels that were compliant with the Energy Independence and Security Act (EISA) Section 526 and all other applicable statutes, that functioned equal to, or better than, the petroleum-derived fuel being replaced by the CTL fuel, that required no vehicle modifications or operator adjustments for use, and were cost competitive with conventional fossil fuels, the Navy would consider buying these fuels. However, from our research into the costs to build a CTL plant with carbon capture and sequestration, the costs could exceed \$10B. Additionally, the CTL technology is not very mature. There are two existing plants in the world, and they are not located in the United States and do not have carbon capture and sequestration as a part of the plant. For these two reasons alone – the overall capital cost and the maturity factor – it would seem unlikely to get fuels derived from these types of plants to come down in price and be cost competitive.

An example plant scenario from the National Academy of Sciences (NAS) has a 50,000 barrel per day capacity of gasoline and diesel fuel for an upfront capital cost of \$4.88 B. This is the cost without carbon capture and sequestration (NAS, "Liquid Transportation Fuels from Coal and Biomass: Technological Status, Costs, and Environmental Impacts (2009)"). Plants up to 150,000 barrels per day have been put into service (Sasol, South Africa); the extrapolated costs for such a plant can well exceed \$10B.

CHARRTS No.: HEC-01-006
Hearing Date: June 03, 2011
Committee: HEC
Member: Congressman Whitfield
Witness: Mr. Hicks
Question: #6

Fischer-Tropsch plants

Question: In your written statement you claim that the cost of a Fischer-Tropsch fuels plant would be "\$5 to 10 billion in capital per plant to provide a fuel result that has more than twice the carbon emissions of petroleum." Please provide the source of this cost estimate, the type of feedstock to be used in this model plant, a clarification as to whether or not this plant would include carbon capture and sequestration, and the production capacity of such a plant.

Answer: An example plant scenario from the National Academy of Sciences (NAS) has a 50,000 barrel per day capacity of gasoline and diesel fuel for an upfront capital cost of \$4.88 B. This is the cost without carbon capture and sequestration (NAS, "Liquid Transportation Fuels from Coal and Biomass: Technological Status, Costs, and Environmental Impacts (2009)"). Plants up to 150,000 barrels per day have been put into service (Sasol, South Africa); the extrapolated costs for such a plant can well exceed \$10B.

In the 2008 RAND report, "Producing Liquid Fuels from Coal," it states that, "Coal-to-liquid (CTL) plants are capital intensive. For moderate to large FT CTL plants producing diesel fuel, naphtha, and electricity, we estimate capital investment costs of \$100,000 to \$125,000 (January 2007 dollars) per barrel of daily production capacity, on a diesel value equivalent (DVE) basis. These are overnight construction costs and do not include interest accumulated during construction." The report goes on to state, "This range is in agreement with a Sasol cost estimate of \$100,000 to \$125,000 per barrel of daily production capacity for a large (80,000 bpd) plant built in the United States." Given the above, an 80,000 barrel per day plant could well cost \$10 billion, with larger plants costing even more.

In the RAND Report, "Alternative Fuels for Military Applications (2011)," pg 19, it is stated that, "For the FT coal-to-liquids method in the absence of management of greenhouse gas emissions, each gallon of alternative fuel yields lifecycle greenhouse gas emissions about double those associated with conventional petroleum-derived fuel." This figure does not include carbon capture and sequestration as pertinent domestic examples of carbon capture and sequestration are not available for analysis.