RISKY BUSINESS:
THE DOE LOAN GUARANTEE PROGRAM

JOINT HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY &
SUBCOMMITTEE ON OVERSIGHT

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED FIFTEENTH CONGRESS

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RISKY BUSINESS:
THE DOE LOAN GUARANTEE PROGRAM

WEDNESDAY, FEBRUARY 15, 2017

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND
SUBCOMMITTEE ON OVERSIGHT,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, D.C.

The Subcommittees met, pursuant to call, at 10:09 a.m., in Room 2318, Rayburn House Office Building, Hon. Randy Weber [Chairman of the Subcommittee on Energy] presiding.

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EDDIE BERNICE JOHNSON, Texas
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Congress of the United States
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Subcommittees on Energy and Oversight

Risky Business: The DOE Loan Guarantee Program

Wednesday, February 15, 2017
10:00 a.m. – 11:30 a.m.
2318 Rayburn House Office Building

Witnesses

Ms. Diane Katz, Senior Research Fellow in Regulatory Policy, Thomas A. Roe Institute for Economic Policy Studies, The Heritage Foundation

Mr. Chris Edwards, Director, Tax Policy Studies, Cato Institute

Mr. Dan Reicher, Executive Director, Steyer-Taylor Center for Energy Policy and Finance, Stanford University

Dr. Ryan Yonk, Assistant Research Professor, Department of Economics and Finance, Utah State University; Research Director, Institute of Political Economy, Utah State University

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HEARING CHARTER

February 8, 2017

TO: Members, Subcommittee on Energy and Subcommittee on Oversight

FROM: Majority Staff, Committee on Science, Space, and Technology

SUBJECT: Joint Subcommittee hearing: "Risky Business: The DOE Loan Guarantee Program"

The Subcommittees on Energy and Oversight will hold a joint hearing titled *Risky Business: The DOE Loan Guarantee Program* on Wednesday, February 15, 2017, at 10:00 a.m. in Room 2318 of the Rayburn House Office Building.

Hearing Purpose:

The purpose of the hearing is to continue the Committee's oversight of the Department of Energy's loan guarantee program, to examine the market impact and risk associated with federal direct loans and loan guarantees for energy innovation, and to consider options to reform the program in the 115th Congress.

Witness List

- **Ms. Diane Katz,** *Senior Research Fellow in Regulatory Policy, Thomas A. Roe Institute for Economic Policy Studies, The Heritage Foundation*
- **Mr. Chris Edwards,** *Director, Tax Policy Studies, Cato Institute*
- **Mr. Dan Reicher,** *Executive Director, Steyer-Taylor Center for Energy Policy and Finance, Stanford University*
- **Dr. Ryan Yonk,** *Assistant Research Professor, Department of Economics and Finance, and Research Director, Institute of Political Economy, Utah State University*

Staff Contact

For questions related to the hearing, please contact Emily Domenech of the Majority Staff at 202-226-2179.

Chairman WEBER. The Subcommittee on Energy and Oversight will come to order.

Without objection, the Chair is authorized to declare recesses of the subcommittee at any time.

Welcome to today's hearing entitled "Risky Business: The DOE Loan Guarantee Program." I recognize myself for five minutes for an opening statement.

Today, we will have the opportunity to review the past, the present, and the future of the Department of Energy's loan program. I want to thank our panel of witnesses for joining us in this important discussion about the appropriate federal role in supporting energy innovation.

Established by the Energy Policy Act of 2005, the DOE loan guarantee program was designed to give federal support to risky, innovative, clean energy technology. Under a federal loan guarantee, instead of the private sector taking on risk to fund the scale-up of new technology, the government steps in, risking federal dollars on the hopes for success of these energy projects.

Through the section 1703 and 1705 programs, the Department guaranteed loans to 30 energy companies, putting about $28 billion of taxpayer money on the line.

After Congress approved over $2 billion to subsidize the costs of loan guarantees, the DOE then issued more than $16 billion in guarantees to 26 different projects. In these subsidized loans, known as section 1705 loans, companies not only received government backing for their loan, but additional taxpayer dollars were authorized to pay, quote, the "credit subsidy cost," end quote, of the loan, or the estimated cost to the federal government to manage the loan over its lifetime.

Easy money combined with political pressure to issue loans before the temporary subsidy program expired led the DOE to rush loan applications. Both the DOE Inspector General and the Government Accountability Office found that DOE did not have the necessary expertise or the metrics to effectively evaluate these loans. Predictably, a number of companies that received section 1705 loans went into default. In total, over $800 million in taxpayer money has been wasted by this DOE loan program.

It's clear that the DOE loan guarantee program is expensive. The GAO estimates that the cost for the current loan guarantees is $2.2 billion with a B. Supporters argue the cost is justified if we can help innovative technologies make the leap to the commercial market.

But what if federal meddling in the market actually hurts innovation? As we will hear in testimony today, when the federal government provides loans and loan guarantees to favored technologies, innovation in fact stalls. While federal government support helps loan guarantee winners attract capital, it draws capital away from other innovative ideas in the marketplace.

And since large companies with the resources to lobby on behalf of their projects often have an advantage in the loan application process, the DOE loan guarantee program pushes capital away from those startups and entrepreneurs that often have the most innovative ideas. We need to be opening doors for these small

innovators, not closing them by pushing investors toward federally backed, so-called risk-free investments.

Additionally, taxpayers often end up paying higher prices for their power because of federal government meddling in the energy market. For example, when the DOE provided a $1.6 billion loan guarantee to the Ivanpah solar project in California, the state mandated the use of renewable power, and utilities entered into contracts to buy power from the DOE-backed facility. Unfortunately, the ratepayers in southern California will now pay two to five more times for power generated by this facility in addition to being stuck with the bill if the project goes into default.

The truth is that when the DOE provides loan guarantees, there is no benefit for the taxpayer even if the guaranteed loan is paid in full. Regular Americans take on the liability of the full loan, they don't see a return, and they can end up paying more for their electricity if and when the project is actually built.

The DOE loan guarantee program is just another way the federal government picks winners and losers in the energy market. It doesn't guarantee innovation, doesn't guarantee cost savings, and it doesn't guarantee access to the next generation of energy technology. The only thing guaranteed for the taxpayers is extra cost and extra risk.

It is our responsibility in this committee to examine Department of Energy programs and ensure our limited resources prioritize the kind of research and science facilities that open doors for all kinds of innovators.The Department cannot prioritize the basic research it does best if it's playing venture capitalist.

Therefore, I think we need to take a hard look at the DOE loan guarantee program and determine whether it is an appropriate way to spend precious federal research dollars. In my opinion, and in the testimony you'll hear today, the American people would be better served if the federal government stopped picking winners and losers, focused on the R&D, and let the market drive the investment for energy innovation.

[The prepared statement of Chairman Weber follows:]

COMMITTEE ON
SCIENCE, SPACE, & TECHNOLOGY
Lamar Smith, Chairman

For Immediate Release
February 15, 2017

Media Contact: Kristina Baum
(202) 225-6371

Statement of Energy Subcommittee Chairman Randy Weber (R-Texas)
Risky Business: The DOE Loan Guarantee Program

Chairman Weber: Today, we will have the opportunity to review the past, present, and future of the Department of Energy's loan program. I want to thank our panel of witnesses for joining us in this important discussion about the appropriate federal role in supporting energy innovation.

Established by the Energy Policy Act of 2005, the DOE loan guarantee program was designed to give federal support to risky, innovative, clean energy technology. Under a federal loan guarantee, instead of the private sector taking on risk to fund the scale up of new technology, the government steps in, risking federal dollars on the hopes for success of energy projects.

Through the Section 1703 and 1705 programs, the Department guaranteed loans to 30 energy companies, putting 28 billion dollars in taxpayer money on the line.

After Congress approved over 2 billion dollars to subsidize the costs of loan guarantees, DOE issued more than 16 billion dollars in guarantees to 26 different projects. In these subsidized loans, known as Section 1705 loans, companies not only received government backing for their loan, but additional taxpayer dollars were authorized to pay the "credit subsidy cost" of the loan, or the estimated cost to the federal government to manage the loan over its lifetime.

Easy money combined with political pressure to issue loans before the temporary subsidy program expired led DOE to rush loan applications. Both the DOE Inspector General and Government Accountability Office found that DOE did not have the necessary expertise or metrics to effectively evaluate these loans.

Predictably, a number of companies that received Section 1705 loans went into default. In total, over 800 million dollars in taxpayer money has been wasted by the DOE loan program.

It's clear the DOE loan guarantee program is expensive – the GAO estimates that the cost for the current loan guarantees is 2.2 billion dollars – but supporters argue the cost is justified if we can help innovative technologies make the leap to the commercial market.

But, what if federal meddling in the market actually hurts innovation? As we will hear in testimony today, when the federal government provides loans and loan guarantees

to favored technologies, innovation stalls. While federal government support helps loan guarantee winners attract capital, it draws capital away from other innovative ideas in the market.

And since large companies with the resources to lobby on behalf of their projects often have an advantage in the loan application process, the DOE loan guarantee program pushes capital away from the start-ups and entrepreneurs that often have the most innovative ideas. We need to be opening doors for these small innovators -- not closing them by pushing investors towards federally backed, risk-free investments.

Additionally, taxpayers often end up paying higher prices for their power because of federal government meddling in the energy market. For example, when DOE provided a 1.6 billion dollar loan guarantee to the Ivanpah solar project in California, the state mandated the use of renewable power, and utilities entered into contracts to buy power from the DOE-backed facility. Unfortunately, the ratepayers in Southern California will now pay two to five times more for power generated by this facility in addition to being stuck with the bill if the project fails and goes into default.

The truth is, when DOE provides loan guarantees, there is no benefit for the taxpayer even if the guaranteed loan is paid in full.

Regular Americans take on the liability of the full loan, they don't see a return, and can end up paying more for their electricity if the project is actually built.

The DOE loan guarantee program is just another way the federal government picks winners and losers in the energy market. It doesn't guarantee innovation or cost savings, and it doesn't guarantee access to capital for the next generation of energy technology. The only thing guaranteed for the taxpayer is extra cost and extra risk.

It's our responsibility in this Committee to examine Department of Energy programs, and ensure our limited resources prioritize the kind of research and science facilities that open doors for all kinds of innovators.

The Department can't prioritize the basic research it does best when it's playing venture capitalist.

Therefore, I think we need to take a hard look at the DOE loan guarantee program, and determine whether it's an appropriate way to spend federal research dollars.

In my opinion, and in the testimony you'll hear today, the American people would be better served if the federal government stopped picking winners and losers, focused on research and development, and let the market drive investment for energy innovation.

###

Chairman WEBER. With that, I conclude, and I now recognize Ranking Member, Mr. Veasey.

Mr. VEASEY. Thank you, Mr. Chairman. I'm looking forward to working with you this Congress in my capacity as Ranking Member of the Energy Subcommittee. And given our history together, previously, we served in the Texas Legislature together, served on the Environmental Regulation Committee together working on similar issues here. And so I think that we'll be able to talk about some things that we think can help move America's energy future together in the right direction.

Today, we are examining the Department of Energy's Loan Programs Office. I hope that by the end of this hearing my colleagues on both sides of the aisle can come to the same conclusion that so many nonpartisan observers and professionals in the finance industry have, that these loan programs have been successful by almost every measure.

Allow me to highlight just a few of these success stories. The LPO portfolio has over 30 projects in 18 States. It has enabled over $50 billion in private sector investment in clean energy technologies. These loan guarantees have created 56,000 American jobs across our country. And these loan guarantees have helped prevent the release of 34.1 million tons of carbon dioxide into our atmosphere. All of this is because at Congress's direction the DOE intelligently leveraged the federal government's strong credit and LPO's deep expertise to the benefit of the American taxpayer.

For my fiscal conservative friends, the loan programs have actually helped reduce the national debt. During LPO's relatively short life, the loan and loan guarantees have returned approximately $980 million to the Treasury. That is net revenue from interest payments after accounting for losses. It is notable that even the Heritage Foundation left LPO off their list of programs to cut or eliminate in their Blueprint for Balance. And based on my quick read, there aren't very many DOE programs that are spared in that particular report.

When Congress authorized the loan program we set aside $10 billion for expect losses that may occur as the federal government takes on varying levels of risk with each of these projects. While there have been a handful of projects that did not pan out, the total losses from all of these projects comes nowhere near the $10 billion originally set aside. In fact, it is less than ten percent of the amount Congress originally projected, with losses so far adding up to $810 million, a number that is covered twice over by the interest payments collected. So if we consider this program on a strictly cost-benefit or risk-reward basis, it has clearly performed beyond expectations and is tremendously successful.

But those aren't the only or even the most appropriate metrics to consider. The section 1705 loan guarantees are responsible for launching the utility-scale PV solar industry. These loan guarantees enabled the first five 100 megawatt solar PV facilities to be built in the United States. What followed that initial investment from DOE perfectly illustrates the role that these loan guarantees fill in the market. After DOE demonstrated the viability of those first five projects, private financing began funding utility-scale

solar PV independently. As of the last year, there are now 45 other projects that have received financing.

However, LPO does more than just provide loan guarantees to renewable energy. In fact, over 1/3 of the portfolio's loan guarantee authority funds the Vogtle nuclear project in Georgia. And with the announcement of a conditional commitment for the first Advanced Fossil Energy Project in Lake Charles, Louisiana the portfolio continues to diversify. In fact, the carbon captured from the Lake Charles project will be used by Denbury, a Texas company for enhanced oil recovery, in Southeast Texas. And as the Chairman of the Carbon Dioxide Enhanced Oil Recovery Caucus, I certainly support this project.

And with the enhanced oil recovery occurring near if not in the district of the esteemed Chairman, I'm hopeful that maybe he will consider being supportive of this particular project as well.

The market for industrial carbon capture has the potential to experience the same revolutionary changes that the solar PV industry has experienced as a result of LPO's unique role and capabilities to foster our innovation pipeline.

In conclusion, the Loan Programs Office has something for everyone. It has investments for fossil energy, renewables, nuclear, and it even reduces our national debt. I hope we can all recognize the benefits and extraordinary gains that have come out of LPO, and furthermore, I hope my colleagues on the other side of the aisle are willing to work together to constructively support and wherever appropriate improve the Department's work in this crucial area.

Mr. Chairman, I want to thank you. I look forward to working with you, and I yield back the balance of my time.

[The prepared statement of Mr. Veasey follows:]

OPENING STATEMENT
Ranking Member Marc Veasey (D-TX)
of the Subcommittee on Energy

Committee on Science, Space, and Technology
Subcommittee on Energy and Oversight
"Risky Business: The DOE Loan Guarantee Program"
February 15, 2017

Thank you, Mr. Chairman. I am looking forward to working with you this Congress in my capacity as the Ranking Member of the Energy Subcommittee. Given our history together in the Texas Legislature, I'm hopeful we can work together to ensure America's bright energy future, and the Department of Energy continues to be a world leader in fostering energy innovation as well as fundamental research.

Today, we are examining the Department of Energy's Loan Programs Office. I hope that by the end of this hearing my colleagues on both sides of the isle can come to the same conclusion that so many nonpartisan observers and professionals in the finance industry have – that these loan programs have been successful by almost every measure.

Allow me to highlight just a few of those success stories: The LPO portfolio has over 30 projects in 18 states. It has enabled over 50 billion dollars in private sector investment in clean energy technologies. These loan guarantees have created 56,000 American jobs across the country. And these loan guarantees have helped prevent the release of 34.1 million tons of carbon dioxide into our atmosphere. All of this is because, at Congress's direction, DOE intelligently leveraged the Federal government's strong credit and LPO's deep expertise to the benefit of the American taxpayer.

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After DOE demonstrated the viability of those first five projects, private financing began funding utility-scale solar PV independently. As of last year there are now 45 other projects that have received financing. However, LPO does more than *just* provide loan guarantees to renewable energy. In fact,

over a third of the portfolio's loan guarantee authority funds the Vogtle nuclear energy project in Georgia. And with the announcement of a conditional commitment for the first advanced fossil energy project in Lake Charles, Louisiana, the portfolio continues to diversify.

In fact, the carbon captured from the Lake Charles project will be used by Denbury, a Texas company, for enhanced oil recovery in southeast Texas. As chairman of the Carbon Dioxide Enhanced Oil Recovery Caucus, I certainly support this project. With this enhanced oil recovery occurring near - if not in - the district of Chairman Weber, I'm hopeful he'd be supportive of this project as well.

The market for industrial carbon capture has the potential to experience the same revolutionary changes that the solar PV industry experienced as a result of LPO's unique role and capabilities to foster our energy innovation pipeline.

In conclusion, the Loan Programs Office has something for everybody. It has investments in fossil energy, renewables, and nuclear, and it even reduces our national debt. I hope we can all recognize the benefits and extraordinary gains that have come out of LPO.

Furthermore, I hope my colleagues on the other side of the aisle are willing to work together to constructively support and, wherever appropriate, improve the Department's work in this crucial area.

Thank you again, Mr. Chairman and I yield back the balance of my time.

Chairman WEBER. Thank you, Mr. Veasey. And I was remiss. I, too, look forward to working with you. We had good times in the Texas legislature.

Mr. VEASEY. Yes, we did.

Chairman WEBER. You bet. Man, I now recognize the Chairman of the Subcommittee on Oversight, Mr. LaHood, for his opening statement.

Mr. LAHOOD. Well, thank you, Chairman Weber. And it's an honor to join you here today for this hearing. I want to thank the witnesses for being here today for our hearing titled "Risky Business: The DOE Loan Guarantee Program."

Today's hearing will provide us with an opportunity to examine one of the ways the previous Administration used taxpayer dollars to fund massive green energy initiatives with the Department of Energy's loan guarantee program. With this program, over $28 billion in taxpayer money was used to support the loan program's portfolio for 30 projects. Too often, loan guarantees were handed out based on political favoritism instead of merit.

Problems with the loan program arose when DOE's first approved project, Solyndra, defaulted on its loan after receiving $535 million in loan guarantees. Four additional projects defaulted on their loans, representing $807 million taxpayer dollars lost to date.

So it's no surprise that the Loan Program Office has faced strong criticism from Congress. Rigorous oversight should be expected when billions of taxpayer dollars are at stake, especially when politics can influence how those dollars are spent. This Committee, the Energy and Commerce Committee, and the Oversight and Government Reform Committee have held many hearings outlining concerns with this program. In addition to Congressional oversight, the DOE Inspector General and the nonpartisan Government Accountability Office have repeatedly raised questions about the mismanagement and accountability in the loan program.

The DOE Inspector General described the DOE Loan Program office as, quote, "attaching a garden hose to a fire hydrant," unquote. Had Congressional committees not drawn attention to the problems with the Loan Program Office, the losses could have been far greater. As part of Congress' oversight mandate, we have a responsibility to ensure that the proper transparency in this place—is the place to ensure that DOE is not putting taxpayer dollars at undue risk.

While this is my first hearing as Oversight Subcommittee Chairman, my colleagues on this committee led efforts in the last Congress to ensure that the DOE loan guaranteeprogram was effectively managed and transparent. I'm committed to maintaining oversight of this program in the 115th Congress.

The loss of taxpayer dollars in the DOE loan program raise significant questions about the overall effectiveness of the program and what steps Congress may need to take to ensure taxpayer dollars are no longer put at risk. We can't keep putting American tax dollars on the line when loan guarantee recipients are in danger of default. And we can't automatically expect the federal government to be better than the private sector when it comes to investment and what makes technology successful in the commercial market.

Today's hearing is intended to analyze the future of the DOE loan guarantee program. How can it be improved? Is the risk to the taxpayers worth the benefits gained? Are the taxpayers truly benefiting from the Loan Program Office? Is the DOE loan guarantee program operating within its intended purpose, to close the gap between innovative technologies and private investment? Or is federal government intervention crowding out other innovative technologies in the energy marketplace?

All of these are important questions that require the kind of thorough discussion I hope we can have here today. It's our job in Congress to ensure responsible management of federal resources and determine the path forward for the DOE loan program.

We have a number of excellent witnesses here today that will help this committee answer some of these questions and provide recommendations on next steps for the DOE loan guarantee program. I would like to thank our witnesses for joining us here today, and I look forward to the testimony.

With that, I yield back, Mr. Chairman.

[The prepared statement of Mr. LaHood follows:]

COMMITTEE ON
SCIENCE, SPACE, & TECHNOLOGY
Lamar Smith, Chairman

For Immediate Release
February 15, 2017

Media Contact: Kristina Baum
(202) 225-6371

Statement of Oversight Subcommittee Chairman Darin LaHood (R-Ill.)
Risky Business: The DOE Loan Guarantee Program

Chairman LaHood: Good morning and welcome to today's Oversight and Energy Subcommittee hearing reviewing the Department of Energy's Loan Program.

Today we intend to discuss and evaluate the DOE loan guarantee program.

Today's hearing will also provide an opportunity to examine one of the ways the previous administration used taxpayer dollars to fund massive green energy initiatives. In the Department of Energy's Loan Guarantee Program, over $28 billion taxpayer dollars were used to support the Loan Program's portfolio of 30 projects. Too often, loan guarantees were handed out based on political favoritism instead of merit.

Problems with loan program arose when DOE's first approved project, Solyndra, defaulted on its loan after receiving a $535 million loan guarantee. Four additional projects defaulted on their loans, representing $807 million taxpayer dollars lost to date.

So it's no surprise that the Loan Program Office has faced strong criticism from Congress. Rigorous oversight should be expected when billions of taxpayer dollars are at stake – especially when politics can influence how dollars are spent. This Committee, the Energy and Commerce Committee, and the Oversight and Government Reform Committee have held many hearings outlining concerns with the program.

In addition to Congressional oversight, the DOE Inspector General and the non-partisan Government Accountability Office have repeatedly raised concerns about mismanagement and accountability in the loan program.

The DOE inspector general described the DOE Loan Program office as "attaching a garden hose to a fire hydrant." Had Congressional Committees not drawn attention to the problems with the Loan Program Office, the losses could have been far greater. As part of Congress' oversight mandate, we have a responsibility to ensure that the proper transparency is in place to ensure DOE is not putting taxpayer dollars at undue risk.

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program was effectively managed and transparent. I'm committed to maintaining oversight of this program in the 115th Congress.

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Today's hearing is intended to analyze the future of the DOE loan guarantee program – how can and should it be improved. Is the risk to the taxpayers worth the benefits gained? Are the taxpayers truly benefiting from the Loan Program Office? Is the DOE loan guarantee program operating within its intended purpose, to close the gap between innovative technologies and private investment? Or is federal government intervention crowding out other innovative technologies in the energy marketplace?

All of these are important questions that require the kind of thorough discussion I hope we can have here today. It's our job in Congress to ensure responsible management of federal resources, and determine the best path forward for the DOE Loan Program.

We have a number of excellent witnesses here today that will help this Committee answer some of these questions, and provide recommendations on next steps for the DOE loan guarantee program. I would like to thank our witnesses for joining us today and I look forward to your testimony. With that I yield back to the chairman.

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Chairman WEBER. Thank you, Mr. LaHood.

I now recognize the Ranking Member of the Subcommittee on Oversight, Mr. Beyer, for his opening statement.

Mr. BEYER. Thank you. Chairman Weber and Chairman LaHood, thanks so much for putting this hearing on today.

The mission of the Department of Energy's Loan Program Office is to help accelerate the deployment of advanced innovative clean energy technologies across the United States, and the successful deployment of these technologies creates jobs, enhances America's competitiveness, and helps to protect the environment, the climate, and public health.

Now, we're likely to hear a lot of criticism about the loan guarantee program today. Both witnesses and members are likely to say that the federal government should play no role in funding energy technologies at all, particularly renewable energy technologies. And I think this is philosophically congruent with much of the majority's opposition to the Export-Import Bank, the idea that government doesn't have a role in loan guarantees.

Some even say that the U.S. Government shouldn't have provided more than $470 billion in subsidies to the oil and gas industry over the last 100 years. But some may also see problems with the DOE providing more than $8 billion in loan guarantees or 1/3 of its current loan guarantees to construct two new nuclear plants in Georgia. The new LPO portfolio that includes solar, wind, fossil fuel, nuclear, and other technologies comprises more than $30 billion in loans, loan guarantees, and conditional commitments covering more than 30 different projects across multiple energy and transportation technologies.

I believe the possible plan to halt the DOE's loan programs completely, as suggested in a memo by President Trump's DOE transition team, is supported by some individuals at the conservative Heritage Foundation is a spectacularly bad idea. Investing in clean energy is smart. It helps to provide scientific solutions to combat climate change. It helps to protect our environment and the public's health from toxic chemicals. It fosters innovation and the development of new technologies. It creates new jobs and helps our economy.

You know, one of the myths here is that somehow we're in a perfectly free market. The American companies' workers in our advanced energy sector face fierce foreign competition. And the international market is certainly not free. Many firms in the advanced energy sector benefit from strong home government support. China automaker BYD benefits from generous support from the Chinese Government, well on its way to becoming the world's largest electric car manufacturer. European firms are also making significant gains in new plug-in vehicles and renewable energy generation.

The United States should simply not cede its leadership to our foreign competitors in the high-tech advanced energy sector. This important DOE program is necessary for American businesses and American workers to compete in this growing field.

So regardless of whether you believe in the abundant scientific evidence that supports the reality of carbon pollution and the role of fossil fuel combustion and sea level rise, supporting clean, innovative, renewable energy technologies that don't damage our water-

ways, air, and land by releasing toxic chemicals is a good idea. The only thing it may really threaten is fossil fuel companies that don't clean up their act.

I hope that as Members of Congress we can have some foresight and can agree to support federal investments today into the clean energy technologies that our nation will need tomorrow, clean energy technologies that will never emerge without federal support.

Perhaps the DOE can get an opportunity today to drill down on the actual math. The numbers we've seen suggest the loss ratio of around two percent, far less than you have in the private sector, that we've already received $980 million more in total interest payments, more than the total losses even projected in the loan program so just on that fact so far it's not projected to be a burden on the taxpayers at all. And that's not even including all of the taxes generated by the many successful businesses funded by this, all the taxes paid by the thousands of jobs created by the federal loan program. This, at least the evidence we've seen so far, is a huge net impact on the positive way against the federal budget deficit and for the federal economy. But perhaps I'll have a chance to drill down on that even more.

Thank you very much for being with us today. And, Mr. Chairman, Chairman, and Ranking Member, thank you for inviting me to be a part of this.

[The prepared statement of Mr. Beyer follows:]

OPENING STATEMENT
Ranking Member Don Beyer (D-VA)
of the Subcommittee on Oversight

House Committee on Science, Space, and Technology
Subcommittees on Energy and Oversight
"Risky Business: The DOE Loan Guarantee Program"
February 15, 2017

Thank you Chairman Weber and Chairman LaHood. I look forward to working with both of you this Congress and I appreciate you holding this hearing today.

The mission of the Department of Energy's (DOE's) Loan Programs Office (LPO) is to help accelerate the deployment of advanced, innovative clean energy technologies across the United States. The successful deployment of these technologies creates jobs, enhances American competitiveness and helps to protect the environment, the climate, and the public's health.

We are likely to hear a lot of criticism of the loan guarantee program today. Both witnesses and Members are likely to say that the federal government should play no role in funding energy technologies at all, particularly renewable energy technologies. Some may even say they don't believe the U.S. government should have provided more than $470 billion in subsidies to the oil and gas industry over the past 100 years. Some may also see problems with DOE providing more than $8 billion in loan guarantees (or one-third of its current loan guarantees) to construct two new nuclear plants in Georgia. The current LPO portfolio, that includes solar, wind, fossil fuel, nuclear and other technologies, comprises more than $30 billion in loans, loan guarantees, and conditional commitments covering more than 30 different projects across multiple energy and transportation technologies.

I believe the DOE loan programs support our Nation's efforts to innovate, invent, and discover new clean energy technologies that help to fuel our economy, enhance our national security and protect our environmental legacy. The possible plan to halt the DOE loan programs completely, as suggested in a memo by President Trump's DOE transition team and supported by some individuals at the conservative Heritage Foundation, for instance, is a spectacularly bad idea.

Investing in clean energy is smart. It helps provide scientific solutions to combat climate change. It helps to protect our environment and the public's health from toxic chemicals. It fosters innovation and the development of new technologies. It creates new jobs and helps our economy.

American companies and workers in our advanced energy sector face fierce foreign competition. The international market is not a perfectly free market – many firms in the advanced energy sector benefit from strong home government support. For example, China auto maker BYD benefits from generous support from the Chinese government and is "on its way to becoming the world's largest electric car manufacturer," according to a July 2016 article in Forbes magazine.[1] European firms are also making significant gains in new plug-in vehicles and renewable energy generation. The United States should not simply cede its leadership to our foreign competitors in the high-tech, advanced energy sector. This important DOE program is necessary for American businesses and American workers to compete in this growing, competitive field.

Regardless of whether or not you believe in the abundant scientific evidence that supports the reality of climate change and the role of fossil fuel production in global warming, supporting clean, innovative, renewable energy technologies that do not damage our waterways, air and land by releasing toxic

chemicals into the environment is a good idea. The only thing they may threaten is fossil fuel companies that don't clean up their act.

I hope that as Members of Congress we have some foresight and can agree to support federal investments today into the clean energy technologies that our nation will need tomorrow.

The DOE's loan programs provide vital financial assistance to help innovate our energy infrastructure, developing new advanced technologies that will help fuel our energy needs in the future and help build the innovative companies contending in the competitive advanced energy international marketplace.

I look forward to hearing from our witnesses and having a constructive dialogue on these issues. I would particularly like to thank the Minority Witness, Mr. Dan Reicher, for being here today.

Mr. Reicher has tremendous experience in energy policy, finance, and the clean energy industry. He was Director of Climate Change and Energy Initiatives at Google and prior to that he was a co-founder of a private equity firm focused on clean energy projects.

Mr. Reicher, I look forward to your testimony and the breadth of experience you bring to the table.

Thank you. I yield back.

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[i] Mark L. Clifford, Contributor to Forbes magazine, "Chinese Government Subsidies Play Major Part In Electric Car Maker BYD's Rise," July 26, 2016, *Forbes*, http://www.forbes.com/sites/mclifford/2016/07/26/with-a-little-help-from-its-friends-lavish-chinese-government-help-for-top-electric-car-maker-byd/ Accessed: February, 2017.

Chairman WEBER. Thank you, Mr. Beyer.

I now recognize the Chairman of the full committee, Mr. Smith, for an opening statement.

Chairman SMITH. Thank you, Mr. Chairman. And I also want to thank Chairman LaHood for holding this joint hearing today.

We will hear from a number of expert witnesses on the market impact and risk associated with federal loan guarantees for energy innovation.

The Department of Energy loan guarantee program was established in 2005. It was intended to provide federal loan guarantees to advance commercial application of innovative clean energy technology. In short, the Department guarantees a loan given to an energy company. By guaranteeing a loan, DOE tells private investors that if the company defaults, the taxpayers will foot the bill for the loan. This takes the risk away from investors who stand to profit and puts it on the American people. Instead of the private sector taking on risk to develop new technology, the government steps in and risks taxpayer dollars on energy projects.

In 2009, Congress expanded the loan guarantee program and gave DOE $2.4 billion and the authority to manage costs of loan guarantees. But instead of careful vetting and appropriate metrics to avoid risk, the DOE rushed loan applications and issued $16 billion in loans to 26 projects. President Obama's political allies, like Solyndra, were often fast-tracked, with little consideration for project merit or benefits to the taxpayer.

The results were predictable. High-profile defaults occurred, like the $535 million loan guarantee to Solyndra in 2011, $68 million lost when Abound Solar filed for bankruptcy in 2012, and $139 million lost from a direct loan to Fisker Automotive. These events demonstrate what happens when the federal government picks winners and losers in the energy market.

DOE has lost over $800 million on bad loans since 2005. According to estimates from the Government Accountability Office, the total cost for the current loan portfolio is $2.2 billion plus $312 million in program administrative costs. This is the cost to manage the current loan portfolio over the lifetime of the loans. These costs will increase if another loan is defaulted or if the Department issues new loan guarantees to projects with any financial risk.

Under the DOE loan guarantee program, American tax dollars also subsidize loans for large companies with billions in available capital like Ford, Goldman Sachs, Google, GE, and Berkshire Hathaway. And if something goes wrong, these companies aren't stuck with the bill; the America people are. It is unfair to ask American taxpayers to subsidize risky loans.

DOE also provides a government stamp of approval to favored technologies through loan guarantees. That means that even when DOE backs a successful project, it drives private investment away from technologies that don't receive federal loan guarantees. Private sector companies can't compete with other private sector companies that get loan guarantees.

It is our responsibility to oversee the use of the Department of Energy's resources and only reauthorize those programs that provide the best investment for the American people.

Though its loan guarantees have a suspect past, DOE has an exemplary track record in basic research. The Department's national labs and scientific user facilities provide opportunities to university researchers and private innovators as they search for the next great breakthrough in energy technology. And unlike the DOE loan guarantee program, the national labs are open to every innovative entrepreneur, not just those with a certain political agenda.

Mr. Chairman, as we reauthorize the Department of Energy's research and development programs, we should prioritize the basic and early-stage research that would not be undertaken by the private sector.

Thank you. And I will yield back.

[The prepared statement of Chairman Smith follows:]

COMMITTEE ON
SCIENCE, SPACE, & TECHNOLOGY
Lamar Smith, Chairman

For Immediate Release
February 15, 2017

Media Contact: Kristina Baum
(202) 225-6371

Statement of Chairman Lamar Smith (R-Texas)
Risky Business: The DOE Loan Guarantee Program

Chairman Smith: I thank the chairmen for holding this morning's joint hearing.

Today, we will hear from a number of expert witnesses on the market impact and risk associated with federal loan guarantees for energy innovation.

The Department of Energy (DOE) loan guarantee program was established in 2005. It was intended to provide federal loan guarantees to advance commercial application of innovative clean energy technology.

In short, the Department "guarantees" a loan given to an energy company. By guaranteeing a loan, DOE tells private investors that if the company defaults, the taxpayers will foot the bill for the loan.

This takes the risk away from investors who stand to profit and puts it on the American people. Instead of the private sector taking on risk to develop new technology, the government steps in and risks taxpayer dollars on energy projects.

In 2009, Congress expanded the loan guarantee program and gave DOE $2.4 billion and the authority to subsidize the management costs of loan guarantees.

Instead of careful vetting and appropriate metrics to avoid risk, the DOE rushed loan applications and issued $16 billion in loans to 26 projects.

President Obama's political allies, like Solyndra, were often fast-tracked, with little consideration for project merit or benefits to the taxpayer.

The results were predictable. High profile defaults occurred, like the $535 million loan provided to Solyndra in 2011, $68 million lost when Abound Solar filed for bankruptcy in 2012, and $139 million lost from a direct loan to Fisker Automotive.

These events demonstrate what happens when the federal government picks winners and losers in the energy market.

DOE has lost over $800 million on bad loans since 2005.

According to estimates from the Government Accountability Office, the total cost for the current loan portfolio is $2.2 billion plus $312 million in program administrative costs. This is the cost to manage the current loan portfolio over the lifetime of the loans.

These costs will increase if another loan defaults or if the Department issues new loan guarantees to projects with any financial risk.

Under the DOE loan guarantee program, American tax dollars also subsidize loans for large companies with billions in available capital like Ford, Goldman Sachs, Google, GE, and Berkshire Hathaway.

And if something goes wrong, these companies aren't stuck with the bill – the America people are. It is unfair to ask American taxpayers to subsidize risky loans.

DOE also provides a government "stamp of approval" to favored technologies through loan guarantees. That means that even when DOE backs a successful project, it drives private investment away from technologies that don't receive federal loan guarantees.

Private sector companies can't compete with other private sector companies that get loan guarantees.

We have a unique opportunity to examine the Department of Energy's programs. It is our responsibility to oversee the use of the Department's resources and only reauthorize those programs that provide the best investment for the American people.

Though its loan guarantees have a suspect past, DOE has an exemplary track record in basic research.

The Department's national labs and scientific user facilities provide opportunities to university researchers and private innovators as they search for the next great breakthrough in energy technology.

And unlike the DOE loan guarantee program, the national labs are open to every innovative entrepreneur – not just those with a certain political agenda.

As we reauthorize the Department of Energy's research and development programs, we should prioritize the basic and early-stage research that cannot be accomplished by the private sector.

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Chairman WEBER. Thank you, Mr. Chairman. And I now recognize the Ranking Member of the full committee, Ms. Johnson, for an opening statement.

Ms. JOHNSON. Thank you very much, Mr. Chairman. And let me express my appreciation to you, Mr. LaHood, and our Ranking Members for holding this hearing and I want to thank the witnesses for being here today.

We are here to discuss the record at the Department of Energy's Loan Programs Office and the unique role that these programs play in our energy innovation pipeline. They provide both direct loans and loan guarantees for projects across a broad range of energy sector, including nuclear, fossil energy, renewables, and advanced vehicles.

This support has been critical because private lenders are typically unwilling or unable to take on the risk associated with financing truly innovative and first-of-a-kind projects of this scale on their own. And that's true across the board in a lot of research and innovation.

These programs have been instrumental in establishing new, American-made, clean energy industries. For example, prior to 2010, there actually were no large-scale photovoltaic solar projects in the United States, but after a careful review of both the opportunities and the risk, DOE's loan guarantee program supported the first five projects of this kind. And since then, the private sector has taken over financing another 45 utility-scale projects without government involvement. Any objective observer will tell you that this simply would not have happened if DOE had not fulfilled the loan program's unique role of reducing the risk of deploying new energy technologies.

The loan guarantee program is also supporting construction of the first U.S. nuclear reactors in 30 years at the Vogtle plant in Waynesboro, Georgia. And less than 2 months ago, DOE issued a conditional loan guarantee for an exciting new carbon capture and methanol production project in Lake Charles, Louisiana.

DOE's advanced technology vehicles manufacturing program which issued direct loans, is yet another success story. Not only did it help launch one of the leading electric vehicles manufacturers in the country today, Tesla Motors, but that company paid back its loan with interest almost ten years early. Overall, this program has supported the production of more than 4 million fuel efficiency cars and more than 35,000 jobs across eight States.

The record is also now abundantly clear that DOE has been carrying out these key programs in a fiscally responsible manner. Even initial critics now view the loan guarantee program as a success with losses equaling only 2.23 percent of the office's entire portfolio, a rate that is lower than any venture capitalist can achieve. While there will undoubtedly be instances when an individual project does not meet its goal, DOE's overall portfolio remains strong and healthy.

In closing, I want to emphasize there is no such thing as a free market when it comes to energy. You can tell that by all these Texans on this committee. The full cost of taxpayers of producing and ensuring the safe transportation of oil on the global market is not reflected in its price. Further, the growing cost of carbon pollution

have yet to be priced into the energy sector unfortunately. And Germany, China, India, and other leading competitors have implemented their own robust energy loan and loan guarantee programs to help them across what's often called the ″valley of death″ between clean energy and technology development and commercialization.

So DOE's loan programs are vitally important for enabling the United States to compete effectively on the world stage, and more broadly, for fostering an American-made clean energy future for all of us.

Again, I thank each of you for joining us today, and with that, Mr. Chairman, I yield back.

[The prepared statement of Ms. Johnson follows:]

OPENING STATEMENT
Ranking Member Eddie Bernice Johnson (D-TX)

House Committee on Science, Space, and Technology
Subcommittees on Energy and Oversight
"Risky Business: The DOE Loan Guarantee Program"
February 15, 2017

Good morning. Thank you Chairman Weber and Chairman LaHood for holding this hearing, and thank you to the witnesses for being here today.

We are here to discuss the record of the Department of Energy's Loan Programs Office and the unique role that these programs play in our energy innovation pipeline. They provide both direct loans and loan guarantees for projects across a broad range of energy sectors including nuclear, fossil energy, renewables, and advanced vehicles. This support is critical because private lenders are typically unwilling or unable to take on the risks associated with financing truly innovative first-of-a kind projects of this scale on their own.

These programs have been instrumental in establishing new, American-made clean energy industries. For example, prior to 2010 there actually were no large-scale photovoltaic solar projects in the U.S. But after a careful review of both the opportunities and the risks, DOE's loan guarantee program supported the first five projects of this kind, and since then the private sector has taken over – financing another 45 utility-scale projects without government involvement. Any objective observer will tell you that this simply wouldn't have happened if DOE had not fulfilled the loan programs' unique role of reducing the risk of deploying new clean energy technologies.

The loan guarantee program is also supporting construction of the first new U.S. nuclear reactors in 30 years at the Vogtle plant in Waynesboro, GA. And less than two months ago, DOE issued a conditional loan guarantee for an exciting new carbon capture and methanol production project in Lake Charles, Louisiana.

DOE's Advanced Technology Vehicles Manufacturing program, which issues direct loans, is yet another success story. Not only did it help launch one of the leading electric vehicle manufacturers in the country today, Tesla Motors, but that company paid back its loan with interest almost ten years early. Overall, this program has supported the production of more than 4 million fuel-efficient cars and more than 35,000 jobs across eight states.

The record is also now abundantly clear that DOE has been carrying out these key programs in a fiscally responsible manner. Even initial critics now view the loan guarantee program as a success, with losses equaling only 2.23% of the Office's entire portfolio – a rate that is lower than many venture capitalists achieve. While there will undoubtedly be instances when an individual project does not meet its goal, DOE's overall portfolio remains strong and healthy.

In closing, I want to emphasize that there is no such thing as a "free market" when it comes to energy. The full cost to taxpayers of producing and ensuring the safe transportation of oil on the global market is not reflected in its price. Furthermore, the growing costs of carbon pollution have yet to be priced into the energy sector, unfortunately, and Germany, China, India, and other leading competitors have implemented their own robust energy loan and loan guarantee programs to help them cross what's often called "valley of death" between clean energy technology development and commercialization. So DOE's loan programs are vitally important for enabling the United States to compete effectively on the world stage – and, more broadly, for fostering an American-made clean energy future for us all.

Again, I thank each of you for joining us today, and with that I yield back the balance of my time.

Chairman WEBER. Thank you, Ranking Member Johnson.

Our first witness today is Ms. Diane Katz, Senior Research Fellow in Regulatory Policy at the Thomas A. Roe Institute for Economic Policy Studies at the Heritage Foundation. Prior to joining the Heritage Foundation, Ms. Katz was a member of the editorial board of the Detroit News for nine years. I guess that proves there is life after editorializing. Okay. Ms. Katz holds a bachelor's degree in philosophy from Thomas Jefferson College and a master's degree in journalism from the University of Michigan. Welcome.

Our next witness is Mr. Chris Edwards, Director of Tax Policy Studies at the Cato Institute. Before joining Cato, Mr. Edwards was a Senior Economist on the Congressional Joint Economic Committee. In addition, he was a member of the Fiscal Future Commission of the National Academy of Sciences. Mr. Edwards received his bachelor's degree in economics from the University of Waterloo and his master's degree in economics from George Mason. Welcome, Mr. Edwards.

Our third witness today is Mr. Dan Reicher, Executive Director of the Steyer-Taylor Center for Energy Policy and Finance at Stanford University. Mr. Reicher previously served as Assistant Secretary of Energy for the Office of Energy Efficiency and Renewable Energy and the Department of Energy Chief of Staff both under President Clinton. Mr. Reicher, it says here you received your bachelor's degree in biology from Dartmouth, your law degree from Stanford, and your honorary doctorate from the State University of New York. Welcome.

And our final witness is Dr. Ryan Yonk, Assistant Research Professor in the Department of Economics and Finance and Research Director in the Institute of Political Economy at Utah State University. Dr. Yonk received his master's degree in political science from Utah State and his Ph.D. in political science from Georgia State. Welcome, Doctor. Is it Yonk or Yonk?

Dr. YONK. Yonk.

Chairman WEBER. It is Yonk. Well, welcome.

I now recognize myself for five minutes—whoops. I now recognize Ms. Katz—I'm sorry. I'm getting ahead of myself—for five minutes of testimony, although I've got questions I would like to ask you. So, Ms. Katz, you're recognized.

TESTIMONY OF MS. DIANE KATZ, SENIOR RESEARCH FELLOW IN REGULATORY POLICY, THOMAS A. ROE INSTITUTE FOR ECONOMIC POLICY STUDIES, THE HERITAGE FOUNDATION

Ms. KATZ. Mr. Chairman, and Members of the Subcommittee, thank you for the opportunity to address you today. My name is Diane Katz, and I'm a Senior Research Fellow in Regulatory Policy at the Heritage Foundation. The views I express in this testimony are my own and do not represent any official position of the Heritage Foundation.

My purpose here is to provide economic context to the loans and loan guarantees issued by the Department of Energy. Few Americans are aware that, collectively, we shoulder more than $18 trillion in debt exposure from loans, loan guarantees, and subsidized insurance provided by some 150 federal programs. Among them are

35 programs administered by the Department of Energy and nine other agencies that provide loans and loan guarantees for clean energy projects. This redistribution of taxpayer dollars and credit risk erodes the nations entrepreneurial spirit, undermines innovation, and fosters cronyism.

The government credit portfolio consists of subsidized financing for energy, housing, agriculture, education, transportation, exporting, small business, and others. Federal insurance programs cover bank and credit union deposits, pensions, flood damage, declines in crop prices, and acts of terrorism. Capital for mortgage lending by banks is provided by Fannie Mae and Freddie Mac. Researchers with the Federal Reserve Bank of Richmond in their bailout barometer estimate that 61 percent of all liabilities throughout the U.S. financial system are explicitly or implicitly backed by taxpayers.

Among—Americans across the political spectrum were rightly indignant to witness Washington bailing out banks and corporations during the 2008 financial crisis. In similar fashion, the Department of Energy routinely uses taxpayers' dollars to finance projects that benefit wealthy investors and titans of industry. With a market cap exceeding $573 billion, Google does not need loan guarantees from the Department of Energy. Ford Motor Company, with a market cap of $50 billion, does not need loans from the Department of Energy. Neither does British Petroleum, Chevron, or Morgan Stanley, but they benefit from them nonetheless.

With some government loans extending decades, the burden of federal credit will encumber generations to come without their consent. Advocates insist that the subsidies are necessary to equalize opportunity, create jobs, and fill gaps in private financing. However, the actual lending patterns and outcomes do not reflect the purported goals.

Government credit is a poor substitute for private financing. The purposes of the two are entirely different, as are the results. Private lenders offer credit to generate profit. The challenge they face is to minimize risk and maximize return within ever-changing market conditions. Under threat of loss, they must take great care in lending.

In contrast, government financing is detached from the profit motive and its inherent discipline because taxes provide an endless source of revenue, and federal agencies are largely shielded from accountability. Consequently, double-digit default rates are common among federal credit programs.

Too often, policymakers create subsidized financing to offset costly regulatory demands, and oftentimes, the beneficiaries are those with the most political influence, not those with the greatest need. The Department of Energy, for example, guaranteed $1.6 billion in loans for a solar thermal power facility in Southern California. The facility negotiated power purchase agreements with two California utilities, and the utilities apply the overpriced power purchases toward California's onerous renewable energy quotas. Ratepayers are forced to pay four to five times more per megawatt hour than they would otherwise. This particular facility is owned by Google; NRG Energy, market cap $5 billion; and BrightSource Energy, a privately held company that reportedly counts British Petroleum, Chevron, and Morgan Stanley among its investors.

Other beneficiaries of the Department's largesse include a Spanish banking consortium with a market cap of $76 billion; and ACS Cobra, a world leader in industrial infrastructure, market cap $9 billion.

When the government shifts credit risk to taxpayers, borrowers are relieved of the consequences of failure and act accordingly. They will still work for success of course, but there is less incentive to prevent loss. When companies do not compete for private capital based on merit, productivity and innovation become less important than political capital. Credit worthiness also becomes less relevant to banks that increasingly act as pass-through agents for government financing. The result is a larger proportion of U.S. assets that are inherently weaker than they otherwise would be if financed by the private sector.

And I'll close up. Fisker Automotive is a case in point. The Department of Energy awarded the company a $529 million loan to produce hybrid plug-in vehicles. Fisker failed to meet performance targets and ultimately filed for bankruptcy, costing taxpayers $139 million.

We will never know what innovations have gone undiscovered because of preoccupation—the Department's preoccupation with electric vehicles, solar panels, and other pet technologies, nor does government financing appear to be all that effective. The Department of Energy has been financing development of electric vehicles for 40 years.

Reform of government financing should be a Congressional priority. Unconstrained spending, unfettered losses, and rampant cronyism are only part of the cost. Trillions of dollars of credit exposure represents the commandeering of the financial services market by the government and is escalating power over private enterprise. This should end. Thank you.

[The prepared statement of Ms. Katz follows:]

Testimony of Diane Katz
Senior Research Fellow in Regulatory Policy
The Heritage Foundation
Before the
Subcommittee on Energy
Subcommittee on Oversight
Committee on Science, Space, and Technology
February 15, 2017

The government is not a canny lender.
—Henry Hazlitt

Subcommittee Chairman Weber, Subcommittee Chairman LaHood, and Members of the Subcommittees, thank you for the opportunity to address you today. My name is Diane Katz, and I am a Senior Research Fellow in Regulatory Policy at The Heritage Foundation. The views I express in this testimony are my own, and do not represent any official position of The Heritage Foundation.

Few Americans are aware that, collectively, we shoulder more than $18 trillion in debt exposure[1] from loans, loan guarantees, and subsidized insurance provided by some 150 federal programs. Among these are 35 programs administered by the Department of Energy (DOE) and nine other agencies that provide loans and loan guarantees for "clean energy" projects.[2]

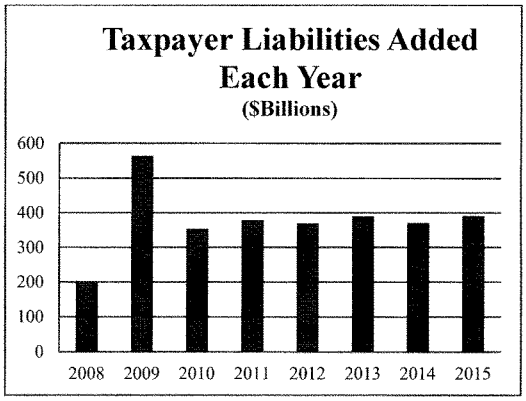
This redistribution of credit risk and taxpayer dollars erodes the nation's entrepreneurial spirit, undermines innovation, and fosters cronyism and corruption.

The government credit portfolio consists of direct loans and loan guarantees for housing, agriculture, energy, education, transportation, infrastructure, exporting, and small business, among other enterprises. Federal insurance programs cover bank and credit union deposits, pensions, flood damage, declines in crop prices, and acts of terrorism. Capital for mortgage lending by banks is provided by government-sponsored enterprises (GSEs), such as Fannie Mae and Freddie Mac.

Total outstanding loans and loan guarantees backed by taxpayers exceeded $3.4 trillion at the end of fiscal year (FY) 2015,[3] including $16 billion in direct loans from the DOE and $3 billion in DOE loan guarantees. Add in the exposure of Fannie Mae, Freddie Mac, the Federal Home Loan Banks (FHLBs), the Federal Deposit Insurance Corporation (FDIC), and the Pension

[1]"Exposure" in this context refers to the amount of potential loss from outstanding federal loans, loan guarantees, and subsidized insurance programs.
[2]Department of Energy, Federal Financing Programs for Clean Energy, 2016, https://energy.gov/downloads/federal-financing-programs-clean-energy
[3]The total includes $1.1 trillion in outstanding direct loans and $2.3 trillion in outstanding loan guarantees. Office of Management and Budget, "Analytical Perspectives: Credit and Insurance," https://www.whitehouse.gov/sites/default/files/omb/budget/fy2017/assets/ap_20_credit.pdf (accessed December 7, 2016).

Benefit Guarantee Corporation (PBGC), and the total exposure swells to an estimated $18 trillion.[4]



Source: https://fiscal.treasury.gov/fsservices/gov/debtColl/pdf/reports/debt14.pdf

Researchers with the Federal Reserve Bank of Richmond, in their "Bailout Barometer," estimate that 61 percent of *all* liabilities throughout the U.S. financial system are explicitly or implicitly backed by government (that is, taxpayers).[5] But the actual liability is greater because federal accounting methods understate the costs. Nor do government balance sheets capture the economic distortions induced by credit subsidies.

Federal credit ballooned amid the 2008 financial crisis. Between November 2008 and March 2012, the government "invested" $187.5 billion in Fannie Mae and Freddie Mac.[6] Similarly, under the Troubled Asset Relief Program, the government[7] purchased $540 billion in stock from Ally Financial, Chrysler, General Motors, AIG, and dozens of banks to shift corporate financial risks to taxpayers.[8] Despite the recession ending in June 2009, higher levels of subsidies have persisted.

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[4]Deborah Lucas, "Evaluating the Government as a Source of Systemic Risk," *The Journal of Financial Perspectives*, Vol. 2, No. 3 (November 2014), pp. 45–57, http://www.ey.com/Publication/vwLUAssets/Journal_of_financial_perspectives_20143/$FILE/EY-Journal%20of%20Financial%20Perspectives-vol%202%20Issue%203.pdf (accessed December 7, 2016).

[5]Liz Marshall, Sabrina Pellerin, and John Walter, "Bailout Barometer How Large Is the Financial Safety Net?" Federal Reserve Bank of Richmond, February 3, 2016, https://www.richmondfed.org/safetynet/ (accessed December 7, 2016).

[6]The two GSEs were placed under federal conservatorship by the Federal Housing Finance Agency on September 6, 2008, making taxpayers liable for the $5 trillion in mortgages currently owned or guaranteed by Fannie Mae and Freddie Mac. See Lucas, "Evaluating the Government as a Source of Systemic Risk."

[7]Matthew Ericson, Elaine He, and Amy Schoenfeld, "Tracking the $700 Billion Bailout," *The New York Times*, 2009, http://www.nytimes.com/packages/html/national/200904_CREDITCRISIS/recipients.html (accessed December 7, 2016).

[8]Lucas, "Evaluating the Government as a Source of Systemic Risk."

Americans across the political spectrum were (and are) rightfully indignant to see their taxes used to protect the profits of banks and multinational corporations. In a great many instances, the DOE is continuing that practice by financing projects that benefit wealthy investors and titans of industry.

With a market cap exceeding $573 billion, Google does not need government loan guarantees from the Department of Energy. Ford Motor Company, with a market cap of $50 billion, does not need government loans from the Department of Energy. Neither does British Petroleum, Chevron or Morgan Stanley.

Appropriations for Department of Energy Loans and Loan Guarantees

Year	Loan Authority[9]	Program
2007	$4 billion	Title XVII Loan Guarantees
2009	$47 billion	Title XVII Loan Guarantees
2009	$2.5 billion	Title XVII Credit Subsidy Support
2009	$25 billion	Advanced Technology Vehicle Manufacturing Loans
2009	$7.5 billion	Advanced Technology Vehicle Manufacturing Subsidy Support
2011	($17 billion)	Title XVII Loan Guarantees
2011	$170 million	Title XVII Credit Subsidy Support
2015	$1 billion	Title XVII Loan Guarantees
2017	$4 billion*	Title XVII Loan Guarantees

*Requested

With some government loans extending 40 years, the ever-growing burden of federal credit will encumber generations to come—without their consent. Advocates insist that the subsidies are necessary to equalize opportunity, create jobs and fill gaps in private financing. Upon examination, however, the actual lending patterns and outcomes do not fulfill the programs' purported goals.[10]

Distortions

Proponents say that government lending is necessary to spur economic growth, or to mitigate "market imperfections,"[11] such as gaps in available financing or lack of competition (leading to unduly high credit costs). But government credit is a poor substitute for private financing. The purposes of the two are entirely different, as are the repercussions.

Private lenders offer credit to generate profit. The challenge they face is to minimize risk and maximize return—within ever-changing market conditions. Under threat of loss (and independent of government meddling), great care is taken in lending decisions.

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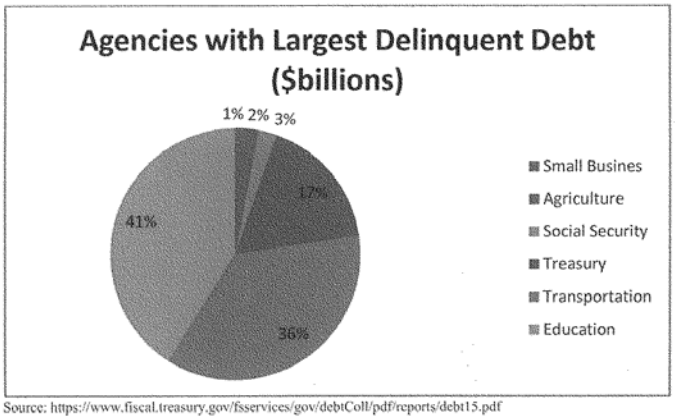
[9]Budget of the U.S. Government, Fiscal Year 2017, Analytical Perspectives, https://www.gpo.gov/fdsys/pkg/BUDGET-2017-PER/content-detail.html

[10]Veronique de Rugy, Assessing the Department of Energy Loan Guarantee Program, Mercatus Center, George Mason University, June 9, 2012, https://www.mercatus.org/publication/assessing-department-energy-loan-guarantee-program

[11]Office of Management and Budget, "Analytical Perspectives: Credit and Insurance."

In contrast, government financing is entirely detached from the profit motive (and its inherent discipline) because taxes provide an endless source of revenue, and bureaucrats are largely shielded from accountability. Losses are dispersed among millions of taxpayers, and are often justified as the cost of reducing inequities in access to capital. Consequently, double-digit default rates are common among federal credit programs.[12]



Source: https://www.fiscal.treasury.gov/fsservices/gov/debtColl/pdf/reports/debt15.pdf

Government credit redistributes risk and access to capital. In many instances, policymakers devise this redistribution to soften costly regulatory demands. And oftentimes, the biggest beneficiaries are those with the most political influence, not those with the greatest need.[13]

The DOE, for example, guaranteed $1.6 billion in loans for the Ivanpah project, a solar thermal power[14] facility in southern California. The facility entered into long-term contracts with Pacific Gas & Electric and Southern California Edison for the purchase of the power generated there, and the utilities will apply these overpriced power purchases toward meeting California's onerous renewable energy quotas.

The long-term contracts with Ivanpah also mean ratepayers will pay two to three times as much per megawatt-hour as other solar power producers, and four to five times per megawatt-hour as natural gas-powered plants.[15]

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[12]Office of Management and Budget, *Federal Credit Supplement: Budget of the United States Government, Fiscal Year 2017*, "Supplemental Materials, Direct Loans Assumptions Underlying the 2016 Subsidy Estimates," https://www.whitehouse.gov/sites/default/files/omb/budget/fy2017/assets/cr_supp.pdf (accessed December 7, 2016).
[13]See, for example, Diane Katz, "The Export–Import Bank Corporate Welfare on the Backs of Taxpayers," Heritage Foundation *Issue Brief* No. 4198, April 11, 2014, http://thf_media.s3.amazonaws.com/2014/pdf/IB4198.pdf.
[14]Mirrors reflect sunlight to boilers that create steam to drive conventional turbines that produce electricity.
[15] David Kreutzer, Taxpayers Are Footing Bill for Solar Project That Doesn't Work, CNSnews.com, March 30, 2016, http://www.cnsnews.com/commentary/david-kreutzer/taxpayers-are-footing-bill-solar-project-doesnt-work

Ivanpah is owned by NRG Energy Inc. (market cap $5.1 billion), Google (market cap $573.8 billion), and BrightSource Energy Inc., a privately held company that reportedly counts Google, BP, Chevron and Morgan Stanley among its investors.

Other beneficiaries of DOE largesse include Banco Santander, a Spanish banking consortium with a market cap of $76 billion, which ranked it as 37th in the Forbes Global 2000 list of the World's biggest public companies; ACS Cobra, a world leader in industrial infrastructure (market cap $9 billion); and Ford Motor Co. (market cap $49.7 billion).

These companies hardly lack access to private capital. This project is no anomaly among DOE's finance programs.

Well-intended or otherwise, there is abundant evidence that government financing produces more harm than benefit for the nation as a whole. For one thing, government credit represents a subsidy (either explicitly or implicitly). Because there is virtually no chance that the government will not cover a loss, federal credit is provided on more favorable terms than financing from a private lender, including:[16]

- Interest rates below commercial levels,
- Longer maturities than private loans,
- Deferral of interest,
- Allowance of grace periods,
- Waiver or reduction of loan fees,
- Higher loan amount relative to the enterprise value, and
- Availability of funds for purposes for which the private sector would not lend.

Whether government credit is provided as a loan or loan guarantee, it constitutes a risk borne by taxpayers for the benefit of a private party. That risk—multiplied by tens of thousands of transactions—carries direct and indirect consequences for the nation.

Indeed, when the government shifts credit risk to taxpayers, borrowers are largely relieved of the consequences of failure, and act accordingly. As noted by economist Henry Hazlitt,[17]

> Responsibility follows risk. When an owner's risk in an enterprise has been minimized or eliminated because the government has supplied the funds which he otherwise would have to supply, then, speaking comparatively, the owner tends to feel no great pain from the failure of the enterprise. He would stand to gain by its success, of course, and so he

[16]This list appears in James M. Bickley, "Budgetary Treatment of Federal Credit (Direct Loans and Loan Guarantees): Concepts, History, and Issues for the 112th Congress," Congressional Research Service, July 27, 2012, https://www.fas.org/sgp/crs/misc/R42632.pdf (accessed December 7, 2016), and was paraphrased from U.S. Executive Office of the President, Office of Management and Budget, *Special Analysis F, Federal Credit Programs, Budget of the United States, Government, Fiscal Year 1988.*

[17]Henry Hazlitt, "Government Lending," *Newsweek*, July 1, 1956, https://fee.org/articles/government-lending/ (accessed December 7, 2016).

> would tend to work for its success; but his position is an unbalanced one because he will not try desperately to prevent its failure.

When borrowers need not compete for private loans based on merit, productivity improvements and innovation become less important than political capital. Moreover, credit-worthiness also becomes less relevant to banks and mortgage lenders that act as pass-through agents for government financing.

The result is a larger proportion of economic assets (in the form of both property and enterprise) that are inherently weaker than they otherwise would be if financed by private lenders instead of government (taxpayers).

Fisker Automotive is a case in point.[18] The DOE awarded the electric car company a $529 million loan in April 2010 to develop and produce two lines of hybrid plug-in vehicles at a plant in Delaware. Fisker's inability to meet performance targets forced the DOE to cap the loan at $192 million. Fisker filed for bankruptcy in November 2013, and taxpayers lost $139 million.

Government financing also distorts the allocation of private lending. As noted by economist Jeffrey Lacker, president of the Federal Reserve Bank of Richmond, "These government lending programs, by targeting particular market sectors, alter the allocation of credit across markets. Consequently, while some market segments benefit from reduced funding costs, others may actually see their costs rise as credit is diverted to those markets that have been targeted for support."[19]

We will never know what innovations have gone undiscovered because of Washington's financial and regulatory preoccupation with electric vehicles, solar panels and other pet technologies. Evidently, the government financing isn't too effective since it never ends. The DOE, for example, has been financing development of electric and hybrid vehicles for more than 40 years. But sales remain a fraction of the auto fleet. Washington evidently bet on the wrong horse (so to speak).

There is also a pernicious regulatory chain reaction when policymakers engage in lending. As Hazlitt noted, "[When] the government provides the financing, the private property becomes public property instead and the government has the right to decide how, where, when, and by whom the property shall be used."[20]

All of which increases the costs to consumers, who take a double-hit: not only are they forced to subsidize energy producers, but they pay more for products and services that are heavily regulated.

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[18]Nick Loris, Examining the Department of Energy's Loan Portfolio, March 3, 2016, file:///C:/Users/Diane%20Katz/Downloads/Loris_Testimony_160303.pdf

[19]Jeffrey M. Lacker, "Government Lending and Monetary Policy," Federal Reserve Bank of Richmond, remarks at the Washington Economic Policy Conference of the National Association for Business Economics, March 2, 2009, https://www.richmondfed.org/press_room/speeches/president_jeff_lacker/2009/lacker_speech_20090302 (accessed December 7, 2016).

[20]Hazlitt, "Government Lending."

Purported Benefits
Proponents of government credit contend that the social goals for which the subsidies are employed justify—or at least offset—the market distortions, regulatory onslaught, and taxpayer risk they produce.

Whether subsidized financing achieves the goals set by policymakers is dubious; there is very little measurement of program results, and abundant evidence of negative consequences. Under the Government Performance and Results Act of 1993, for example, Congress directed federal agencies to set goals and report on their progress. But the metrics largely measure only inputs (such as the number of loans awarded), not outcomes.

In testimony to this committee last year, my colleague Nick Loris[21] reviewed each of the projects in the DOE's loan portfolio. He found repeated incidences of the following:

- Failed companies that could not survive even with the federal government's help.
- Projects labeled as success stories but are still in the infancy of their operation and it is too early to tell if they will succeed in the long run.
- Projects that have the backing of companies with large market capitalizations and substantial private investors. These companies should have no trouble financing a project without government-backed loans if they believe it is worth the investment.
- Private investors hedging their bets and congregating toward public money. These projects on their surface appear to be financial losers but the government involvement entices companies to take a chance.
- Companies and projects that benefit from a plethora of federal, state, and local policies that push renewable energy.
- Government incompetence in administering and overseeing the loans.

At the very least, any benefit derived from government credit is offset by handicapping enterprises that operate without subsidies.

Tracking Costs
The Federal Credit Reform Act (FCRA) of 1990 requires agencies to estimate the long-term costs (including subsidy costs) of loans and loan guarantees, and to "true up" those figures annually (after the end of the fiscal year) to reflect actual loan performance and to incorporate any changes in projections of future loan performance.

However, the methods required by law to do so produce imprecise results, and, consequently, faulty projections of budgetary gains and losses. There are also inconsistencies among agencies in scoring, and scarce oversight by Congress of payment errors and default rates.[22]
Under the FCRA, the subsidy cost of federal credit is calculated by first converting all future loan costs and revenue into a "net present value."[23] Because $100 to be received a year from now

[21]Nick Loris, Examining the Department of Energy's Loan Portfolio, March 3, 2016, file:///C:/Users/Diane%20Katz/Downloads/Loris_Testimony_160303.pdf
[22]Government Accountability Office, "Credit Programs: Key Agencies Should Better Document Procedures for Estimating Subsidy Costs," GAO-16-269, July 2016, http://www.gao.gov/assets/680/678373.pdf (accessed December 7, 2016).

is not worth as much as $100 today (which could be invested now and grow larger over the next year), a discount rate is applied to future revenues when calculating the net present value. Under the FCRA, that discount rate is tied to the interest rate on U.S. Treasury securities.[24]

If the present value of estimated cash outflows exceeds cash inflows, there is a subsidy cost. If the present value of estimated cash inflows exceeds cash outflows, there is a negative subsidy cost, referred to as "subsidy income."

However, as currently calculated, subsidy estimates consistently understate costs because of the nature of the discount rate applied when calculating net present value. Treasury yields are lower than private securities because there is virtually no risk that the government will default. This low rate does not account for the actual risks that government loans represent. Therefore, the government's accounting method produces artificially high estimates of future revenue. (In other words, the lower the discount rate, the higher the present value of future income.) The use of these artificially low discount rates makes government loans appear to generate income for the Treasury.

Inaccurate budget estimates feed the propensity of government to minimize costs, and induce policymakers to expand federal credit rather than adopt other policy tools. All of which increases the risk to taxpayers.

Most agencies have been granted "permanent indefinite authority" to obtain additional funds from the Treasury to cover higher subsidy costs that result from annual re-estimates. That means the actual costs are largely hidden.

How should agencies calculate subsidy costs? The Financial Economists Roundtable recommends that subsidy costs be calculated using the same discount rates as private lenders. Those rates would be higher than Treasury rates, thereby reducing the present value of future income—and thereby providing a more accurate estimate of the costs to taxpayers.

According to Lucas, "Private-sector financial institutions are responsible for reporting fair values [of loans and guarantees], so there is an entire infrastructure for providing these values."[25]

Conclusion

Reform of government financing has not been a congressional priority. Few taxpayers are aware of the extent of the burden, and the subsidies have given rise to powerful constituencies of beneficiaries. And unconstrained spending, unfettered loses, and rampant cronyism are only part of the cost of the government's vast credit racket. Trillions of dollars of credit subsidies represent the commandeering of financial services by government and its escalating power over private enterprise.

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[23]The net present value represents the loan disbursements and claim payments to lenders minus estimated cash flows to the government from loan repayments, interest payments, fees, and default recoveries on defaulted loans over the life of the loan, excluding administrative costs.

[24]More precisely, "the average interest rate on marketable Treasury securities of similar maturity." Section 502(5E).

[25]Financial Economists Roundtable, "Accounting for the Cost of Government Credit Assistance," October 2012, http://www.chandan.com/content/knowledgewharton/real-cost-government-loans-and-credit-guarantees (accessed December 7, 2016).

Appendix:
Federal Credit Programs by Agency

Loans

Agriculture
- Agriculture Credit Insurance Fund
- Farm Storage Facility Loans
- Apple Loans
- Boll Weevil Eradication Loan Program
- Distance Learning, Telemedicine, and Broadband Loans
- Rural Electrification and Telecommunications Loans
- Rural Telephone Bank
- Rural Housing Insurance Fund
- Rural Economic Development Loans
- Rural Development Loan Program
- Rural Community Facilities Program
- Rural Business and Industry Program
- Rural Water and Waste Disposal Program
- Rural Community Advancement Program
- Public Law 480
- Title I Food for Progress Credits
- Multifamily Housing Revitalization Program
- Rural Microenterprise Investment Program

Commerce
- Fisheries Finance

Defense–Military Programs
- Military Housing Improvement Fund

Education
- Federal Direct Student Loan Program
- Temporary Student Loan Purchase Authority
- College Housing and Academic Facilities Loans
- Historically Black Colleges and Universities
- TEACH Grants

Energy
- Advanced Technology Vehicle Manufacturing Fund
- Title 17 Innovative Technology Fund

Health and Human Services
- Consumer Operated and Oriented Plan
- Consumer Operated and Oriented Plan Program Contingency Fund

Homeland Security
Disaster Assistance

Housing and Urban Development
Green Retrofit Program for Multifamily Housing

Interior
Bureau of Reclamation Loans
Bureau of Indian Affairs Direct Loans
Assistance to American Samoa

State
Repatriation Loans

Transportation
Alameda Corridor Loan
Transportation Infrastructure Finance and Innovation
Railroad Rehabilitation and Improvement Program
Highway Infrastructure Investment, Recovery Act

Treasury
GSE Mortgage-Backed Securities Purchase Program
Community Development Financial Institutions Fund
Troubled Asset Relief Program Direct Loan
Troubled Asset Relief Program Equity
Small Business Lending Fund

Veterans Affairs
Veterans Housing Benefit Program Fund
Native American Veteran Housing
Vocational Rehabilitation Loans

Environmental Protection Agency
Abatement, Control, and Compliance

International Assistance Programs
Foreign Military Financing
U.S. Agency for International Development, Micro and Small Enterprise Development
Overseas Private Investment Corporation, OPIC Direct Loans
IMF Quota 4
Loans to the IMF Direct Loan Program
Debt Reduction

Small Business Administration
Business Loans
Disaster Loans

Other Independent Agencies
Export–Import Bank Direct Loans
Federal Communications Commission

Loan Guarantees

Agriculture
Agriculture Credit Insurance Fund
Agriculture Resource Conservation Demonstration
Biorefinery Assistance
Commodity Credit Corporation Export Guarantees
Rural Electrification and Telecommunications Loans
Rural Housing Insurance Fund
Rural Business and Industry Program
Rural Community Facilities Program
Rural Water and Waste Disposal Program
Rural Community Advancement Program
Rural Energy for America
Rural Business Investment Program

Commerce
Fisheries Finance
Emergency Steel Guaranteed Loans
Emergency Oil and Gas Guaranteed Loans

Defense–Military Programs
Military Housing Improvement Fund
Defense Export Loan Guarantee
Arms Initiative Guaranteed Loan Program

Education
Federal Family Education Loan Program

Energy
Title 17 Innovative Technology Fund

Health and Human Services
Heath Center Loan Guarantees
Health Education Assistance Loans

Housing and Urban Development
- Indian Housing Loan Guarantee
- Title VI Indian Guarantees
- Native Hawaiian Housing
- Community Development Loan Guarantees
- FHA-Mutual Mortgage Insurance
- FHA-General and Special Risk
- Guarantees of Mortgage-Backed Securities

Interior
- Bureau of Indian Affairs Guaranteed Loans
- Bureau of Indian Affairs Insured Loans

Transportation
- Maritime Guaranteed Loans (Title XI)
- Minority Business Resource Center

Treasury
- Air Transportation Stabilization Program
- Troubled Asset Relief Program
- Troubled Asset Relief Program, Housing Programs

Veterans Affairs
- Veterans Housing Benefit Fund Program

International Assistance Programs
- U.S. Agency for International Development
  - Development Credit Authority
  - Micro and Small Enterprise Development
  - Urban and Environmental Credit
  - Assistance to the New Independent States of the Former Soviet Union
  - Loan Guarantees to Israel
  - Loan Guarantees to Egypt
  - Loan Guarantees to Middle East and North Africa
- Overseas Private Investment Corporation, OPIC Guaranteed Loans

Small Business Administration
- Business Loans

Other Independent Agencies
- Export–Import Bank Guarantees

Diane Katz is a Senior research fellow in regulatory policy at The Heritage Foundation.

A policy analyst from Detroit, Katz joined Heritage's Thomas A. Roe Institute for Economic Policy Studies in August 2010.

She previously was director of risk, environment and energy policy for three years at the Fraser Institute, an independent policy research and educational organization in Canada.

From 2002 to 2008, she was director of science, environment and technology for the Mackinac Center for Public Policy, a free market think tank in Midland, Mich.

As a member of the editorial board of the Detroit News for nine years, Katz specialized in writing about science and the environment, telecommunications and technology, and the auto industry.

She also covered national issues as a reporter in the newspaper's Washington bureau. Her work won top honors from the Michigan Press Association in 1994, 1996, 1997 and 1998.

Katz's analyses and commentary have been published by The Wall Street Journal, The Washington Times, National Review, The Weekly Standard and Reason Magazine in addition to dozens of regional and local newspapers.

She has testified before Congress and several state legislatures.

Katz was awarded fellowships by the Jack R. Howard Science Institute for Journalists at the California Institute of Technology, the Paul Miller Washington Reporting Fellowship of the National Press Foundation and programs at the Kinship Conservation Institute and the Political Economy Research Center.

She holds a bachelor's degree in philosophy from Thomas Jefferson College and a master's degree in journalism from the University of Michigan.

Chairman WEBER. Thank you, Ms. Katz.
I now recognize Mr. Edwards for five minutes.

TESTIMONY OF MR. CHRIS EDWARDS, DIRECTOR, TAX POLICY STUDIES, CATO INSTITUTE

Mr. EDWARDS. Thank you very much.
[Audio malfunction in hearing room.]
Chairman WEBER. There we go.
Mr. EDWARDS. Today, 29 States impose renewable portfolio standards that require purchases of renewable energy such as solar and wind, so it seems to me with that high level of state support, layering on top federal subsidies is overkill.

Secondly, the failures like Solyndra have been mentioned, and it is true that the DOE appears to have a low default rate on its loan portfolio. But to an economist the real issue is are the benefits of these projects higher than the costs, and in a lot of cases I don't think they are.

And to give you one example, the Ivanpah solar project in California has been mentioned. It strikes me that there's been very high cost there with moderate or low benefits. The project is generating a lot less power than promised. It's using a lot more natural gas to fire up its facility every day than promised, and the price of power is a lot higher than natural gas fuel generation in California.

I also think the $8 billion loan guarantee for the nuclear power plant in Georgia owned by Southern Company, that's been a rather dubious loan as well. That project is far behind schedule and far over cost.

A third issue is the corporate welfare and cronyism issue. The Washington Post, looking at Obama's subsidies, concluded, quote, "Obama's green technology program was infused with politics at every level," unquote.

Public opinion polls over recent years have shown plunging support both for federal politicians and for big businesses, and I think part of the issue is cronyism. I think both big business and federal lawmakers would gain a lot more public support if they separated themselves more, if they ended corporate welfare, allowed big business to earn profit and loss without federal intervention.

A fourth issue is that the private sector can fund alternative energy itself these days. As has been mentioned, most DOE loan guarantees in this program have backed wealthy investors and large corporations. Warren Buffett's Berkshire Hathaway has invested $17 billion in renewable energy projects over the last decade. To me this shows that there's a heck of a lot of private cash available for renewable energy these days, and the time for federal intervention, I think we're beyond that. These are large and mature industries these days that should be able to fund themselves.

A fifth issue is that subsidies distort decision-making. In technology-based industries like renewable energy, it is the leanest and quickest and most adaptive firms that usually succeed. I think federal subsidies undermine private productivity. I think they tend to make businesses slow and slow to change as markets are constantly changing. So I think subsidies undermine private innovation and productivity.

So without programs like this, what can the federal government do? I think one thing the federal government can do is do major tax reform. Rather than subsidizing debt for particular projects like DOE loan guarantee program did, I think Congress should look at reforming the tax code to reduce the cost of equity financing across the economy. Rather than favoring particular projects, Congress should do things like reducing capital gains tax rates, which will incentivize more venture and angel investment in advanced industries like renewable technology.

Also, I'm a big fan of capital expensing, which is part of the House Republican tax plan. Capital expensing is very much a green tax policy reform. Not only does—capital expensing would benefit a capital-intensive industries like utilities and energy, expensing would encourage businesses in all industries to more rapidly change and invest, replacing their old structures, their old equipment and technologies that tend to be less energy-efficient with new structures and new equipment and machinery which is more energy-efficient. So I think tax reform can very much be an exercise in green policymaking on Capitol Hill.

So to conclude, I think Republicans are in a unique position to start cutting back on some business subsidies like the DOE loan guarantees because Republicans are also promising to reduce taxes and reduce regulation on business. So business would lose federal handouts on the one hand but on the other hand the regulatory tax burdens faced by businesses would fall. I think that would be a good trade that would benefit everyone and the economy. Thank you.

[The prepared statement of Mr. Edwards follows:]

Department of Energy Loan Programs

Statement of Chris Edwards, Cato Institute

before the Subcommittees on Energy and Oversight,

House Committee on Science, Space, and Technology,

February 15, 2017

Mr. Chairman and members of the committee, thank you for inviting me to testify. I will discuss reasons why Congress should end funding for Department of Energy (DOE) loan guarantee programs.

The federal government has subsidized the energy sector for decades. The DOE runs an array of programs in support of the conventional and renewable energy industries, and there are about 20 special breaks for energy activities under the federal income tax.

DOE projects have often suffered from poor management, and numerous federal energy projects over the years have been costly failures.[1] The failures span from the Clinch River Breeder Reactor and Synthetic Fuels Corporation projects of the 1970s and 1980s to the FutureGen and Solyndra projects of recent years.

Today's hearing looks at the section 1703 and 1705 guaranteed loan programs created in 2005 and 2009 respectively. Under the American Recovery and Reinvestment Act (ARRA), the DOE provided $22 billion of 1703 and 1705 loan guarantees between 2009 and 2015, and it provided $8 billion for the Advanced Technology Vehicles Manufacturing (ATVM) loan program.[2] The ARRA also included the Section 1603 program, which provided the Department of Treasury with $24 billion to hand-out in energy grants.[3]

My testimony looks at these programs and discusses broader concerns about federal subsidies for energy businesses. It concludes that spending on applied energy technologies should be left to the private sector, and that tax reform would spur investment in both the conventional and renewable energy industries.

Four Decades Is Enough

Business subsidies are sometimes supported based on the "infant industry" idea. The theory is that new companies—such as solar and wind energy firms— need government aid so that they can build economies of scale and compete against larger firms.

However, what we often see in the U.S. economy is that new companies—without subsidies—enter markets and outcompete existing large companies. New products and technologies are

often pioneered by new companies, not existing ones, and so there is no need to subsidize new ventures since they have inherent advantages over other firms.[4]

Even if the "infant industry" idea was valid, it is not relevant for the industries subsidized by DOE loan programs. The federal government has been subsidizing the nuclear power industry since the 1950s and the renewable energy industry since the 1970s. The Energy Tax Act of 1978, for example, included tax credits for solar, wind, and other alternative energy technologies.

After decades of subsidies, policymakers should allow the conventional and renewable energy industries to stand on their own feet. We should move toward a level playing field in energy, but we should also make tax and regulatory reforms to foster a dynamic energy marketplace based on private research and innovation.

The head of DOE's loan office testified to the House in 2016: "Today, solar projects at this scale are readily financed by private lenders."[5] That suggests that such projects no longer need federal subsidies. These days the solar and wind industries can raise investment funds through their net earnings and private capital markets, just as other industries do.

Most of the solar and wind projects receiving DOE loan guarantees have been backed by large corporations and have gained favorable utility purchase deals. The Government Accountability Office noted in 2016, "In DOE's portfolio, 21 of the 30 projects had guaranteed revenue streams provided for under a long-term contract, such as a power purchase agreement."[6]

Today, 29 states impose "renewable portfolio standards" that require such purchases.[7] In many states, the mandated purchase amounts are increasing over time. State and local governments also provide a slew of other spending and tax code subsidies for renewables. The proliferation of state aid for renewables indicates that the layering on top of federal subsidies is overkill.

Failures and Boondoggles

The most famous recipient of DOE's 1705 program was Solyndra, a maker of solar panels, which received a $535 million loan guarantee in 2009. President Barack Obama visited Solyndra and called the company an "engine of economic growth."[8] But the company was spendthrift, and its products were uncompetitive. As a result, it went bankrupt and closed its doors in 2011. Taxpayers footed the bill for the failed loan.

There were other failures in the 1705 program. Abound Solar received a $400 million loan guarantee in 2010. The company went bankrupt in 2012, leaving behind polluted facilities in Colorado. And Fisker Automotive received a $192 million loan in 2010. Vice President Joe Biden championed Fisker's facility in his home state, but the company went bankrupt and ceased operations in 2013. The DOE recovered a portion of the loan amount, but taxpayers were left with loss of $139 million for Fisker.[9]

The DOE says that the overall rate of losses on its loan portfolio is low.[10] But that is because most of the projects have been solar and wind facilities that have taken advantage of utility purchase requirements for renewables. Of course it is a low risk for the government to guarantee

loans for companies that have guaranteed revenues, but that suggests that federal subsidies were not needed in the first place. Federal aid has simply enhanced the profits for the private investors in many solar and wind projects.

DOE's touting of a low failure rate is off-base in another respect. Aside from the bankruptcies, other DOE projects have been losers because their costs likely exceed their benefits. DOE provided $8.3 billion in loan guarantees to Southern Company and partners for the construction of the Vogtle 3 and 4 nuclear reactors in Georgia. The project has turned into somewhat of a debacle, as it is years behind schedule and the estimated total costs have risen from $14 billion to $21 billion.[11]

In California, the Ivanpah solar thermal project, partly owned by Google and NRG Energy, received a $1.6 billion DOE loan guarantee in 2011. It is generating two-thirds or less of the power that was planned, and it burns substantial natural gas to heat up each day.[12] The power it produces is expensive, running between $135 and $200 per megawatt-hour, which compares to power from California's natural gas plants of about $35 per megawatt-hour.[13] The Ivanpah project also kills thousands of birds each year.[14]

Corporate Welfare and Cronyism

Business subsidies generate a corrupting relationship between businesses and policymakers. During the Obama administration, politics played a key role in the awarding of energy subsidies. In an investigation, the *Washington Post* found, "Obama's green-technology program was infused with politics at every level."[15] The newspaper found that "$3.9 billion in federal [energy] grants and financing flowed to 21 companies backed by firms with connections to five Obama administration staffers and advisers."[16]

Solyndra was a classic example of cronyism. The *New York Times* found that the company "spent nearly $1.8 million on Washington lobbyists, employing six firms with ties to members of Congress and officials of the Obama White House."[17] And the *Washington Post* found that the "main players in the Solyndra saga were interconnected in many ways, as investors enjoyed access to the White House and the Energy Department."[18] A key Solyndra investor was billionaire George Kaiser, who was also a major fundraiser for President Obama. The DOE was apparently pressured by the White House to approve the subsidy.[19]

The Trump administration would be wise to cut business subsidies and avoid these sorts of entanglements. Public opinion polls have shown plunging support for both politicians and big businesses over the years, and one of the reasons is the cronyism evident in Washington. The rise of populist politicians in 2016—particularly Bernie Sanders and Donald Trump—indicate that many Americans think that the "system is rigged." To most people, it is unfair that when subsidized companies earn profits they pocket them, but when they go bankrupt taxpayers foot the bill, as they did with Solyndra.

Businesses and policymakers would gain more public respect if they cut ties to each other by ending corporate welfare. In energy policy, Congress should end subsidies such as DOE loan programs and create a level playing field for energy businesses and technologies.

The Private Sector Can Fund Alternative Energy

Many DOE loan guarantees have gone to projects backed by wealthy investors and large corporations, such as Warren Buffett and General Electric.[20] Such individuals and companies are fully capable of pursuing energy projects with their own private financing.

The effect of DOE aid is to boost private returns at taxpayer expense. The *New York Times* described the gusher of energy spending in recent years as a "banquet of government subsidies," and wondered whether "the Obama administration and state governments went too far in their support of solar and wind power projects, some of which would have been built anyway, according to the companies involved."[21]

Consider, for example, that ethanol is heavily subsidized by the Renewable Fuel Standard and other federal programs. Yet, for some reason, the DOE decided to give the U.S. subsidiary of Spanish conglomerate Abengoa a $132 million loan guarantee and a $97 million grant for an ethanol plant in 2011.[22]

The *New York Times* stressed the overkill of DOE subsidies: "The government support—which includes loan guarantees, cash grants and contracts that require electric customers to pay higher rates—largely eliminated the risk to the private investors and almost guaranteed them large profits for years to come. The beneficiaries include financial firms like Goldman Sachs and Morgan Stanley, conglomerates like General Electric, utilities like Exelon and NRG—even Google."[23]

Consider the Agua Caliente solar project in Arizona, which is owned by NRG, a large energy utility. DOE gave it a $1 billion loan guarantee in 2011, which ended up subsidizing Warren Buffett whose Berkshire Hathaway purchased 49 percent of the project in 2012. Buffett is one of the richest people in America, with wealth of about $60 billion in 2016.

Similarly, the Alamosa solar project in Colorado did not need federal subsidies. DOE gave it a $91 million loan guarantee in 2011 and the Treasury gave it a $35 million 1603 grant in 2012. Yet the project had been owned by Goldman Sachs, and is today owned by the Carlyle Group, which is one of the largest private equity firms in the world.

And there is the Shepherds Flat wind farm in Oregon. It is owned by Caithness Energy and received large investments by General Electric, Google, and other major corporations. Despite these well-heeled backers, the project received a $1.3 billion DOE loan guarantee in 2010, as well as state subsidies.[24] Power from the project is being sold to Southern California Edison, taking advantage of California's mandate for utilities to purchase renewable power. By the way, wind farms may not be so great for the environment because they kill hundreds of thousands of birds and bats each year.[25]

Throughout American history, venture investors, entrepreneurs, and businesses have taken risks and pumped money into new products and technologies. That is true of the energy sector, and in recent years we've seen billions of private dollars flowing to renewable energy projects. Warren

Buffett's Berkshire Hathaway has invested $17 billion into renewable energy since 2004.[26] With that kind of private cash available for renewables, we do not need the DOE handing out loan guarantees and other business subsidies.

Subsidies Distort Decisionmaking

Federal energy subsidies create counterproductive incentives in the economy.[27] One problem is that subsidized firms tend to become slow and spendthrift. Solyndra neglected cost control and did not adjust quickly enough as the solar industry was changing. In technology based industries, the leanest and quickest firms usually succeed.

Another problem is that subsidies are not driven by consumer demands, so they can induce firms to invest in activities that will not succeed in the marketplace in the long term. No one can accurately predict the future of the energy economy, but subsidies distort the best judgement of businesses based on market indicators and consumer feedback.

When private investors are induced by subsidies to put their money into dubious projects, the harm comes both from the wasting of tax dollars and the wasting of private resources. The more that green energy is subsidized by multiple federal and state sources, the more that green businesses will be divorced from markets and consumers.

Subsidies can distort the structure of businesses. As one example, governments always focus on the number of jobs created by subsidized projects, but to succeed in competitive markets businesses need to minimize labor costs and be as lean as possible. Also, subsidies many induce businesses to set up facilities in more costly locations than otherwise, which works against them in the long run. One solar executive testifying to Congress noted, "giving companies money to set up manufacturing in the U.S. may doom them to failure by financing them into a strategically uncompetitive position."[28]

Finally, a widely noted effect is that businesses with weak ideas are often the ones that get in line for government handouts because the businesses with good ideas can get private funding and often do not want the bureaucratic hassles of subsidies. One economist quipped, "I don't know whether the government is better at picking winners rather than losers, but I do know that losers are good at picking governments."

Reform Taxes to Spur Energy Investment

In the private sector, business investments are financed with earnings, debt, and equity. The DOE says that on its loan and loan guarantee projects, there is $18 billion in private investor financing and $30 billion in outstanding guaranteed debt.[29] Federal loan guarantees subsidize the debt financing portion of chosen projects.

But rather than subsidizing debt for specific projects, the government would spur more economic growth by reducing taxes on equity for all investments. Debt is already favored under the federal income tax compared to equity, so reforms should aim to reduce the taxation of equity. That

would increase returns on investment, including in technology industries such as renewable energy.

Capital gains taxes are particularly important for technology industries. Technology investors take risks on unproven ventures in the hopes that their bets pay off years down the road. Their reward for putting up "patient capital" is a possible capital gain on some of their investments. Thus the capital gains tax rate directly affects the willingness of investors to back renewable energy and other risky projects instead of safer investments.

Reducing the capital gains tax rate would spur more investment in start-ups and growth companies by angel investors, venture capitalists, and wealthy entrepreneurs. Lower capital gains tax rates would also encourage more people to become entrepreneurs because the payoff from a successful start-up would be improved compared to a wage job. Historically, Silicon Valley roared to life after reductions in the top federal capital gains tax rate from 40 percent in 1978 to 20 percent in 1981.

Looking ahead, cutting the top federal capital gains tax rate from 23.8 percent to 16.5 percent, as proposed by House Republicans, would be a favorable reform. Nearly all other high-income nations have capital gains tax rates below their ordinary rates, partly because they recognize the importance of capital gains to growth and technology firms. The average top capital gains tax rate across the Organization for Economic Cooperation and Development is about 16 percent.[30]

House Republicans are also proposing a sharp cut to the corporate income tax rate. As noted, many large-scale solar and wind projects have been backed by major corporations, and so such projects would benefit from a corporate tax rate cut.

Republicans are also proposing to allow businesses to expense investment, which would encourage investment in capital intensive industries such as energy and utilities. One study found that current depreciation rules create a hurdle to investment in some green assets, such as pollution control equipment and electricity smart meters.[31] Expensing would solve that problem. And, in general, expensing would promote the replacement of all types of older capital assets in the economy with newer capital assets, which are usually more energy efficient.

Conclusions

U.S. energy markets have changed dramatically over the past decade. Technological advances in the oil and natural gas industries—particularly hydraulic fracturing and horizontal drilling—have led to large increases in domestic production. U.S. imports of oil and gas have plunged, while exports have increased. U.S. businesses and consumers have benefited as gasoline and natural gas prices have fallen in recent years.

This energy revolution was driven by private innovation and competitive markets, and it has created environmental as well as economic benefits. Cleaner natural gas is replacing coal as a fuel source in U.S. electricity production.[32] Over the past decade, coal fell from 49 percent of electricity production to 33 percent, while natural gas rose from 20 percent to 33 percent.[33]

The share of renewables in U.S. energy production has also increased, and industries such as solar and wind have become large players. Indeed, solar and wind have become such large industries that it is time to cut off the federal umbilical cord. That would incentivize renewable energy businesses to become leaner and focus on the most efficient products and technologies.

All areas of federal spending—including the DOE budget—will need to be scrutinized for savings in coming years. Federal deficits and debt are reaching critical levels, which risks pushing America into a financial and economic crisis down the road. Policymakers should be looking at all areas of the budget to find savings, and business subsidies such as DOE loan programs are ripe for cuts.

Republicans are in a unique position to cut business subsidies, including DOE programs, because they plan to cut business taxes and regulations. Businesses would lose handouts, but their tax and regulatory burdens would also fall. The U.S. energy sector, including conventional and renewable energy, is large, dynamic, and entrepreneurial, and it does not need federal subsidies to thrive.

Thank you for holding these important hearings.

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[1] Chris Edwards, "Energy Subsidies," DownsizingGovernment.org, Cato Institute, December 15, 2016.

[2] Congressional Budget Office, "Federal Support for the Development, Production, and Use of Fuels and Energy Technologies," November 2015, Table 3. In addition to the items in the CBO table, the Vogtle project received another $1.8 billion loan guarantee in 2015.

[3] Department of the Treasury, "Overview and Status Update of the Section 1603 Program," July 31, 2016.

[4] Nathan Rosenberg and L.E. Birdzell found that "new enterprises, specializing in new technologies, were instrumental in the introduction of electricity, the internal-combustion engine, automobiles, aircraft, electronics, aluminum, petroleum, plastic materials, and many other advances." Nathan Rosenberg and L.E. Birdzell, Jr., *How the West Grew Rich* (New York: Basic Books, 1986), p. 277. We can update that list to include cellphones, smartphones, personal computers, biotechnology, and many Internet businesses. This idea has also been explored by economist Clayton Christensen.

[5] Mark A. McCall, Department of Energy, Testimony to the Subcommittees on Energy and Oversight, House Committee on Science, Space, and Technology, March 3, 2016.

[6] Frank Rusco, Government Accountability Office, Testimony to the Subcommittees on Energy and Oversight, House Committee on Science, Space, and Technology, March 3, 2016.

[7] National Conference of State Legislatures, "State Renewable Portfolio Standards and Goals," December 28, 2016.
[8] Carol D. Leonnig and Joe Stephens, "Obama Was Advised against Visiting Solyndra after Financial Warnings," *Washington Post*, October 3, 2011.
[9] Bill Canis and Brent D. Yacobucci, "The Advanced Technology Vehicles Manufacturing (ATVM) Loan Program: Status and Issues," Congressional Research Service, January 15, 2015, p. 13.
[10] Mark A. McCall, Department of Energy, Testimony to the Subcommittees on Energy and Oversight, House Committee on Science, Space, and Technology, March 3, 2016.
[11] Jasper Scherer, "Another Chance for Nuclear Power?" *U.S. News and World Report*, March 3, 2016.
[12] Cassandra Sweet, "High-Tech Solar Projects Fail to Deliver," *Wall Street Journal*, June 12, 2015.
[13] Cassandra Sweet, "Ivanpah Solar Plant May Be Forced to Shut Down," *Wall Street Journal*, March 16, 2016.
[14] Cassandra Sweet, "High-Tech Solar Projects Fail to Deliver," *Wall Street Journal*, June 12, 2015.
[15] Joe Stephens and Carol D. Leonnig, "Solyndra: Politics Infused Obama Energy Programs," *Washington Post*, December 25, 2011. And see www.washingtonpost.com/politics/specialreports/solyndra-scandal.
[16] Carol D. Leonnig and Joe Stephens, "Federal Funds Flow to Clean-Energy Firms with Obama Administration Ties," *Washington Post*, February 14, 2012.
[17] Eric Lipton and John M. Broder, "In Rush to Assist a Solar Company, U.S. Missed Signs," *New York Times*, September 22, 2011.
[18] *Washington Post*, "Greenlighting Solyndra," December 22, 2011, www.washingtonpost.com/wp-srv/special/politics/solyndra-key-players.
[19] Joe Stephens and Carol D. Leonnig, "Solyndra Loan: White House Pressed on Review of Solar Company Now Under Investigation," *Washington Post*, September 13, 2011.
[20] Nicolas Loris provides summaries of 1703 and 1705 projects in Nicolas Loris, "Examining the Department of Energy's Loan Portfolio," Heritage Foundation, March 3, 2016. See also Veronique de Rugy, "Assessing the Department of Energy Loan Guarantee Program," Mercatus Center, June 19, 2012.
[21] Eric Lipton and Clifford Krauss, "A Gold Rush of Subsidies in Clean Energy Search," *New York Times*, November 11, 2011.
[22] Nicolas Loris, "Examining the Department of Energy's Loan Portfolio," Heritage Foundation, March 3, 2016. Despite all the subsidies, Abengoa Bioenergy filed for bankruptcy protection in 2016, and its U.S. ethanol business was sold.
[23] Eric Lipton and Clifford Krauss, "A Gold Rush of Subsidies in Clean Energy Search," *New York Times*, November 11, 2011.
[24] Controversy surrounds the multiple subsidies the project received from the state government. See Ted Sickinger, "Shepherd's Flat Wind Farm's $30 Million in Tax Credits Will be Reviewed by Oregon Energy Department," *The Oregonian*, February 23, 2013.
[25] Cassandra Sweet, "Ivanpah Solar Plant May Be Forced to Shut Down," *Wall Street Journal*, March 16, 2016. And see Brady Dennis, "Study: Wind Turbines Kill More Bats than Estimated," *Washington Post*, November 8, 2016.

[26] Stephen Gandel and Katie Fehrenbacher, "Will Donald Trump Blow Warren Buffett's Clean-Energy Bet Off Course?" *Fortune*, December 7, 2016.
[27] These ideas are discussed in Veronique de Rugy, "Assessing the Department of Energy Loan Guarantee Program," Mercatus Center, June 19, 2012. See also James Nelson, Solar3D, Testimony to the House Committee on Oversight and Government Reform, Subcommittee on Regulatory Affairs, Stimulus Oversight, and Government Spending, May 16, 2012.
[28] James Nelson, Solar3D, testimony to the House Committee on Oversight and Government Reform, Subcommittee on Regulatory Affairs, Stimulus Oversight, and Government Spending, May 16, 2012.
[29] Mark A. McCall, Department of Energy, Testimony to the Subcommittees on Energy and Oversight, House Committee on Science, Space, and Technology, March 3, 2016.
[30] Chris Edwards, "Advantages of Low Capital Gains Tax Rates," Cato Institute Tax and Budget Bulletin no. 66, December 2012. A more recent study found the OECD average to be 18 percent. See Kyle Pomerleau, "The High Burden of Federal and State Capital Gains Tax Rates in the United States," Tax Foundation, March 24, 2015.
[31] Ernst & Young for the American Council for Capital Formation, "International Comparison of Depreciation Rules and Tax Rates for Selected Energy Investments," May 2, 2007.
[32] Natural gas emits about half the CO2 that coal does in electricity production. *Wall Street Journal*, "Energy: Squaring Off," November 14, 2016, p. R1.
[33] *Wall Street Journal*, "Energy: Squaring Off," November 14, 2016, p. R1.

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Chris Edwards is the director of tax policy studies at Cato and editor of www.DownsizingGovernment.org. He is a top expert on federal and state tax and budget issues. Before joining Cato, Edwards was a senior economist on the congressional Joint Economic Committee, a manager with PricewaterhouseCoopers, and an economist with the Tax Foundation. Edwards has testified to Congress on fiscal issues many times, and his articles on tax and budget policies have appeared in the *Washington Post*, the *Wall Street Journal*, and other major newspapers. He is the author of *Downsizing the Federal Government* and coauthor of *Global Tax Revolution*.

Edwards holds a BA and an MA in economics, and he was a member of the Fiscal Future Commission of the National Academy of Sciences.

Chairman WEBER. Thank you, Mr. Edwards.
Mr. Reicher, you are now recognized for five minutes.

TESTIMONY OF MR. DAN REICHER, EXECUTIVE DIRECTOR, STEYER-TAYLOR CENTER FOR ENERGY POLICY AND FINANCE, STANFORD UNIVERSITY

Mr. REICHER. Thank you, Chairmen Smith, Weber, and LaHood and Ranking Members Veasey, Johnson, and Beyer. I appreciate the opportunity to testify.

You have my bio, but let me emphasize that I have some honest-to-goodness background in energy project investing. I cofounded an energy project investment firm where we raised $100 million from a major pension fund and a venture-capital firm. I also made project investments while working at Google. Finally, I worked for an energy technology company that received a major venture-capital investment.

Mr. Chairman, the U.S. Government has long played a vital and successful role in helping to commercialize energy technologies, including, among others, commercial nuclear power, carbon capture and storage, and hydraulic fracturing. I am focusing on technology commercialization because that is the real core of the DOE loan guarantee program today.

You will hear lots of arguments today about how the loan guarantee program is not an appropriate role for government and that the private sector should assume the burden, but these comments miss the mark because the loan guarantee program, as currently structured and operating, is focusing quite precisely on the role where the private sector needs help. And I emphasize technologies that have not reached full commercial scale and where, because of their risk profile, banks and bond issuers are reluctant to provide financing. Once the technology has been proven to work at commercial scale, the DOE loan program generally has no further role, and that is the case today in the DOE loan program where, for example, financing for solar PV projects using fully commercialized technologies has ended following loan guarantees made about five years ago that helped U.S. PV projects get to full utility scale.

The private sector has financed scores of subsequent projects. The DOE loan guarantee program, as authorized by Congress and signed by President George W. Bush, is carrying out its role across a broad range of energy and transportation technologies: advanced fossil, nuclear, renewables, energy efficiency, and vehicles. And DOE's Loan Program Office is managing the investment portfolio successfully.

Here are the numbers, the most updated ones. As of December 31, 2016, 22 projects supported by the Loan Program Office are operational and $6.65 billion in loan principal and $1.79 billion in interest have repaid to the U.S. Treasury. Loan losses in the portfolio are approximately $810 million. This is barely half of the interest already paid on the DOE loans to date. It is only a little over two percent of the program's $36 billion of loans, loan guarantees,

and conditional commitments. And these losses are a tiny fraction of the $10 billion set aside by Congress to cover failed loans.

I would note that in her testimony, Ms. Katz indicates that, quote, "double digit default rates are common among federal credit programs." The DOE rate is barely in the single digits, and the LPO's two percent loan loss ratio is less loss ratio in the loan portfolios of virtually every U.S. money-centered bank. And these banks are generally not making loans for energy projects deploying advanced technologies and certainly not in the riskier commercialization stage.

I also want to emphasize that the focus today is on loans, not grants. Loans get paid back, grants do not, and they get paid back with interest to the U.S. Treasury, also known as U.S. taxpayers. A lot of the testimony today confuses grants and loans.

Looking ahead, the Loan Program Office has more than $40 billion in remaining authority with $12.5 billion for advanced nuclear projects, $8.5 billion for advanced fossil, $4.5 billion for renewable energy and efficiency, and $16 billion for advanced transportation projects. Importantly, the office has recently received more than 70 applications in response to its current solicitations for almost $50 billion in loans and loan guarantees.

Mr. Chairman, U.S. infrastructure has emerged as an area of both substantial national need and bipartisan support. The good news is that there are multiple areas where the DOE loan guarantee program can provide much-needed infrastructure investment from already authorized funds and simultaneously support important technology innovation. This includes infrastructure projects involving, for example, electricity transmission, advanced nuclear technology, carbon capture utility-scale storage, and advanced vehicles.

Infrastructure investing, Mr. Chairman, can divine the next phase of the DOE loan guarantee program with no new authorization or appropriations. This is a very nice down payment on the proposed trillion-dollar infrastructure program that is the subject of so much discussion.

A final point: In the next 20 years the International Energy Agency projects that the world will spend roughly $48 trillion on energy infrastructure, one of the biggest economic opportunities of the 21st century. China is organized to take the biggest piece of this economic pie. It has no reluctance helping energy project developers raise capital to commercialize technologies and sell them to the world. We ignore China's resolve and impressive success to date at our peril, and it is the situation that makes the attacks on federal energy technology commercialization like the DOE loan program so misguided.

The Congress and the new Administration should build on the loan guarantee program's success to date and substantial remaining loan authority to jumpstart infrastructure investing and advance the U.S. economy and environment and security in the process. Thank you very much.

[The prepared statement of Mr. Reicher follows:]

Summary of Testimony on the DOE Loan Guarantee Program
House Committee on Science Space and Technology
Dan W. Reicher
February 12, 2017

The U.S. government has long played a vital and successful role in helping to commercialize energy technologies including, among others, commercial nuclear power, carbon capture and storage, and hydraulic fracturing. The DOE loan guarantee program, as authorized by Congress and signed into law by President George W. Bush, has continued this role across a broad range of energy and transportation technologies. The DOE's Loan Program Office (LPO) is carrying out its Congressionally-directed mission very capably, both helping to commercialize advanced fossil, nuclear, renewable, energy efficiency and vehicle technologies and managing the related investment portfolio successfully.

As of December 31, 2016, 22 projects supported by LPO are operational and $6.65 billion in loan principal and $1.79 billion in interest have been repaid to the U.S. Treasury. Loan losses in the portfolio are approximately $810 million, or only a little over 2 percent of the program's $36 billion of loans, loan guarantees and conditional commitments and a small fraction of the $10 billion set aside by Congress to cover failed loans. LPO's ~2% loan loss ratio is less than the loss ratio in the loan portfolios of virtually every U.S. money center bank, and these banks are generally not making loans for energy projects deploying advanced technologies – and certainly not in the riskier commercialization stage.

The LPO has more than $40 billion in remaining authority, with $12.5 billion for advanced nuclear projects, $8.5 billion for advanced fossil projects, $4.5 billion for renewable energy and energy efficiency projects, and $16 billion for advanced transportation technologies. Importantly, LPO has recently received more than 70 applications, in response to its current solicitations, for almost $50 billion in loans and loan guarantees.

U.S. infrastructure has recently emerged as an area of both substantial national need and bipartisan support. There are several areas where the DOE loan guarantee program can provide much needed investment in U.S. infrastructure and simultaneously support important technology innovation. This includes infrastructure projects involving, for example, electricity transmission, advanced nuclear technology, carbon capture and storage, advanced vehicles and components, and utility-scale storage.

In the next twenty years, the International Energy Agency projects that the world will spend roughly 48 trillion dollars on energy infrastructure, one of the biggest economic opportunities of the 21st century. China is getting organized to take the biggest piece of this economic pie. We ignore China's resolve – and impressive success to date – at our peril. And it is this situation that makes the attacks on federal energy technology commercialization, like the DOE loan guarantee program, so misguided.

The Congress and the new administration should build on the loan guarantee program's successful work to date and substantial remaining loan authority to advance the U.S. economy, environment and security.

Statement of Dan W. Reicher
Executive Director
of the
Stanford University Steyer-Taylor Center for Energy Policy & Finance
and
Professor, Stanford Law School
Lecturer, Stanford Graduate School of Business
to the
House Committee on Science, Space and Technology
Subcommittee on Energy
and
Subcommittee on Oversight
Hearing on the Department of Energy Loan Guarantee Program
February 15, 2017

Chairman Smith, Ranking Member Johnson, and members of the subcommittees, my name is Dan Reicher and I am pleased to share my perspective on the Department of Energy loan guarantee program, as authorized by Congress and administered by DOE's Loan Programs Office. I am Director of Stanford University's Steyer-Taylor Center for Energy Policy and Finance and a faculty member of the Stanford Law School and the Graduate School of Business. I am testifying in my individual capacity and my views do not necessarily reflect those of Stanford University.

I am also a senior fellow at the Brookings Institution, have been a member of the Secretary of Energy Advisory Board since 2013, and recently finished a 10-year term on the National Academy of Sciences Board on Energy and Environmental Systems. I also chair the board of directors of the American Council on Renewable Energy.

Prior to my role at Stanford, I was Director of Climate Change and Energy Initiatives at Google. I also served on President Obama's transition team where I helped develop the stimulus package for clean energy. Prior to my position with Google, I was President and Co-Founder of New Energy Capital, a private equity firm funded by the California State Teachers Retirement System and Vantage Point Venture Partners to invest in clean energy projects. Prior to this position, I was Executive Vice President of Northern Power Systems, a venture capital-backed renewable energy company.

Prior to my roles in the private sector, I served in the Clinton Administration as Assistant Secretary of Energy for Energy Efficiency and Renewable Energy, the Acting Assistant Secretary of Energy for Policy, and Department of Energy Chief of Staff.

Introduction

The Department of Energy's (DOE) Loan Programs Office (LPO) implements a key program, originally signed into law by President George W. Bush, that helps innovative U.S. energy and transportation technologies cross the colorfully but accurately named "valley of death" that sits between the early development of an advanced energy or vehicle technology and its full commercial deployment. By helping to cut the risk in technology commercialization, the LPO has increased U.S.

private sector investment in advanced energy and vehicle technology deployment, with the attendant economic, environmental and security benefits.

The loan guarantee program is at a pivotal point with the arrival of a new administration and questions in some quarters about the need for LPO investment. In sum, I believe the LPO is carrying out its Congressionally-directed mission very capably, both helping to commercialize important energy and transportation technologies and managing the related investment portfolio successfully. With more than $40 billion in remaining authority, the LPO is well positioned to advance important bipartisan U.S. priorities, particularly supporting a broad range of critically important energy and transportation-related infrastructure investments.

I. My Background in Energy Technology Commercialization

Let me briefly personalize the energy technology commercialization story, before I turn to a broader discussion of the federal government's role in commercialization and DOE's loan guarantee program in particular. For two decades I have walked the ups and downs of the energy research, development, demonstration and deployment (RDD&D) pathway. I started my journey at DOE under President Clinton where we invested substantially in advancing the full range of energy technologies. Energy-related R&D was – and is – a high-risk enterprise where the only certainty is that it almost always takes longer and costs more than originally anticipated to get an energy technology to a point where a private sector investor might invest and take things from there.

I left DOE at the end of the Clinton administration and joined a renewable energy company that had recently received significant venture capital investment. Our mandate was to take this high-risk capital and use it to turn the fruits of energy R&D into commercialized products that were successful enough that a bigger company would want to buy our firm or we could take it public. It was tough sledding at this company, in part because the route to successful commercialization of energy technologies is so challenging. One example: the company developed a more efficient and lower maintenance wind turbine but didn't have the cash it took to deploy enough of them – for a long enough time – to satisfy energy project lenders that they could back these turbines in utility-scale wind projects.

Proceeding down the RDD&D pathway, I helped form a private equity firm, with $100 million in capital we raised from a large public pension fund and a venture capital firm to invest in clean energy projects. We were the "equity" in these projects and we worked with banks and other "debt" providers - as well as engineering and construction firms - to get energy projects built and operating. It was at this firm that I reached perhaps the most challenging point along the energy RDD&D pathway.

Day after day our firm received investment proposals for energy projects based on technologies with profiles that simply exceeded the risk threshold of our capital. Had the underlying technologies been proven in a lab? Generally yes. Had they operated in a pilot plant? Sometimes. Had they operated at commercial scale for a long enough period of time that bankers would lend to projects that deployed them? Rarely.

We received so many project proposals – from wind, solar, biomass and geothermal, to advanced coal and natural gas projects, to nuclear power and beyond – but there were so few where we could actually make an investment. So what were we left with? Well, the truth is that the biggest chunk of

our capital, when I was at the firm, was used to finance corn ethanol plants – a technology well proven at large commercial scale for decades. We and most other private equity firms simply couldn't shoulder the risk inherent in the initial commercial scale-up of an energy technology, where a single project can costs hundreds of millions or even billions of dollars.

It was interesting landing next at Google, primarily a software company where engineers spend time – generally measured in months – writing computer code for a new software product, test it internally, and then one day determine it's ready for initial commercial deployment. In my simple terms, they push a button and it's deployed. If the product needs improvements then Google engineers make them and a new version is launched. There are certainly very tough engineering challenges and products that fail. It's just that with software my perception is that a product generally succeeds – or fails – faster and more cheaply than with energy technology. In the energy technology world, months turn into years, and years into decades, and billions can be spent on a single technology before even one commercial-scale plant is operating.

Following the 2008 election, I joined President Obama's transition team. I spent a significant time helping to develop the energy provisions of the stimulus package, eventually adopted by the Congress in the 2009 American Recovery and Reinvestment Act (ARRA). Among other things, the ARRA created a time-limited loan guarantee program to stimulate investment in shovel-ready energy projects during the depths of the financial crisis.

At Stanford I have continued to focus on the energy technology commercialization challenge, including in a course for graduate students in business, law and engineering on how to develop and finance energy projects.

II. The Importance of Federal Support for Energy Technology Commercialization

There is a view in our country today, mostly inside the D.C. beltway, that the federal government shouldn't play a role in commercializing energy technology. This view flies in the face of long-standing U.S. history – and basic business logic. The U.S. government has long played a vital and successful role in helping to commercialize energy technology and it is a role that should continue, especially in light of unprecedented competition from other countries, in particular China. Three examples follow.

a. *U.S. Commercial Nuclear Power*

The federal government, in the Eisenhower administration, financed the commercialization of civilian nuclear power, fully funding an Idaho reactor (EBR-I) "where usable electricity was first generated from nuclear energy in 1951". The federal government spent approximately $550 million in current dollars on the Idaho project.[1] Further government-funded civilian reactors followed, including six years later the federally-financed Shippingport reactor in Pennsylvania, "the world's first full-scale atomic electric power plant devoted exclusively to peacetime uses."[2] It was not until 1960 that we saw "the first U.S. nuclear power plant built without government funding."[3]

[1] http://www4vip.inl.gov/ebr/
[2] https://www.nrc.gov/about-nrc/emerg-preparedness/history.html
[3] Id.

The federal government has stayed in the nuclear power commercialization business helping to finance the scale-up of various technologies, some successful and some not. This includes federal funding of breeder reactors[4] and in recent years significant DOE investment in the development of small modular reactors, involving a number of U.S. companies.

Recently, the LPO backed the construction of the first new reactors in the U.S. in decades. The Vogtle project in Georgia is using the "next generation of nuclear reactors that incorporate a number of new safety features, including....passive safety systems that are able to respond in an emergency without any human intervention or electrical power."[5]

Recently, a bipartisan report to Secretary of Energy Moniz concluded that the successful development, commercialization and deployment of advanced reactor technologies in the U.S. at gigawatt-scale beginning in 2030 would require significant government investment, measured in the billions of dollars.[6]

b. Carbon Capture and Storage

The Department of Energy launched its program to develop and commercialize carbon capture and storage (CCS) technology in 1997. Over the past 20 years, it has relied on a variety of federal support mechanisms and incentives – R&D funding, grants, federal tax credits, private activity bonds and loan guarantees – to advance the technology. This array of federal support, measured in the billions of dollars, has helped advance first-time applications of CCS at a number of different types of U.S. facilities, for example a coal-fired power plant in Texas, an ethanol plant in Illinois, a Texas oil refinery and, most recently, a project that will help demonstrate CCS technology in natural gas-fired power generation.

Recently, the DOE LPO issued a conditional commitment for the first loan guarantee made under the Department's $8 billion Advanced Fossil Energy Project solicitation. The $2 billion loan guarantee would back the world's first methanol production facility to employ carbon capture technology, in Lake Charles, Louisiana. The captured carbon dioxide would be utilized for enhanced oil recovery (EOR) in Texas. The project would also be the first petroleum coke (petcoke)-to-methanol facility in the U.S.[7] Petcoke is a byproduct from oil refining. Methanol is one of the world's most widely used industrial chemicals in applications like paints, plastics, automotive parts and fuel blending.

c. Hydraulic Fracturing

The federal government played an important role in the commercialization of hydraulic fracturing ("fracking"), the process by which the U.S. has been able to access substantial deposits of shale gas, tight gas and tight oil. The private sector, particularly pioneers like George Mitchell, were instrumental in the development of fracking but the federal government supported commercialization of this important technology in a variety of ways. These include: shale fracturing and direct drilling technologies developed by the federal government and federal labs; public-private shale drilling demonstration projects in the 1970s; the section 29 production tax credit for unconventional gas in

[4] https://en.wikipedia.org/wiki/Clinch_River_Breeder_Reactor_Project
[5] https://www.energy.gov/articles/vogtle-big-results-nuclear-power
[6] https://www.energy.gov/sites/prod/files/2016/10/f33/9-22-16_SEAB%20Nuclear%20Power%20TF%20Report%20and%20transmittal.pdf
[7] https://energy.gov/articles/energy-department-offers-conditional-commitment-first-advanced-fossil-energy-loan-guarantee

effect from 1980 to 2002; federal funding of cost-shared fracking projects including Mitchell Energy's first horizontal well in 1991; and 3-D microseismic imaging developed by DOE Sandia National Lab. As a 2102 study concluded:

> *These federal investments, coordinated in close concert with gas industry representatives, were predicated upon a single mission: the commercialization of shale gas extraction technology. As a result of these efforts carried out over the course of 30 years, shale gas went from inaccessible deposits locked in unfamiliar geologic formations to the fastest growing contributor to the nation's energy portfolio.*[8]

d. The Business Case for Federal Support of Energy Technology Commercialization

These and many other examples point to the long-standing role the federal government has played – through Republican and Democratic administrations alike – in commercializing energy technology. As explained above, energy project developers and investors often can't or won't shoulder all the risk inherent in the initial commercial scale-up of an energy technology, where a project can costs hundreds of millions or even billions of dollars and there are a number of reasons the first-time project can fail.

The federal government, for decades, has been willing to step up, sometimes completely funding an initial commercial-scale project or cost-sharing it. From a business standpoint the government's role makes eminent sense. Back in the 1950s there was no way that an individual company or private investor was going to take the full risk of developing an early nuclear power plant. The technical unknowns and safety concerns were simply too great. Without the major investment the federal government made in the first generation of civilian reactors – measured in the billions of today's dollars plus the brainpower and facilities provided by federal labs – commercial nuclear power would not have developed at the pace and scale that it did, or perhaps would have been stillborn with an early accident.

Similarly, it is highly unlikely that utilities or energy companies would have shouldered the cost alone of the initial applications of CCS at U.S. power plants, refineries and other industrial facilities. While some of the underlying technologies, for example amine chemistry, had been used in other industries, the technical risks of a new application were too great for an individual company or utility to shoulder alone. This was particularly the case given current CCS economics in the U.S. – with no serious carbon pricing and a volatile market for the sale of CO2 (tied to the price of oil) for enhanced oil recovery. Securing a commercial loan for an initial scale-up plant in a setting like this was next to impossible.

And the partnership between the federal government and the natural gas industry was crucial in the efforts to develop hydraulic fracturing, a game-changing technology in the energy industry. George Mitchell, often called the "father of fracking", was a bold businessman but he enjoyed strong backing from the federal government in getting his important technology to commercial scale. It is conceivable he and others in the private sector could have succeeded without government help, but it is highly doubtful given modern fracking's dependence on government-born technologies like 3-D seismic imaging, along with generous government tax credits and early cost-shared projects.

[8] http://thebreakthrough.org/archive/shale_gas_fracking_history_and

The federal government backs energy technology commercialization efforts because they advance the economic, security, and environmental interests of our nation. Cutting our dependence on foreign energy sources, for example, partially drove the federal government's substantial support over decades in commercializing fracking. The future of fossil fuels in the U.S. and around the globe depends on cutting their environmental footprint and CCS has a major role to play. Adding to its benefits, the CO2 captured in some CCS projects finds a ready market in enhanced oil recovery, helping to squeeze out additional oil from older fields and leaving the CO2 back in the ground where it started. And the federal government may see some of the upside through royalty payments for oil on federal lands, while also increasing tax revenues to state and local federal coffers.

Outside of the energy context we don't generally have this debate about whether the federal government should back technology development and deployment. Thus the federal government, through DARPA, has had a major and well-supported hand in the development and application of revolutionary technologies ranging from the Internet and videoconferencing to GPS and the Cloud.[9]

e. China Is Poised to Dominate Clean Energy Globally

There is another reason why the federal government should continue its efforts in clean energy technology commercialization: the Chinese government and private sector have a well-organized and executed plan to dominate the energy technology industry, with all of its attendant economic, security and environmental benefits. From wind, solar and storage to nuclear power, advanced vehicles, steam turbines and transmission, China is not only dominating in low-cost manufacturing and domestic deployment but increasingly in energy technology R&D and commercialization, traditionally the U.S. strong suit. My Stanford center is finishing up a major report on the Chinese solar industry, funded by DOE, and it has been eye opening to understand how far the Chinese have come in solar R&D, including recently posting an important world record in solar cell efficiency. The Chinese government and industry have a well-organized partnership to dominate the solar industry, and several other energy technologies as well.

In the next twenty years, the International Energy Agency projects that the world will spend roughly 48 trillion dollars on energy infrastructure, one of the biggest economic opportunities of the 21st century. China is getting organized to grab the biggest piece of this economic pie. We ignore China's resolve – and impressive success to date – at our peril. And it is this situation that makes the attacks on federal energy technology commercialization, like the DOE loan guarantee program, so misguided and troubling.

f. Should the Government Pick Winners and Losers?

In the debate over the DOE loan guarantee program there is also this argument: "the government shouldn't be picking winners and losers." The DOE loan guarantee program, as designed by Congress, has a broad technology focus with specific funding allocations across an array of technologies, including nuclear, fossil, renewables and efficiency. This ensures that no particular technology is favored. While much of the early LPO investment was in renewables, the current remaining Title XVII authorization is largely for nuclear and fossil projects. Furthermore, by far the largest loan guarantee to date has been for the Vogtle nuclear reactors and the most recent LPO

[9] http://www.alphr.com/features/373546/10-brilliant-darpa-inventions/page/0/1

conditional guarantee is for the Lake Charles petroleum coke CCS project. And it should be noted that the LPO is an application-based process: companies must apply for a loan guarantee, meet a number of explicit and well-established eligibility criteria, and pay significant fees, in order to secure a loan or loan guarantee.

More broadly, this argument against picking winners and losers collides head long with reality. The federal government picks winners and losers all the time and in fact the Congress, through the 1984 Competition in Contracting Act[10], has generally insisted on competition in discretionary federal funding programs. Thus, as Boeing and Lockheed-Martin know well, the Pentagon has required competition in the procurement of the military's next jet fighter. The General Services Administration generally does the same for a range of products and services supporting the work of government agencies. And it should come as no surprise that DOE generally insists on competition - and often private sector cost share - for much of its energy technology funding, including recent support for small modular reactors, CCS and off-shore wind.

III. The Case for Federal Loan Guarantees

President George W. Bush signed legislation launching the two key DOE loan programs under discussion today. Title XVII of the 2005 Energy Policy Act, enacted by a Republican-led Congress, directed DOE to issue loan guarantees to support the commercial deployment of energy projects that "employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued" and cut greenhouse gas emissions. The Title XVII program covers a number of eligible technologies including advanced fossil, nuclear, and renewable energy, and energy efficiency.

Congress authorized the Advanced Technology Vehicles Manufacturing (ATVM) program under Section 136 of the Energy Independence and Security Act of 2007. It authorizes the DOE to issue direct loans to auto manufacturers and component suppliers for manufacturing of advanced technology vehicles and associated components in the U.S.

President Obama signed a third bill in 2009, the American Recovery and Reinvestment Act (the "stimulus bill"), that authorized a new deployment-oriented loan guarantee program to stimulate job creation during the financial crisis and also appropriated funds to cover "credit subsidy" costs for borrowers. This program, which funded a number of LPO loan guarantees for "shovel-ready" energy projects, expired in 2011. The Congress the same year also appropriated funds to cover credit subsidy costs for the ATVM program and in 2011 did the same for energy efficiency and renewable energy projects under Title XVII.

The two current loan guarantee programs – Title XVII and ATVM – enjoyed Republican and Democratic support for a reason: they are a smart way to leverage private capital in advancing the commercialization of an innovative energy technology or increasing domestic manufacturing of fuel-efficient vehicles. In simple terms, the programs support energy and transportation technologies that are ready for commercialization but face challenges raising capital in the debt markets.

[10] https://fas.org/sgp/crs/misc/R40516.pdf

In contrast with federal grants, which constitute one-time "money out the door" expenditures, loans and loan guarantees are the federal financial mechanism "that keeps on giving". Thus the innovative U.S. auto manufacturer Tesla Motors received a $465 million ATVM loan at a critical moment in its efforts to buy a shuttered former GM-Toyota manufacturing plant in California. The loan was pivotal in Tesla's efforts to reopen the factory, creating more than 3000 full-time jobs in the process. And critical to today's hearing, in May 2013 Tesla repaid the federal government the entire remaining balance on its loan – nine years early and with interest.

To this end, LPO loans and loan guarantees are structured to be fully repaid with interest over the life of the loan. Each project in the portfolio must begin repaying the principal and interest on its loan around the time it reaches completion. As many of LPO's projects have reached completion in recent years, project sponsors have been repaying their loans. **As of December 31, 2016, LPO borrowers repaid $6.65 billion in principal and $1.79 billion in interest.** So not only is an LPO loan repaid but the federal treasury – aka U.S. taxpayers – see the upside in the form of major interest payments

a. The LPO's Strong Financial Track Record

Beyond the debate over the philosophy underlying the Title XVII and ATVM programs, critics of the programs have raised issues regarding LPO's financial management and track record. There has been a great deal of hand-waving on this subject, particularly focused on a few failures in the LPO portfolio, chief among them the Solyndra loan guarantee. What all of the noise about Solyndra obscures is LPOs admirable track record in commercializing energy technology and increasing U.S. production of advanced technology fuel-efficient vehicles with thousands of related jobs.

The best way to take stock of LPOs financial management is to do what any portfolio manager would do: scrutinize portfolio results to date and the status of individual investments. A quick review should give members of the committee, and U.S. taxpayers more generally, confidence about the LPO track record.

As of December 31, 2016 22 projects supported by LPO are operational and generating revenue. These projects are now repaying their loans to the U.S. Treasury, which issued the loans guaranteed by the DOE primarily through the Federal Financing Bank. Already, as noted above, $6.65 billion in loan principal has been repaid on these long-term loans, which have an average tenor of 22 years. Importantly, the U.S. Treasury has received more than $1.79 billion in interest payments. For loans that have been disbursed to date, more than $5 billion in total interest payments are expected over the full term of the loans - to the benefit of taxpayers.

However, losses are also anticipated in any lending portfolio. And because the mission of LPO is to finance innovative technologies that have not been deployed at commercial scale in the U.S., the program was designed to carry some level of risk. In light of this Congress set aside funds to cover those losses when the program was established. **But today, actual and estimated loan losses to the portfolio are approximately $810 million, or only a little over 2 percent of the program's loans, loan guarantees and commitments - and roughly half of the approximately $1.79 billion in interest payments the program has earned to date. Importantly, this $810 million in loan losses is a small fraction of the $10 billion set aside by Congress to cover failed loans.**

As projects continue to repay loans and as LPO issues new loans and loan guarantees with its more than $40 billion in remaining authority, these portfolio numbers will continue to change. But given

the strong portfolio management by the highly experienced team of LPO professionals, DOE expects the portfolio's financial performance to remain strong and continue to advance the commercialization and deployment of key energy and transportation technologies.

In the last ten years, the Government Accountability Office (GAO) has published eight reports reviewing the loan guarantee program and providing recommendations to DOE. Of the 24 recommendations GAO has made concerning the program, the DOE has fully implemented 15. The LPO is actively working towards fully implementing three more, has partially implemented one, and has concurred with GAO's findings for two more. Of the 24, LPO has only disagreed with and declined to work towards implementing 4 of the recommendations. It should also be noted that GAO has made no additional recommendations in either its 2015 or 2016 report.

b. A Few Losses Shouldn't Obscure The Overall Success of the LPO

Despite the overall success of the LPO portfolio there has been much focus on a handful of losses. Most well-known among them is Solyndra, which was indeed a major loss in the LPO portfolio but it has been used for years to impugn the overall program more broadly. This is unfortunate because as described above the full portfolio is in admirable shape. **A key fact: LPO has about a 2% loss ratio, less than the loss ratio in the loan portfolios of just about every U.S. money center bank, and these banks are generally not making loans for energy projects deploying advanced technologies – and certainly not in the riskier commercialization stage.**

It should also be noted that most of the loans and loan guarantees in the Title XVII LPO portfolio have been for energy projects secured by a long-term power purchase agreement from a major utility or corporation or similar commitment. The rationale for a DOE loan guarantee in these cases is that (a) the borrower, generally an energy project developer, is credit worthy because of the long-term off-take agreement but (b) there are technical or scale-up risks in the underlying technology that lenders will not take. In contrast, Solyndra involved a loan for a solar manufacturing plant selling products into a commodity solar panel market without the benefit of a long-term sales contract. This was a riskier bet in a broader portfolio that is mostly built around projects with long-term off-take commitments and therefore a safer risk profile.

c. DOE Has Addressed the Credit Subsidy Issue

There have been issues under Title XVII whether DOE has been adequately charging for the cost of the liability that government takes on in issuing a loan guarantee. To this end, Title XVII specifies that the DOE must receive either a federal appropriation for the Credit Subsidy Cost (CSC) – the expected long-term liability to the Federal Government in issuing the loan guarantee – or payment of that cost by the borrower. Under the current Title XVII program borrowers pay the CSC directly. Additionally, LPO determined that a credit-based interest rate spread will be added to certain loans that are issued by the Federal Financing Bank (FFB) and backed by a 100 percent loan guarantee issued by the DOE. In simple terms the lower the credit score of a particular project the higher the interest rate spread.

Further strengthening the government 's coverage of its liability, just last month DOE adopted a final rule imposing a "Risk-Based Charge" taking into account all interest and interest-related costs. The rule is intended to make DOE's charges and costs consistent with commercial markets and other federal credit programs. This Risk-Based Charge will be used only to the extent the aggregate of

other interest-related charges do not sufficiently reflect creditworthiness or specific risks arising from individual transactions.

With this recent rule change DOE appears to have addressed concerns about adequately covering the federal government's long-term liability for particular projects.

IV. A Strong Future for the Federal Loan Guarantee Program

The DOE loan guarantee program rests on a solid base: a strong need for its services and an admirable track record to date in providing them. In setting a path forward for the program there are several considerations:

a. *There is Substantial Remaining Funding Authority*

While the LPO has used about half of its loan and loan guarantee authority provided by Congress, there is $41.5 billion in remaining authority. This includes $16 billion in the ATVM program and $25.5 billion in the Title XVII program, with $12.5 billion for advanced nuclear projects, $8.5 billion for advanced fossil projects and $4.5 billion for renewable energy and energy efficiency projects (the relative small allocation for renewables and efficiency reflects greater LPO investment in these technologies in initial phases of the program). Importantly, there is also strong interest among applicants for additional support. **DOE reported in December that LPO has received more than 70 applications in response to its current solicitations for almost $50 billion in loans and loan guarantees.**[11]

b. *Some Needs Have Already Been Addressed – LPO Success in Utility-Scale Solar*

Some technology areas have been addressed and are unlikely to need additional LPO support. For example, prior to 2010, there were no utility-scale PV projects in the United States greater than 100 megawatts. LPO helped finance the first five utility-scale PV projects, and since then the private debt markets have taken over, financing many more projects.[12] There are now 48 other privately financed U.S. PV projects greater than 100 megawatts operating as of January 2017. Another 83 planned solar PV farms greater than 100 megawatts have been announced, representing over 20 gigawatts of new utility-scale capacity.

In addition to solar PV, Title XVII also supported a number of projects involving Concentrating Solar Power (CSP).[13] U.S. leadership on these technologies has placed the developers of these Title XVII-supported projects at the forefront of the global CSP market. The developer of the Crescent Dunes project, California-based SolarReserve is now exporting the CSP technology used at the project to other global markets – including Chile and South Africa, where SolarReserve has been approved for a 100 MW plant. BrightSource, the original developer of the Ivanpah CSP project, is also expanding its work to other nations. The company's solar field technology is being deployed at the world's tallest CSP tower now under construction in Israel. BrightSource also formed a joint venture with Shanghai Electric Group to sell its technology in China, and the JV's first project was one of 20 chosen from 109 applications under China's 1.35 gigawatt CSP Pilot Program.

[11] https://energy.gov/articles/energy-department-offers-conditional-commitment-first-advanced-fossil-energy-loan-guarantee
[12] https://www.energy.gov/lpo/articles/mesquite-solar-highlights-how-doe-loan-guarantees-helped-launch-utility-scale-pv-solar
[13] https://energy.gov/lpo/articles/celebrating-potential-energy-storage-technology

c. *There Are Several Emerging Areas of Need For LPO Support – Infrastructure In Particular*

Infrastructure has emerged as an area of both substantial national need and bipartisan support. There are several areas where the DOE loan guarantee program could provide much needed investment in U.S. infrastructure and simultaneously support important technology innovation. Several examples follow.

- *Electricity Transmission Projects*: To date the LPO has provided support for one U.S. transmission project deploying advanced technology. DOE provided a $343 million Title XVII loan guarantee for the One Nevada Line that uses tubular guyed-V transmission towers with a much smaller footprint and easier and more cost-effective construction.[14] The LPO could do more to support much needed transmission development and the commercialization of advanced transmission technologies. New transmission is needed across the nation to upgrade current capacity and add new lines to move renewable generation from resource-rich areas to distant load centers. When he was governor, DOE Secretary-designee Perry oversaw the nation's most successful development of new transmission capacity that helped Texas become the top wind energy producing state in the nation.
- *Electricity Storage Projects:* LPO has provided one Title XVII loan guarantee for an electricity storage project – the Stephentown Spindle – a flywheel storage project in New York State.[15] Electricity storage, especially long-duration utility-scale systems, is critically needed in our electrical system and there are an array of technologies that could benefit from commercialization support, including thermal systems, compressed air, advanced pump storage, and new battery technologies.
- *Carbon Capture and Storage:* As described above, LPO has provided one loan guarantee for a CCS project – a $2B Title XVII guarantee for the Lake Charles Methanol project, the world's first methanol production facility to employ CCS technology.[16] The captured carbon would be used for enhanced oil recovery (EOR) in Texas. This project is the first loan guarantee made under LPO's $8 billion Advanced Fossil Energy Project solicitation. LPO has significant remaining authority to advance other CCS projects deploying advanced technologies. There are an array of proposed projects that could commercialize CCS in both power and industrial applications. One of those is the use of CCS in natural gas-fired power plants. Exelon and Net Power are demonstrating one approach[17] and DOE has recently funded another demonstration project[18] but full-scale projects will be necessary to establish the commercial viability of the approach and support mainstream project finance. There may also be opportunities to support CO2 pipeline infrastructure related to a CCS project.
- *Advanced Nuclear Technology:* LPO has provided one loan guarantee for a nuclear power plant – the Vogtle project in Georgia, as discussed above. There are an array of new nuclear technologies that could benefit from additional LPO support. To that end, in September 2016, DOE invited Terrestrial Energy Inc. to submit the second part of its application for a loan guarantee for an integrated molten salt reactor.[19] And earlier DOE provided a conditional $2B loan guarantee for a

[14] https://energy.gov/lpo/one-nevada-line
[15] https://energy.gov/lpo/stephentown-spindle
[16] https://energy.gov/articles/energy-department-offers-conditional-commitment-first-advanced-fossil-energy-loan-guarantee
[17] https://www.snl.com/interactiveX/Article.aspx?cdid=A-31571952-12589
[18] http://www.utilitydive.com/news/doe-awards-80m-for-first-large-scale-supercritical-co2-pilot-plant/428552/
[19] http://www.forbes.com/sites/rodadams/2016/09/14/terrestrial-energys-advanced-nuclear-technology-the-imsr-takes-several-steps-forward/#6927c049733e

uranium enrichment plant in Idaho.[20] LPO has significant remaining authority to advance other nuclear projects deploying advanced technologies. Principal among them could be the first U.S. small modular reactor project.

- *Vehicle Charging and Fueling Infrastructure:* LPO recently announced that Title XVII loan guarantees could support the development of electric vehicle charging facilities as well as vehicle refueling infrastructure using hydrogen, liquefied natural gas (LNG), compressed natural gas (CNG), and biofuels. [21]
- *Advanced Transportation Vehicle Manufacturing:* LPO has substantial remaining financing authority under the ATVM program. ATVM loans may be used to finance the cost of reequipping, expanding or establishing manufacturing facilities in the U.S. to produce advanced technology vehicles or qualifying components. They can also be used for engineering integration in the U.S. of advanced vehicles or qualifying components. To date LPO has provided financing for advanced vehicle projects focused on upgrading facilities to produce more fuel-efficient engines (e.g. for the Ford F-150 truck), new battery production capacity, all-electric vehicle assembly, and powertrain and electric motor production. These kinds of investments, plus other technologies like "light-weighting" of auto components, could be helpful as our nation seeks to slow the loss of its domestic auto and auto parts manufacturing capacity to other countries and also stimulate growth in the competitive electric vehicle manufacturing business, where China is increasingly leading the world.

V. Next Steps

The new administration, in particular the new Secretary of Energy, will need to focus on next steps for the loan guarantee program, building on the successful work currently underway at LPO. The likely trajectory is to allocate the remaining funding to a set of projects reflecting the remaining balances, which are largely focused on advanced nuclear, fossil and transportation projects. Along the way, Congress, working with the president, might authorize additional LPO loan authority to advance critical energy and transportation technologies vital to both U.S. competitiveness and environmental goals. President Obama proposed this approach in his FY2017 budget, including another $4 billion in new loan authority for advanced fossil, renewable energy and energy efficiency projects.

Another option would be to transition existing loan authority from the LPO to an independent federal revolving fund. The LPO already has a successful program structure in place, including the needed staff and resources, to manage such a fund. This might be part of a larger independent federal entity with a broader set of tools, such as the Clean Energy Deployment Administration (CEDA), introduced in bipartisan legislation by then Senate Energy Committee Chair Jeff Bingaman (D-NM), with support from current committee chair Senator Lisa Murkowski (R-AK)

CEDA would administer various types of credit instruments, such as loan guarantees, insurance products, and clean energy backed-bonds to accelerate private sector investment in the commercial deployment of new energy technologies. Initially funded with an appropriation of $10 billion, CEDA could become a self-sustaining entity based on "profit participation" mechanisms that would allow it take a financial stake in the projects it backs. This "evergreen" approach would distinguish it from

[20] https://energy.gov/lpo/areva
[21] https://www.energy.gov/lpo/electric-vehicles-and-alternative-fuel-vehicles

the current LPO that cannot recycle repayment of loan principal and interest into new investments. Also, while CEDA would be established as an agency within DOE it would be under the direction of an administrator, a board of directors, and technical advisory council and would enjoy a degree of independence from what may be perceived as an administration's influence on its investment decisions.

Conclusion

The DOE loan guarantee program has a strong track record and a bright future, particularly helping to advance the current bipartisan interest in increasing investment in energy and transportation-related infrastructure. With more than $40 billion in remaining authority, the loan guarantee program, as administered by the highly professional DOE loan programs office, could do much to help commercialize advanced U.S. energy and transportation technologies in support of our nation's economy, environment and security.

Dr. Ryan Yonk - Summary of Testimony on Title XVII Programs

Conceived as an idea to push financing towards underdeveloped clean energy technology to improve the environment, promote economic growth, and produce a more secure energy supply the Title XVII loan guarantee program has likely failed to meet these objectives. Instead, it has been used as a political tool, exposed taxpayers to unnecessary risk, diverted funding from alternative clean energy investments, and primarily benefitted large, politically connected corporations.

Loan guarantee programs, offered both by governments and the private sector, are intended to close a fiduciary gap between burgeoning ideas and private investment. By promising to cover loan payments if a company fails, loan guarantors allow entrepreneurs easier access to private capital. Progenitors of government programs argue that private capital is too risk averse to properly finance whatever it is they seek to subsidize.

Not all cases in which "promising" technology fails to secure private financing can be considered justification for government intervention. The inability of high-risk projects to get private backing is a feature of a free market system, not a bug. The market is generally good at making strategic, risk-conscious investments and research indicates loan guarantees indeed attract riskier investments and encourage mal-investment.

Much of the funding from the programs goes to established corporations who should already have access to capital. The full ramifications of supporting mainly large corporations are rarely understood. It does not simply mean that large corporations make risky investments and leave taxpayers to pick up the tab. The fundamental problem is that the loan guarantee program makes it more difficult for new ideas to emerge since it further entrenches established ideas. Research on new energy technology has stalled at least in part because of government's involvement. Government support may make it easier for those who receive support, but it also makes it more difficult for new ideas to gain private funding and grow. The net result of loan guarantee programs is likely a loss in meaningful innovation.

The primary take away from my analysis is that government's attempt to promote innovation have likely done exactly the opposite. In place of these programs government would do better to simply step out of the way of entrepreneurs and individuals. As the development of the technology industry demonstrates, allowing experimentation and markets to drive innovation is a promising avenue for improving the world. In contrast to policymakers propensity to want to plan for every contingency, permissionless innovation, an idea developed by the Adam Thierer, is more likely to provide the new ideas needed to solve energy and environmental issues. It calls for government officials to clear a path for entrepreneurial experimentation unfettered by precautionary regulation.

A policy of permissionless innovation is more likely to find successful solutions to the pressing environmental and energy questions, such as the potential dangers from climate change and the health issues caused by pollution, than government bureaucrats choosing projects to fund based on political considerations.

Chairman WEBER. Thank you, Mr. Reicher.
Dr. Yonk, you're recognized for five minutes.

**TESTIMONY OF DR. RYAN YONK,
ASSISTANT RESEARCH PROFESSOR,
DEPARTMENT OF ECONOMICS AND FINANCE,
AND RESEARCH DIRECTOR,
INSTITUTE OF POLITICAL ECONOMY,
UTAH STATE UNIVERSITY**

Dr. YONK. Mr. Chairman, Members of the Subcommittee, it's my pleasure to speak with you this morning to share some of my thoughts and results of preliminary research we've done in the Institute of Political Economy at Utah State.

To begin, the loan guarantee programs were conceived as an idea to push financing towards underdeveloped clean energy technology and to improve the environment, to promote economic growth, and to produce a more secure energy supply. However, the title 17 loan guarantee program has likely failed to meet these objectives and instead has been used as a political tool, diverted funding from alternative clean energy investments, and primarily benefited large politically connected corporations.

Government loan guarantees programs present a number of policy difficulties, and the Department of Energy's program is no exception. My testimony today and my full written testimony illustrate how the Department's loan guarantee programs distort markets, misdirect funds, and fail to promote truly innovative technology.

Loan guarantee programs offered by governments and the private sector are intended to close a fiduciary gap between burgeoning ideas and private investment. By promising to cover loan payments if a company fails, loan guarantors allow entrepreneurs easier access to private capital. And presenters of government programs in this area argue that private capital is too risk-adverse to properly finance whatever it is that they seek to subsidize.

The loan guarantee program is well-intentioned, as most policy generally is, but its designers failed to consider a number of unseen effects. The Department of Energy's program has deterred investment in other areas and made it more difficult for some to receive private investments, been used as a political tool, encouraged malinvestment, and primarily benefit established companies with access to—with pre-existing access to capital for research and development.

Now, federal loan guarantees can only be said to serve a public benefit if they accomplish what we might call additionality, meaning the program must be offering loans to projects that would not otherwise have garnered funding in the open market. A program that extends government assistance to projects and companies that would have little trouble securing private financing accomplishes little, adds unnecessary administrative costs, and ultimately puts taxpayer money at risk.

Some exploratory research on the additionality of loan guarantee programs for energy technology from both the Department of Energy and the Department of Agriculture have revealed poor

additionality. However, even if government loan guarantees managed to accomplish perfect additionality, this alone would not sufficient justification for the continuation of the program.

Many conceive of loan guarantee programs as marginally shifting the risk calculus for private investment. Realistically, loan guarantees completely shift the entire calculation of private investors. Securing a government loan guarantee proves to be a highly political process, and private capital often follows public capital.

Now, despite the appealing tenor of that statement, this unfortunately means that only the politically connected are funded. Most section 1705 funding has gone to large corporations who already have access to capital for investments in research development and deployment. And it's here that the fundamental problem with this form of subsidy emerges because it makes it more difficult for new ideas to emerge and come to fruition as it further entrenches establishments.

Government support, as the previous Chief Marketing Officer at Tesla motors complained, may make life easier for those who receive support, but it also makes it difficult for new ideas to gain private funding and grow.

Loan guarantee programs, like any subsidy, move resources towards the subsidized good. A subsidy redirects private capital towards the subsidy because it changes the risk calculation investors go through. The subsidy distorts the market signals of profit and loss to appear as if the subsidized industries provide more value than they do. Political power and lobbying prowess, not the collective intelligence of all individuals in the market allocate the funding of these programs.

My own analysis indicates that the unseen costs are greater than we often anticipate, and this position rests in large part on a counterfactual. How do you measure what did not happen? The question of what could have been, the opportunity cost of these loans, is a serious consideration, even if it is a difficult empirical one.

Preliminary examinations of the Department of Energy and USDA's programs have been discouraging. Though the entire literature pleads for more concerted research efforts, the political problems associated with the funding justify further skepticism towards section 1705 and section 1703, as do the very nature of the recipients of the guarantees.

In place of these programs, government would do well to simply step out of the way of entrepreneurs and individuals. As the development of the technology industry demonstrates, allowing experimentation and markets to drive innovation is a promising avenue for improving the world. Government officials should clear a path for entrepreneurial experimentation unfettered by precautionary regulation and subsidization. A policy of permission-less innovation is more likely to find successful solutions to pressing environmental and energy questions such as climate change and pollution than government agencies choosing projects based on political considerations. Thank you.

[The prepared statement of Dr. Yonk follows:]

Testimony to
Joint Energy Subcommittee and Oversight Subcommittee
by
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Introduction

Conceived as an idea to push financing towards underdeveloped clean energy technology to improve the environment, promote economic growth, and produce a more secure energy supply[1] the Title XVII loan guarantee program has likely failed to meet these objectives. Instead, it has been used as a political tool, exposed taxpayers to unnecessary risk, diverted funding from alternative clean energy investments, and primarily benefitted large, politically connected corporations.

The loan guarantee programs supported under Title XVII in general aim to provide financing to projects that would otherwise be unable to secure funding in the private market. When governments initiate loan guarantee programs, they generally target fledgling companies or struggling industries. In contrast, the Department of Energy program targets specific technologies irrespective of the company investing in them. The Loan Programs Office (LPO) offers loan guarantees under authority granted in Title XVII of the Energy Policy Act of 2005 and expanded in the American Recovery and Reinvestment Act of 2009. Loan guarantees are currently available only under Section 1703, which funds high-risk clean energy technology. While the LPO still oversees loan guarantees made under the Section 1705 program (of Solyndra fame), that program that expired in 2011.[2] The latter program was more expansive and thus makes up the lion's share of the LPO's portfolio.[3] The LPO presides over a third program financing advanced vehicle technology, but that program utilizes direct loans rather than loan guarantees and will not be discussed in this testimony.

Government loan guarantee programs present a number of policy difficulties and the Department of Energy's program is no exception. This testimony will illuminate how the Department's loan guarantee program distorts markets, misdirects funds, and fails to promote truly innovative technology.

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[1] Federal Register. Loan Guarantees for Projects That Employ Innovative Technologies. 10 CFR Part 609. Vol. 74, No. 232. Pg. 63544. Retrieved from https://energy.gov/sites/prod/files/2014/03/f14/FR-1703-Dec4.pdf

[2] Brown, Phillip. 2012. "Loan Guarantees for Clean Energy Technologies: Goals, Concerns, and Policy Options". *Congressional Research Service*. Retrieved from: https://fas.org/sgp/crs/misc/R42152.pdf

[3] Government Accountability Office. 2015. "DOE LOAN PROGRAMS: Current Estimated Net Costs Include $2.2 Billion in Credit Subsidy, Plus Administrative Expenses." Retrieved from http://www.gao.gov/assets/670/669847.pdf

Loan Guarantee Programs in General

Loan guarantee programs, offered both by governments and the private sector, are intended to close a fiduciary gap between burgeoning ideas and private investment. By promising to cover loan payments if a company fails, loan guarantors allow entrepreneurs easier access to private capital. Progenitors of government programs argue that private capital is too risk averse to properly finance whatever it is they seek to subsidize. Credit guarantees in private agreements are used to mitigate risks when individuals are considering investments, but the lender is unsure of the borrower's ability to repay the loan.[4]

Not all cases in which "promising" technology fails to secure private financing can be considered justification for government intervention. The inability of high-risk projects to get private backing is a feature of a free market system, not a bug. The free market is generally good at making strategic, risk-conscious investments. Evidence from the Richmond Federal Reserve Bank indicates that loan guarantees indeed attract riskier investments and encourage entrepreneurs to overinvest.[5] This is a classic moral hazard problem; when the costs of risks are removed without a corroborating reduction in reward, entrepreneurs will take risks more flagrantly.[6] The burden of proof lies with those who claim that private financiers are indeed failing particular markets. Even then, as the aforementioned Richmond Federal Reserve study concluded, grants, direct loans, or other public financing options might be superior.

Some economists do argue that adverse selection among lenders, lender apprehension about particular technologies, industries, or geographical areas, or the existence of a credit crunch can all offer theoretical justification for loan guarantees.[7] Still others attest that clean energy technologies ought to be subsidized by the government because they provide social benefits in excess of what can be returned to lenders, prompting private markets to underinvest. While clean energy technology does not create any positive externalities per se, it does crowd out carbon-emitting sources of energy and therefore may counteract a negative externality. Of course, there are more direct and efficient ways of targeting the carbon problem, but subsidizing clean energy is often taken as a politically viable next best alternative.

History and Background

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[4] Honohan, Patrick. 2009. "Partial credit guarantees: Principles and practice." *Journal of Financial Stability.* 6 (2010) 1-9.
[5] Li, Wenli. 1998. "Government Loan, Guarantee, and Grant Programs: An Evaluation." *Economic Quarterly* 84 (1998) 25-51.
[6] Vogel, Robert C., Dale W Adams. 1996. "The Benefits and Costs of Loan Guarantee Programs". *The Financier.* Vol. 4, No. 1 & 2. 22-29. Retrieved from: https://www.microfinancegateway.org/sites/default/files/mfg-en-paper-the-benefits-and-costs-of-loan-guarantee-programs-1996.pdf
[7] Honohan, Patrick. 2009. "Partial credit guarantees: Principles and practice." *Journal of Financial Stability.* 6 (2010) 1-9.

If there is one reason to be skeptical of loan guarantee programs in general, it is the paucity of conclusive academic research on their effectiveness. In my review of the academic literature it became glaringly obvious that there is still much important research to be performed on the questions of the loan guarantee program's effects, its costs and benefits, and best program design.[8] Data that is exact enough to make meaningful conclusions is difficult to collect. Studies are often too specific, meaning they examine one particular program and may not provide generalizable results, or too broad to have enough data to employ proper statistical analyses. This problem is further compounded by the many types of loan guarantee programs. Some provide funding for businesses to start-up, others guarantee business expansions, and in the program in question today, encourage the use of certain technologies.

As illustrative examples, here is what preliminary economics research has said about some international forays into loan guarantees. A French program targeting new firms was said to have no impact on the total number of companies, to increase their average size, and significantly increase their risk of default.[9] An investigation into a Malaysian small and medium sized enterprise program claims "there is sufficient evidence that the Scheme has failed to meet all [its] objectives."[10]

Policy Issues in the Loan Guarantee Program

The loan guarantee program is well-intentioned, as most policy is, but its designers failed to fully consider many unseen effects. The Department of Energy's program has deterred investment in other areas and made it more difficult for some to receive private investments, been used as a political tool, encouraged malinvestment, and primarily benefitted established companies with plenty of preexisting access to capital for research and development.

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[8] Bartik, Timothy, and Richard Bingham. 1995. Can Economic Development Programs be Evaluated? Upjohn Institute Staff Working Paper 29; Boocock, Grahame, and Mohd Noor Mohd Shariff. 2005. Measuring the Effectiveness of Credit Guarantee Schemes: Evidence from Malaysia. International Small Business Journal 23, no. 4, Aug: 427-52; Cressy, Robert. 2002. FUNDING GAPS: A SYMPOSIUM. Economic Journal 112; Green, Anke. 2003. Credit Guarantee Schemes for Small Enterprises: An Effective Instrument to Promote Private Sector-Led Growth? UNIDO: SME Technical Working Paper: Vienna, 10; Levitsky, Jacob. 1997. CREDIT GUARANTEE Schemes for SMEs: An International Review. Small Enterprise Development 8, no. 2, June; O'Bryan III, William E. 2010. "An Analysis of Small Business Loan Guarantee Funds". Thesis. Retrieved from: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1003&context=arch_crp_theses; Cowling, Marc and Peter Mitchell. 2003. "Is the Small Firms Loan Guarantee Scheme Hazardous for Banks or Helpful to Small Business?" Small Business Economics. 21: 63–71.

[9] Lelarge, Claire, David Sraer, David Thesmar. 2010. "Entrepreneurship and Credit Constraints: Evidence from a French Loan Guarantee Program". Chapter from International Differences in Entrepreneurship. Lerner, Josh and Antoinette Schoar (ed). *National Bureau of Economic Research (NBER).* Retrieved from: http://www.nber.org/chapters/c8218.pdf

[10] Boocock, Grahame and Mohd Noor Mohd Shariff. 2005, August 1. "Measuring the Effectiveness of Credit Guarantee Schemes Evidence from Malaysia". *International Small Business Journal.* Retrieved from: https://doi.org/10.1177/0266242605054054

One key insight from policy analysis is that we must measure what matters. In the case of loan guarantee programs, simply because the program expands entrepreneurs' access to credit does not make the program a success. There are other important aspects that must be considered. Government action is not justified merely because there is a market failure. Government ought to act to fix market failures only when the net gains from resolving those problems, given the possibility of government failure, are positive. As Professor and governor of the Central Bank of Ireland Patrick Honohan writes, "With many competing pressures for public funds, an economically coherent argument in favor of a subsidized credit guarantee system needs to go a lot further than the observation that such a scheme would increase availability of credit."[11]

Federal loan guarantees can only be said to serve a public benefit if they accomplish what economists call additionality, meaning the program must be offering loans to projects that would not have otherwise garnered funding in the open market. A program that extends government assistance to projects and companies that would have no trouble securing private financing accomplishes little, adds unnecessary administrative costs, and puts taxpayer money at risk.

Some exploratory research on the additionality of loan guarantee programs for energy technology from both the DOE and UDSA reveals poor additionality.[12] The early evidence suggests few loans are extended that would not otherwise be attained. Given the size and robust access to financing of many companies seeking Title XVII funding, which I will discuss momentarily, poor additionality should come as no surprise.

Even if government loans managed to accomplish perfect additionality, this alone would not be sufficient justification for the continuation of a program. Many conceive of loan guarantee programs as marginally shifting the risk calculus for private investment. In other words, guarantees allow projects that would previously have been considered barely too risky to finance to get funding. Realistically, loan guarantees completely shift the entire calculation of private investors. Securing a government loan guarantee proves to be a highly political process. Private capital often follows public capital. Despite that statement's appealing tenor, this is not a positive outcome. It means only the politically connected are funded and the extent of that problem is compounded beyond the bare dollar value of the government program.

The source of problems with government support for particular energy sources is that corporations and interest groups subvert the program to serve their private interests. Funding is

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[11] Honohan, Patrick. 2009. "Partial credit guarantees: Principles and practice." *Journal of Financial Stability.* 6 (2010) 1-9.

[12] Juchau, Chris and David Solan. 2014, April 4. "Draft: Energy Technology Loan Guarantee Programs: The Search for Additionality in Support of Commercialization". *Energy Policy Institute.* Working Paper from WPSA 2014. Retrieved from: https://wpsa.research.pdx.edu/papers/docs/WPSA%202014%20-%20Energy%20Technology%20Loan%20Guarantee%20Programs.pdf

allocated by political processes instead of the free choice of individuals who judge it to be a worthwhile investment. The fundamental problem at the heart of the Solyndra scandal, for example, was not that the business failed after securing a loan guarantee. After all, some failure will arise out of any loan guarantee program. Rather, the evidence that emerged following that failure demonstrated that Solyndra's path to securing a government loan guarantee had been dictated by political pressure, not market viability. As documented in a chapter of *Nature Unbound,* my book with two of my colleagues, Solyndra's application rushed through or even skipped critical oversight steps in order to reach approval before a California trip President Obama had planned. Even when failure was imminent, personnel at the Department of Energy urged even more funding to be pumped into Solyndra in an attempt to save face, despite warning from the OMB.[13]

The 2015 Inspector General's report on Solyndra confirmed that "the Department missed opportunities to detect and resolve indicators that portions of the data provided by Solyndra were unreliable" and that employees "felt tremendous pressure, in general, to process loan guarantee applications [...] based on the significant interest in the program from Department leadership, the Administration, Congress, and the applicants."[14] Solyndra shed light on this malfeasance, but political interference is a structural problem with loan guarantee programs, not merely the fault of a single public officer, agency, or administration.

One point that is too often underemphasized is that this argument against government interference applies equally to subsidizing fossil fuels. When President Carter's administration pushed for energy independence it meant government support for coal companies along with the research funding for and promotion of renewables.[15] These are at least equally problematic, and considering their size, perhaps even moreso.

Most Section 1705 funding has gone to large corporations who already have access to capital for investments in research, development, and deployment. Recipients of LPO guarantees include multiple Fortune 200 companies, utility companies, and multinationals. Many are wholly owned by yet larger companies.[16] The application process itself all but ensures that

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[13] Yonk, Ryan, Randy T Simmons, and Ken Sims. 2016. *Nature Unbound: Bureaucracy vs. the Environment.* Independent Institute.

[14] U.S. Department of Energy Office of Inspector General. 2015, August 24. "The Department of Energy's Loan Guarantee to Solyndra, Inc.". OIG Case No. 11-0078-I. Retrieved from: https://energy.gov/sites/prod/files/2015/08/f26/11-0078-I.pdf

[15] Carter, Jimmy. 1977. "The President's Proposed Energy Policy." 18 April 1977. Vital Speeches of the Day, Vol. XXXXIII, No. 14, May 1, 1977, pp. 418-420. Retrieved from: http://www.pbs.org/wgbh/americanexperience/features/primary-resources/carter-energy/; Carter, Jimmy. 1977, April 20. "National Energy Program Fact Sheet on the President's Program". Retrieved from: http://www.presidency.ucsb.edu/ws/?pid=7373

[16] de Rugy, Veronique. 2012. "Assessing the Department of Energy Loan Guarantee Program." Testimony Before the House Committee on Oversight and Government Reform. https://www.mercatus.org/publication/assessing-department-energy-loan-guarantee-program

only large, established companies will be capable of participating in the program. Applicants can expect to pay between $150,000 and $400,000 in fees before even being considered.[17]

The full ramifications of supporting mainly large corporations are rarely understood. It does not simply mean that large corporations make risky investments and leave taxpayers to pick up the tab, but the fundamental problem is that it makes it more difficult for new ideas to emerge since it further entrenches established ideas. Research on new energy technology has stalled at least in part because of government's involvement. Government support, as a previous chief marketing officer at Tesla Motors complained, may make it easier for those who receive support, but it also makes it more difficult for new ideas to gain private funding and grow.[18]

Loan guarantee programs, like any subsidy, move resources towards the subsidized good. A subsidy redirects private capital towards the subsidy because it lowers the risk and changes the risk calculation investors go through. In general, the subsidized industries see growth and investment. The unsubsidized, however, see lower investment. The subsidy distorts the market signals of profit and loss to appear as if the subsidized industries provide more value than they do.

The net result of loan guarantee programs is likely a loss in meaningful innovation. This is the fundamental problem with loan guarantees. Even if the additionality was 100 percent, the program employs poor methodology to pick those to subsidize. Political power and lobbying prowess, not the collective intelligence of all individuals in the market, allocate the funding of these programs. My analysis indicates that the unseen costs are much greater than anticipated. To some extent this position rests on a counterfactual--how do you measure what did not happen? The question of what could have been, the opportunity cost of these loans, is a serious consideration even if it is a difficult empirical one.

Conclusion

Preliminary examinations on the Department of Energy and USDA's programs have been discouraging, though the entire literature pleads for more concerted research efforts. The political problems associated with the funding justify further skepticism towards Section 1705 and Section 1703, as do the characterics of their recipients.

The primary take away from my analysis is that government's attempt to promote innovation have likely done exactly the opposite. In place of these programs government would do better to simply step out of the way of entrepreneurs and individuals. As the development of the technology industry demonstrates, allowing experimentation and markets to drive innovation

[17] Loans Programs Office. n.d. "Title XVII Application Process". Department of Energy. Retrieved February 3, 2017 from https://energy.gov/lpo/title-xvii-application-process

[18] Siry, Darryl. 2009. "In Role as Kingmaker, the Energy Department Stifles Innovation". *Wired*. Retrieved from: https://www.wired.com/2009/12/doe-loans-stifle-innovation/

is a promising avenue for improving the world. In contrast to policymakers propensity to want to plan for every contingency, permissionless innovation, an idea developed by the Adam Thierer, is more likely to provide the new ideas needed to solve energy and environmental issues.[19] It calls for government officials to clear a path for entrepreneurial experimentation unfettered by precautionary regulation.

A policy of permissionless innovation is more likely to find successful solutions to the pressing environmental and energy questions, such as the potential dangers from climate change and the health issues caused by pollution, than government bureaucrats choosing projects to fund based on political considerations.

[19] Thierer, Adam. 2016, March 15. *Permissionless Innovation: The Continuing Case for Comprehensive Technological Freedom.* Mercatus Center. Retrieved from: https://www.mercatus.org/publication/permissionless-innovation-continuing-case-comprehensive-technological-freedom

Ryan M Yonk is an Assistant Research Professor in the Department of Economics and Finance at Utah State University. His books include Green V. Green (with Randy Simmons and Brian Steed), Direct Democracy in the United States (with Shauna Reilly), Nature Unbound: Bureaucracy vs. the Environment (with Randy Simmons and Ken Sim), and a forthcoming booking Reality of American Energy (with Jordan Lofthouse and Megan Hansen). Dr. Yonk is the author of numerous academic journal articles and policy reports focused on the intersection of public policy, economics, and politics with particular interest in questions around energy and environmental policy.

In his work he emphasizes the importance of understanding public policy using the tools of the public choice economist and political scientist. This work along with a strong interest in energy and environmental policy comprises much of his current research agenda. At the core his research explores how energy and environmental policy can be better crafted to achieve greater individual autonomy and prosperity.

Dr. Yonk received his Ph.D. in political science from the Georgia State University in 2011. He was previously an assistant professor of political science at Southern Utah University, where he was also the director of the Institute for Policy Analysis. Also at Utah State University, he is the research director of the Institute of Political Economy.

Chairman WEBER. Thank you, Dr. Yonk.

Heritage was actually mentioned earlier, a discussion of the Heritage Foundation about they were not recommending to do away with the loan program, and yet we have a Blueprint for Reform that they update every year, in 2017, "Mandate for Leadership" Series. And on page 51 they actually do recommend doing away with it. I want to submit this into the record, without objection.

[The information appears in Appendix II]

Chairman WEBER. And then furthermore, before I get going, I have a letter from the Mercatus Center, Veronique de Rugy, also a letter about the loan program I, too, want to submit into the record. Without objection, so ordered.

[The information appears in Appendix II]

Chairman WEBER. I now recognize myself for five minutes of questioning.

Mr. Edwards, according to a report by the Mercatus Center that I just cited, 90 percent of the section 1705 loans went to subsidize lower-risk power plants backed by big companies, which actually had pretty good access to capital. These companies included Goldman Sachs, NextEra Energy, and General Electric. If these projects would have been built without government guarantees, why do you think that DOE would be wanting to subsidize them? And do you think this is just yet another form of corporate welfare?

Mr. EDWARDS. It does seem to me that you can divide the section 1703 and 1705 projects into two sort of pots. The great majority of them were subsidies for projects in my view would've gone ahead anyway because, as I said, 29 States now have these renewable purchasing requirements, mandates that are escalating and increasing over time. These projects were going to get built, and when federal subsidies were layered in, it just meant that the investors like Warren Buffett and others earned higher returns than otherwise. Then, there was a smaller group of other investments in the very risky projects like Solyndra and a few others that didn't pan out and, you know, those didn't have those sort of state subsidy backing.

So I think in both cases federal intervention doesn't make sense. I think the state government subsidized renewable so much now not only with the purchase requirements, with the tax credits, their own subsidies, federal subsidies are overkill. And I have in my testimony some discussion from The New York Times which looked at this and agreed that during the Obama years there really was overkill in subsidies.

Chairman WEBER. Thank you. I want to follow up with you, Dr. Yonk. And I want to come back to something you said in your written testimony. The follow-up is that with all of these large companies applying for loan guarantees, what does that mean for the little guy, number one? What about a small business startup or one innovative entrepreneur? Do they have the resources to compete against the lobbying power of these big companies? What has been your findings?

Dr. YONK. Yes, Mr. Chairman. I think you illustrate one of the problems with any sort of approach in this regard, and that is that precisely those—that entrepreneur in the garage with the crazy idea is—will never have access to these sort of loan guarantees.

What's interesting is, as Mr. Reicher said, these are really about commercialization of projects moving from one phase to another, as opposed to actually spurring the innovation of new technology industries. And so it limits greatly the ability of those to do it, and we select on those that are already at a certain point and we make a continued bet on that same industry over time.

Chairman WEBER. Thank you. You had made the comment that you can't measure what has not happened and I was following in your testimony and I had actually written down what cannot be measured is if the private equity firms adopt a wait-and-see posture. They're standing on the sidelines, and you'll never know what they contemplated not doing if that's not too many negatives, you know. And so I think you make a good point.

So what does that mean, Dr. Yonk, for innovation in the energy market in practical terms? Don't DOE guarantees to some companies discourage investment in others? Do you know of examples?

Dr. YONK. Yes, Mr. Chairman. There are two sort of—let me take the first question and then apply it to the second, and that is what I believe happens in these regards is, as individuals are making these private risk calculations, as hedge funds or wherever are, they now incorporate the probability of a loan guarantee being brought into it and they seek to mitigate risk on their own side by following the loan guarantee or the issuance of a loan by government. And as a result, we end up primarily betting on—because this again is a commercialization issue, we end up betting on technologies that are attempting to make the transition into full-scale commercial size, as opposed to spurring the innovation at the smaller scale.

And so what I believe happens—and this is where the counterfactual comes in—is that we end up seeing that there is a flight towards pre-existing alternatives as opposed to what might be termed the crazier ideas that in large part if you read the background on these loan guarantees, it was meant to do risky things.

So we talk a lot about the risk profile. I hear the risk profile of this if it was meant to fund risky technologies of a two percent loss rate, that's not encouraging to me if the goal was in fact to be spurring the riskier side of innovation.

Chairman WEBER. Thank you. I've got about a minute left. Actually, I'm down to 11 seconds. So I tell you what, I'm going to stop there and I'm going to recognize the Ranking Member for five minutes, Mr. Veasey.

Mr. VEASEY. Thank you, Mr. Chairman. And before I go into my questions, I just want to be clear. And I'm not going to submit a report for the record—that I specifically referenced the Blueprint for Balance while the Chairman specifically referenced the Blueprint for Reform, so two different reports there that were referenced but just wanted to clarify that.

And this question is government role for Mr. Reicher. Mr. Reicher, some would argue that the government shouldn't have a role in issuing loan guarantees or direct loans to companies, but this perspective ignores a long history of success that loan guarantees have shown not just in the energy sector but also the housing market, agriculture market, and many other industries. How would

you respond to the assertions we've heard today that the government should have no role in this space at all?

Mr. REICHER. Thank you, Mr. Veasey. The government has had a very long role in commercializing energy technology and in providing finance, both loans, loan guarantees, grants. I would argue that we would not have seen the development of commercial power if the government in the 1950s in the Eisenhower Administration had not paid for the development of the early plans, could have been delayed, could have been stillborn if there was an accident. The private sector was not in a position to put its own private capital into those early nuclear power plants.

The government participated with private entrepreneurs in the development of fracking. Government put in grants, the government put in tax credits, the government provided technologies in collaboration with the private sector, and from that, in 2006, we saw this technology take off.

Carbon capture is another example. We would not have seen the development of carbon capture to the point that it's reached—still a long way to go—had the government not started putting federal dollars into this technology in 1997.

So the government has a long role of commercializing energy technology, and I think all this is doing is putting it in a smarter form. Remember, these are loans. They have to be paid back. These are not grants, which has been the more traditional form of government support.

Mr. VEASEY. When you start talking about us being able to lessen our dependency from petro-dictators around the world, one of the things that has lessened our ability to depend upon those petro-dictators have been the advent of renewable energies. And in your opinion, would the utility-scale solar industry exists as it does today without DOE's loan programs?

Mr. REICHER. So let's remember where we were in 2008, 2009, 2010. We were in the depths of the financial crisis. It was not easy. In fact, for most companies it was next to impossible to go out and get a loan for an energy project. That's number one. They were also deploying utility-scale solar. We had never built a solar project in this country that was 100 megawatts or bigger. Scaling up energy technology is really tough. It's very risky.

Those two things together meant that most banks, most bond issuers said we don't either have the money or your project is too risky. The federal government stepped in with its congressionally authorized loan guarantees and said we're going to back the first few projects. Remember, these are just the first few projects, number one, number two, number three, not 30, 40, or 50. The private sector followed from there and the photovoltaic project market has exploded.

Mr. VEASEY. Again, us being able to lessen our dependency upon foreign oil by investing in our own energy, clean energy sectors here, but startup money is a big problem. IT startup companies have low capital costs. They are attractive options for venture capitalists, but my understanding is that energy investments take much longer to pay back and are much riskier. In your expert opinion, how do energy sector investments compare to other sectors, whether it be information technology, health care, or retail?

Mr. REICHER. Mr. Veasey, Mr. Chairman, I have to say I spent several years at Google, and it was fascinating to watch the difference between investing in information technology, software technology, and investing in energy hardware, extraordinarily different. With information technology, software engineers sit down. It's often for a few months. They develop a new product, and in simple terms, they push a button and it's deployed. They make adjustments to it over time, low cost, relatively quick.

In comparison, developing a piece of energy hardware, you don't measure things in months. You don't even measure things in years. You often measure them in decades. I'll show you any number of technologies—you know them well—where it's taken 10, 20, 30, 40, 50 years to get energy technology to full scale. And you don't measure this in billions—I'm sorry in millions. You measure it in billions or tens of billions, completely different. And that's why these loan guarantees make great sense.

Mr. VEASEY. Thank you, Mr. Reicher. Thank you, Mr. Chairman.

Chairman WEBER. I now recognize Chairman LaHood.

Mr. LAHOOD. Thank you, Mr. Chairman. And I want to thank the witnesses for being here today and your valuable testimony.

And in looking at the DOE loan guarantee program, I guess I've tried to objectively look at the program and the 28 projects that are part of this loan guarantee program. And as I look at those projects, many of them have value. There are innovative. They present opportunities. They have great people involved with them. And so figuring out what role the federal government plays with those projects and in looking at that, when we think from a public policy standpoint what role we should play in that or government should play in that and two questions that come up, does the loan guarantee program artificially change or alter the marketplace by having this in place? And does it dis-incentivize competition in this area?

And I know, Mr. Reicher, you talked about the role the federal government has played and, you know, I guess when I look at 2017, you know, if we were $20 trillion of surplus, you know, figuring out where to spend money, you know, these 28 projects would be probably great examples of where to spend money. But the reality is we are $20 trillion in debt in this country, and that's different from the 1950s where, you know, it was a much different country we lived in.

In 2017 the technology marketplace in this country is thriving. We lead the world in innovation. As was mentioned earlier, there's a lot of cash in this country that people are sitting on waiting to invest. Angel investors were mentioned earlier.

So figuring out that role of how the federal government plays a role in this program and that's really objectively what I've looked at here. And it seems to me that the role of the federal government we always got to keep in mind the fact that we're in debt, and that's a problem in this country. And then also looking at the marketplace.

And I guess, Ms. Katz, what I would ask you is when, and you mention this in your opening statement, we look at government financing, it seems as if government financing is divorced from profit motive. Can you elaborate on that challenge and also on my state-

ments about those two questions on whether we're de-incentivizing competition?

Ms. KATZ. The profit motive requires that you have skin in the game, that is, that you're driven to do well by the potential for a good return. In government funding programs, there is no personal stake. There is no skin in the game in terms of a financial incentive, and therefore, the criteria for investing money is looser, the demands for, you know, the type of performance is looser, and I think those things tend to prop up enterprises that tend to be weaker. And then the more of those we have, you know, the weaker the economy becomes.

And given this—the extent to which the federal government is now providing credit across the economy, you know, not just DOE but, you know, $18 trillion in exposure economy-wide, that's very troubling to me in terms of the loss of the incentives that are going to make our companies the strongest and are going to make them the most competitive.

In terms of your comment about the effect on competition and innovation, absolutely, you know, when government is financing certain programs, the private financing tends to follow that because that's where the incentives are and that's where the, you know, rewards tend to be and that's where the regulatory action is also going to occur. And so there's a lot of, you know, interest in following that.

And that—you know, we can say on the balance sheet that these programs have a rate of return that's positive. We can say they have default rates, but that's only half the equation. The other side of the book is all of the distortions that these programs cause, among them, loss of competition and innovation, and the competitive disadvantage that this creates for all the companies that aren't lucky enough to get this largesse.

Mr. REICHER. Mr. LaHood, could I give a quick answer?

Mr. LAHOOD. I'm out of time. Mr. Chairman?

Chairman WEBER. Sure, I think we've got some extra time. Go ahead.

Mr. REICHER. I'll be quick. You mentioned the deficit, the debt. Just I want to emphasize these are loans, not grants. They're getting repaid and they're getting repaid with interest. That's a very different measure I would assert.

The second thing you mentioned about U.S. leadership in energy technology, as much as I'd like to agree, in many ways our dominance in energy technology is very much being challenged by the Chinese. They have a very well organized effort, very well-funded across a whole range of energy technologies. We no longer lead in wind or solar. They are far ahead of us in many aspects of nuclear and various types of turbines and coal-related technology.

So, Mr. LaHood, I would not assume that we're in great shape when it comes to this $48 trillion opportunity we've got in energy infrastructure investing over the next 20 years. We are not leading in many respects, and programs like this can really help.

Chairman WEBER. All right. I thank you, Mr. LaHood, for yielding back.

And I believe that we're going to go to Mr. Foster now.

Mr. FOSTER. Thank you, Mr. Chairman.

Several of you have mentioned and referred to the DOE loan programs, which are the subject of this hearing, as a subsidy. And I was wondering how is it that a subsidy makes money for the taxpayer? That has me a little confused. Is there anyone wants to try answering that?

Ms. KATZ. Sure.

Mr. FOSTER. We need more of——

Ms. KATZ. So——

Mr. FOSTER. —those subsidies, it seems. It could take——

Ms. KATZ. Right.

Mr. FOSTER. —the debt down to zero with enough of these.

Ms. KATZ. So because there's virtually no chance that the government will not cover a loss, federal credit is provided in more favorable terms. Even if the recipient still continues to pay fees or interest, it's at a more advantageous rate than they would otherwise get in the private financing sector because the——

Mr. FOSTER. I understand it's a good deal for the recipient of the loan, but it's also a good deal for the taxpayer, so it seems like this——

Ms. KATZ. Well, it——

Mr. FOSTER. —is a win-win.

Ms. KATZ. It's only a good deal for the taxpayers if you ignore all of the distortions and costs that are created——

Mr. FOSTER. Well, these distortions you hypothesize are pretty hard to calculate and, you know, we have—anyway. So your argument relies totally on these hypothesized distortions and the hypothesized economic damage that they do——

Ms. KATZ. No.

Mr. FOSTER. —is that correct?

Ms. KATZ. No, it's not.

Mr. FOSTER. All right. Then how does the taxpayer not benefit from these? Would the federal debt be higher or lower if this—if these projects would not have existed?

Ms. KATZ. It—that's—I don't know.

Mr. FOSTER. I think it's a pretty easy——

Ms. KATZ. It's not such an easy equation.

Mr. FOSTER. Mr. Reicher?

Mr. REICHER. Their interest payments exceed the losses. It's hard to see how this isn't a net positive. Another——

Mr. EDWARDS. The issue is the broader one of opportunity constant in the economy. If resources are being steered into companies and technologies that are not the best for the overall economy, then we've wasted resources, so the issue is not just taxpayer resources but the crowding out that occurs in the private sector. If you have a big DOE loan office that is acting as a venture capitalist, they're drawing some of the best minds from Silicon Valley to come here to Washington to steer flows of money when I would rather those minds in Silicon Valley steering money. That's crowding out——

Mr. FOSTER. Well, this is really actually my second question here, which is, you know, I'm struck by the lower—the very low default rate, lower than a typical VC. And so I was wondering how is it that these federal bureaucrats—excuse me, these unelected federal bureaucrats seem to be making loan-making decisions that are better than free-market investors? And I——

Mr. EDWARDS. Well, the answer is and I think I touched on in my testimony, the vast majority of these projects, as has been mentioned, have gone to wind and solar projects that have been heavily subsidized by state government. State governments, particularly California, have very large and increasing——

Mr. FOSTER. But those subsidies would be——

Mr. EDWARDS. —mandates, requirements, so these projects would have been built anyway I think without federal subsidies because there's state-level mandates for them.

Ms. KATZ. I also think that it reflects——

Mr. FOSTER. Just a minute.

Ms. KATZ. —the fact that these——

Mr. FOSTER. But the state-level subsidies are—would be available to either a free market investor or one of these——

Ms. KATZ. No.

Mr. FOSTER. Is that true, Mr. Reicher?

Mr. REICHER. Absolutely. The subsidies at the state level don't distinguish between a project that's gotten some federal support and projects that haven't.

Mr. FOSTER. Sure.

Ms. KATZ. Right, but not every company is going to be allowed to benefit from state subsidies. They're not available to all.

Mr. REICHER. You qualify for the state subsidy, you get the state subsidy. If you can also get some help from the federal government—again, this happens across the whole range of energy technologies.

Ms. KATZ. When Tesla Motors negotiates tax abatements or other benefits with a state, that's not a deal that's available to every company.

Mr. REICHER. It happens—let me let Mr. Foster go ahead.

Mr. FOSTER. Yes. I was a little bit confused, Dr. Yonk. You seem to be criticizing the fact that there was a low loss rate on this at the end of your testimony, and I—it confused—is there a consensus whether a high loss rate is a good thing or a bad thing and whether low loss—I'm just—I couldn't follow that logic there.

Dr. YONK. Yes, so let me walk you through the logic, Mr. Foster, because I think it's actually an important policy question here. If the goal was in fact to provide loan guarantees to what was termed as risky technologies that truly would see—that were—that the private market was not willing to bear the risk of, we would expect to see higher——

Mr. FOSTER. But you're advocating for more Solyndra-type investments.

Dr. YONK. Only if that is the actual goal of the policy. I think that's an ill-advised policy given what can happen in the larger economy.

Mr. FOSTER. Okay. Let's see. I was also struck in your testimony that you seem to buy into this legend, I guess, that somehow the high-tech industry Silicon Valley started was a bunch of entrepreneurs by themselves whereas in fact if you look at the history, they were completely dependent on getting federal defense contracts, NASA contracts, and so on and that the history of that was completely dependent on government investment.

And so I think that really we should all, you know, study history a little bit and understand how effective strategic government investments are in getting our economy heading in directions that will pay off massively in the future.

And I believe my time is—and I have to yield back at this point.

Chairman WEBER. Thank you, Mr. Foster.

The Chair recognizes Mr. Posey from Florida.

Mr. POSEY. Thank you very much, Mr. Chairman. Mr. Katz and Mr. Edwards, how do you measure accountability for government funding in the Department of Energy loan guarantee program? Mr. Katz first.

Ms. KATZ. I don't know that it is being——

Mr. POSEY. Ms. Katz.

Ms. KATZ. —you know, measured. I can tell you that, you know, there are rules for setting program goals and, you know, at the end of the year the Department looks at whether it's succeeded. And—but most of those are measured in terms of inputs not in terms of, you know, that so many dollars were spent as opposed to what the—you know, the actual success of the program was.

And this follows on the earlier discussion, which is, you know, it—to assume that these projects wouldn't have happened anyway or this Silicon Valley, you know, development wouldn't have happened without government I think is a conceit. I think we've seen that, you know, there are many great developments and innovation throughout the—you know, the history of the world that have occurred without the government subsidizing them.

Mr. POSEY. Well, I appreciate your comments. So often government accountability to some people is how much we spend, not what actually gets accomplished. And I'm glad to see that the focus is on accomplishments.

Mr. Edwards?

Mr. EDWARDS. Yes, I mean, you know, it's the role of this Oversight Committee obviously, and it seems like this Oversight Committee has done a good job. It strikes me that the Republican scrutiny on some of these projects that the Obama Administration started dishing out in 2009, the scrutiny has been good because it seems to me that the Obama Administration started steering the money to safer projects like the ones that had the state purchasing requirements for them in order to get the loan losses down because they made these initial screw-ups with companies like Solyndra. So—and obviously the GAO and the IGs do a fantastic job on this account.

That's—those are all accounting issues. I think the bigger issues are the economic ones. Would the private sector steer money into the most innovative and most efficient energy technologies, and I think the answer is yes without any kind of federal subsidy.

Mr. POSEY. Okay. Have either of you read any of Peter Schweizer's books? Extortion, throw them all out, great, great literature on government accountability or lack thereof and crony capitalism. You know, Solyndra gets mentioned quite often, but it was a relatively small potato in a bag full of litanies of much bigger ones that for one reason or another the media seemed to never think was important.

As a follow-up, do you think there is a reasonable amount of up-front investment before taxpayers can expect returns?

Mr. EDWARDS. Again, I think—I mean, I don't think this is the role—you know, taxpayers should not be investing in these sorts of projects. It's been mentioned a couple times by Mr. Reicher that—you know, that there's gaps in private markets here that the government has to fill. I just don't buy it. I've looked at the history of R&D and industrial R&D in the U.S. economy and looked at the history of inventions. The vast majority of advances and innovations have come from the private sector without federal subsidies. Computers and, you know, Xerox machines and cell phones and smart phones, that was all private risk capital, private entrepreneurs, investors, and Silicon Valley putting their money into these projects.

The energy industry, I don't believe, is any different than any other risky industry, and the—I don't believe that these so-called gaps exist in private financing. Entrepreneurs can do it. They've shown that they're willing to invest in all kinds of risky and new technologies, including energy technologies, so we should leave the field to them, I think.

Ms. KATZ. Just as a quick follow on, you know, I'm—I don't buy the idea that DOE is funding, you know, the most innovative and riskiest, but if they were, then it raises the question if private investors are not willing to take a risk on a particular project, why should taxpayers have to underwrite that?

Mr. POSEY. Well, you know——

Mr. REICHER. Mr. Posey, if I could, I just want to emphasize again we're talking about energy technology that has huge scale-up costs. We're not talking about computers——

Mr. POSEY. Yes.

Mr. REICHER. —or cell phones and the like. And the history is there. The nuclear power industry got launched in the 1950s with major checks being written by the federal government——

Mr. POSEY. My time's up. I just want to make one comment. We had some employment downturn in our district and we decided to host an entrepreneurs summit, so we took some local ideas and had a summit and invited a few angel investors to attend and analyze the projects. And I think there was surprising amount of action on some funding there. We did several of them and we eventually had, you know, a long list, more than we could accommodate people who had wanted to invest in these new ideas and these new products that people had, and even in dire economic times, investors are interested in making investments in things that seem plausible and have potential to show return on them.

So I appreciate your comments very much. Thank you, Mr. Chairman. I see my time is up.

Chairman WEBER. I thank the gentleman from Florida.

The gentleman from Virginia——

Mr. BEYER. Virginia.

Chairman WEBER. —Mr. Beyer, is recognized.

Mr. BEYER. Thank you, Mr. Chairman, very much. Mr. Chairman, I'd like to begin by saying I appreciate the need to title these hearings with cool names like "Making the EPA Great Again" and "Risky Business," but I fear that we're going to go down the road

of Top Gun and Mission Impossible and Jerry Maguire, so I'd like to move that we don't name any more after Tom Cruise movies.

Chairman WEBER. I notice you left your six-shooter in your locker, so we won't name any after Tom Cruise movies. So ordered.

Mr. BEYER. Okay. Thank you, Mr. Chairman. Also, we talked earlier about GAO mismanagement in this program, and we had a hearing on this a year ago and one of the—and we had a GAO representative at that point who pointed out that only 16 of the 24 GAO recommendations for the loan program had been fulfilled, but I've discovered this morning that all 24 are now fulfilled. So many of the problems that we're talking about are historical rather than current.

The—I also would like to speak to this as a small-business person, and I guess I've borrowed more money than any of our panelists—that it's hard to borrow money as a small-business person. It—we have—what I've learned in 43 years of running a family business is that banks only want to lend money to people that don't need it. If you need it, it's very, very hard to get it, which is one of the reasons why there's $50 trillion in private equity sitting on the sidelines right now.

So to you, Mr. Reicher, is the industry marketplace actually free and does government money actually crowd out the private investment?

Mr. REICHER. I would say that we don't have a free market for energy. You know, there's been talk about eliminating all subsidies at the federal level. I think that's highly unlikely. And even if we did, that market is very much determined in many ways by the 50 state Public Utility Commissions that have an awful lot to say about how the energy markets and the electricity markets work.

Are we crowding out other companies or other technologies? I don't think so. This is a limited program, the loan guarantee program, that's focused on getting the first couple of big projects built to demonstrate a technology.

Let me say this. In many of these cases, the project developers, often thinly capitalized project developers, often small businesses, if they could get a loan from a bank or if they could float a bond, they would love to do it. Interest rates are low right now. It's much easier. It's not painful like having to go to the DOE and getting reviewed for a couple of years, having to do an environmental impact statement, having to pay a credit subsidy, loan spread. That's tough stuff. If they could do it in the normal way, they would do it. And I've talked to many developers. I was a developer myself. These are painful processes going to the Department of Energy, but sometimes you can't get the project done.

Mr. BEYER. Are you suggesting the federal government works slowly?

Mr. REICHER. I would never suggest such a thing.

Mr. BEYER. Would it even be possible for the Department to manage a federal research grant program without picking winners and losers?

Mr. REICHER. Listen, I was Assistant Secretary for Energy, for Energy Efficiency, and Renewable Energy. We had a $1.2 billion budget then. We were always being asked to pick winners and losers. We had competitive processes. The Competition in Contracting

Act told us we had to do it this way. That's what the federal government does, and that's what it often should be doing with taxpayer dollars. So I don't understand this argument about picking winners and losers. If you're Boeing competing with Lockheed for a jet contract, you know the government is picking winners and losers.

Mr. BEYER. When President Trump affects the economic prospects of American companies by tweeting about Nordstrom's or Toyota or Vanity Fair or Carrier, is that an example of the federal government picking winners or losers?

Mr. REICHER. I'll leave that up to the august members of this committee to decide.

Mr. BEYER. I was fascinated by Mrs.—Ms. Katz's testimony, especially the—and I very much respect sort of the deep philosophical notion that we have this $18 trillion of federal loan guarantees, that it has all kinds of pernicious effects.

But, Mr. Reicher, what's the—what would the U.S. economy look like without the FDIC and the—which would keep from the bank runs in the Great Recession or without Freddie Mac and Fannie Mae and the ownership society that George W. Bush pushed so hard or TARP so you wouldn't have General Motors or Chrysler, States that Donald Trump won pretty easily, or Homeland security's disaster assistance or the Veteran's Housing Benefit Program Fund for veterans or business loans to the Small Business Administration or to move from federal loans to the $470 billion in oil and gas subsidies?

Mr. REICHER. Very quickly——

Mr. BEYER. What's the economy look like without that $18 trillion.

Mr. REICHER. I wouldn't have been able to buy a home, let me say that. But I want to make one more really important point that I think we have to emphasize at this hearing. Let's look forward. We seem to be looking backwards. There's $41 billion worth of loan guarantee authority for nuclear, for fossil, for renewables, and for transportation. We could turn this into infrastructure investing, which seems to be the great focus, Republican and Democrat, on the Hill right now. This is an existing down payment we can make on the infrastructure hope that a lot of people have up here on Capitol Hill. So let's look forward at what we've got, and let's figure out how to spend it well.

Mr. BEYER. Great. Thank you very much.

Mr. Chair, I yield back.

Chairman WEBER. Thank you, sir. The Chair now recognizes Mr. Dunn for five minutes.

Mr. DUNN. Thank you, Mr. Chairman. I want to say also thank you for the opportunity to serve on this committee. It's a great pleasure and it really plucks at my heartstrings so I'm delighted to be here.

So I actually am the Chairman of a bank back home. This is a community bank. And I want you to know that I have been intimately involved in buying failed banks in that capacity. Now, that involves reviewing and underwriting a great many failed loans, toxic loans if you will. And as I reviewed the Department of Energy's loan portfolio for today's committee meeting, I find myself in

familiar territory. There's a lot of loans in here that are highly, highly questionable, and I think you would find frankly very few private bankers would actually have made loans on the terms that they were made to companies like Solyndra, Beacon, Fisker, VPG, and some of the others there. I didn't make my way through the entire loan portfolio last night. Valentine's Day.

So this costs the taxpayers hundreds of millions of dollars, and I feel like DOE should actually re-examine themselves and say are they comfortable in the role of being a banker. They apparently have very few staff with any experience in corporate lending.

I want to call attention to a couple things and ask a question. So first off, the actual loan loss ratio. I've heard people say that this is a two percent loan loss ratio. The government allowed $10 billion for losses, so that's the asset that you're measuring against. And the loan loss is actually about 8.1 percent if you believe the $810 million is all we lost. I would argue that that's a low number for a number of reasons.

I also heard that the interest paid back—the loans that went bad—I would remind everyone that interest income does not equal profit.

I would like to also underscore the comments Mr. Edwards made on the successful back end of the loan portfolio where they're being paid off. Most of those loans already enjoyed a government guarantee in the form of purchasing the energy that was being put out. So we had a company that was guaranteed success if you will on the back end and we gave them another guarantee, in fact, a loan at a low rate on the front end. So I'm not sure that that should count as you pointed out.

Now, this is my first committee meeting on this very fascinating, important subject that's near to my heart, but I would look forward in the future to actually seeing a full profit and loss on this just the way a bank would publish a profit-and-loss statement. And we do that on pretty much a monthly basis. If we don't, the FDIC comes after us.

Mr. Edwards, I want to ask you, do you believe that the Department of Energy prospectively put in place the kind of lending structures that would properly and soundly administer billions of dollars in loans and serve the public in a transparent fashion?

Mr. EDWARDS. Well, it certainly wasn't transparent, and I think as this committee has investigated in past hearings, that initially there were not the proper checks and balances in place for a lot of these loans. The expertise wasn't there and the GAO heavily criticized these programs. And it does seem that over time that DOE has improved at administering these programs because of all the scrutiny, particularly by this committee.

But again, I think the bigger issues are the broader economic issues. Is there really a gap here that the federal government has to fill? And I think the answer is no. There are a trillion dollars—trillions of dollars available for private investment. If we did overall a general tax reform as House Republicans want to do, there would be trillions more for all kinds of innovative infrastructure and other types of investment in the U.S. economy, and we wouldn't be worrying about small programs like this.

Mr. DUNN. Thank you very much, Mr. Chairman. I yield back.

Mr. REICHER. Mr. Dunn, could I respond for one second?

Chairman WEBER. You have—I'll give you two seconds.

Mr. REICHER. All right. Very few private bankers——

Chairman WEBER. Thank you very much. No, go ahead.

Mr. REICHER. You say very few private bankers would have made these loans. That's exactly why this program existed, particularly in the depths of the recession, number one.

There is a group of highly professional staff at DOE with finance background.

And third, I guess I do the math. It's $810 million on $36 billion——

Mr. DUNN. I think you've got the wrong denominator. The denominator was $10 billion. That's how much was placed at risk of the taxpayers' money.

Mr. REICHER. I'm doing the calculation based on the loss to date. You—fair enough, you can do it either way, but——

Mr. DUNN. Well, you do a profit and loss on the same—let's run it like a business, you know? And I could tell you it's not being run like a business.

Chairman WEBER. If you all want to talk offline, we'd——

Mr. REICHER. Thank you, Mr. Chairman.

Chairman WEBER. Yes, appreciate that.

The gentleman from Colorado is recognized.

Mr. PERLMUTTER. Thanks, Mr. Chairman.

And, Mr. Reicher, I just appreciate your comments. And I think one of the things that's gone unstated is the fact that many of these loans were to the renewable industry because of fear that our climate is just getting worse and worse and worse and we've got to do something about it. So I appreciate Ms. Katz, Mr. Edwards, your comments, wait a second, this is kind of political. Well, sometimes it's policy and—you know, and policy can be politics. I got it. And I worry about the climate so let's just put that aside.

Mr. Reicher has testified as to, you know, making some $900 million when you net it all out. That seems to be a positive to me, but maybe there are some opportunity costs that aren't being considered or maybe there are some benefits to the climate that you may not be considering, Mr. Edwards. So, I mean, there's a lot of stuff going on here.

But for me, the two percent loss ratio—I don't know how many of you have been in the lending business, but I represented lenders for 25 years. They would have loved to have two percent loss ratio.

Having said all of this, Mr. LaHood, after he finished kind of his rhetorical comments, you know, really focused on five questions that I thought were very important. I wish he were here so I could compliment him on that. And some of you have brought up points that I really do have a concern about. Ms. Katz, you talked about cronyism and the potential for cronyism with respect to these loans. And you may be absolutely right because I am worried about cronyism under the Trump Administration—I really am—and the potential for conflicts of interest and where exactly these loan dollars would go. You know, forget about Russia for a second but where will they go?

And so, you know, I appreciate the testimony of all of you, but that's the one that has me most concerned. And to a degree, even

though this—you know, the Republican Congress passed this back in 2005, signed by George Bush, used by that Administration, used by the Obama Administration, if this Congress wants to take this tool away from the Trump Administration because they're worried about potential cronyism, I may applaud that. I think it's—I think good work's been done to benefit a lot of jobs, as Mr. Reicher said, and to improve the climate I hope, but you may be right.

This is subject to cronyism, and under this Administration that's refused to give its tax returns, you know, is already in hot water with everything that happened yesterday with General Flynn resigning, I think, Ms. Katz, you're right to worry about cronyism.

Ms. KATZ. I don't think it's just DOE either. It's all of these—the programs of this nature invite that——

Mr. PERLMUTTER. You think all these loan programs should be taken away from the Trump Administration? Is that your testimony?

Ms. KATZ. Absolutely.

Mr. PERLMUTTER. Okay.

Ms. KATZ. Absolutely.

Mr. PERLMUTTER. I yield back.

Mr. EDWARDS. Can I give you one comment agreeing with you on that, too? During the Bush Administration—during the early Bush Administration, the issue was Enron. Enron was the recipient of all kinds of cronyism, guaranteed loans, loan guarantees that encouraged it to put its millions, billions of dollars of taxpayer and its own money into risky foreign investments that ended up crashing down and destroying that company. So this is an issue with both Republican and Democrat Administrations.

Mr. REICHER. Okay. Mr. Perlmutter——

Ms. KATZ. And just to your comment that most bankers would love a two percent default, I think that speaks to exactly the point we're making, which is if this is such a riskless or at least good bet on the part of taxpayers and that it's performing so well, then I can't imagine that, you know, private investors wouldn't jump for it.

Mr. PERLMUTTER. No, and you may be absolutely right. And Mr. Edwards was saying maybe this is—we moved into a mature industry where the risk has been reduced because we've been doing these things. But I agree with Mr. Reicher. Back in 2007, '08, '09, '10 when nobody was making a loan except for the federal government, period, because everybody in the market was so risk-adverse, sometimes you have to step in to get things moving.

So, Mr. Reicher, you can finish this up and I'll——

Mr. REICHER. So let me just say this. Again, we're looking backwards. DOE is not in the business right now of making loans to mainstream solar and wind projects. They're looking ahead.

Mr. Higgins, in your district, this new carbon capture project that just got a conditional loan guarantee for $2 billion, that's looking forward. That's a smart investment that DOE is backing.

Chairman WEBER. Mr. Reicher, I appreciate that. We're going to go to Mr. Higgins now for five minutes I hope.

Mr. HIGGINS. Mr. Chairman, thank you, sir. I know this committee has an extremely important oversight responsibility regarding the Department of Energy and its programs, and it's clearly un-

derstood that the loan guarantee program has had serious problems regarding some of the loans in its portfolio, including controversial failed projects such as Solyndra.

But I think although it's clear that there's room for improvement in the program, it's important that we give reasonable consideration to Department of Energy loans designed to commercialize innovative technology in the oil and gas industry versus the green industry. The oil and gas industry is well-established by generations of Americans. They well understand how to navigate the terrain of innovative technologies and energy. And energy technology is certainly not cell phones.

So I believe there may be a continued role for the government to play, but we have to balance between the wisdom of that role and the careful protection of the people's treasure. And again, I would point out an example of where an oil and gas industry has certainly demonstrated its capacity to take advantage of a program like this to help our country.

The Lake Charles methanol project received its conditional loan guarantee from the Department of Energy last year. Now, I've heard terms like startup and skin in the game, Mr. Chairman. That would seem to indicate, you know, zero investment from the private sector when the reality is, for example, Lake Charles methanol project has invested about a decade of research and development and about $40 billion of private capital. And LCM will use cutting-edge technology to refine petroleum coke, and that's a waste product of the oil industry in the high-value energy and chemical product such as CO_2, hydrogen, methanol, and industrial gases. And all of its products will be sold to major industrial and energy customers under long-term market-driven commercial agreements. This clean energy manufacturing plant is ready to commence construction and will result in 1,500 direct new jobs.

Now, that's an example to me of a wise investment, although, again, it's the duty of this body to balance wise investment in things like the commercialization of innovative technology in the energy industry versus the careful protection of the people's treasure.

So I'd ask you, Dr. Yonk, would you agree that it's reasonable to conclude that investment in innovative technologies in the oil and gas sector is a more sound investment than sinking money into green energy projects?

Dr. YONK. Mr. Higgins, so in general, as my early comments indicated, I'm skeptical of the ability of any centrally directed program to identify what the most innovative or the most likely to be successful is. Instead, what I suggest and what I think the evidence bears out over time is that entrepreneurs, those acting in the marketplace, responding to the market demands, which it's not a free market, although with a little luck we might get closer to that, will do better to push forward that innovation both in terms of how we produce energy and how we get a cleaner environment than simply allowing bets on loan guarantees or loan programs or any of these sorts of subsidies to make those sorts of decisions.

And so my belief is that if we actually allow the marketplace to make some of these decisions, we will see investment across a vari-

ety of sectors, including oil and gas and—as well as alternative energy.

Mr. HIGGINS. In the example of Lake Charles methanol project, hasn't the private sector already made decisions in the form of hard dollars and a decade of invested research and development?

Dr. YONK. It certainly seems to have. I know—I don't know a terrible amount about that particular project, but oftentimes, the issue here is not that there's no private investment in these things but that we nudge investment into things because they're following public dollars, as opposed to the marketplace speaking and acting.

Mr. HIGGINS. Thank you, sir, and thank you, ma'am. Gentlemen, thank you for your testimony. Mr. Chairman, I thank you. I yield back.

Chairman WEBER. I thank the gentleman from what we call East Texas.

And the gentleman from California Mark Takano is recognized for five minutes.

Mr. TAKANO. Thank you, Mr. Chairman.

I want to ask a question of each of you. I want to clarify for the committee whether any of you have had any experience investing in a major clean energy or power project, so being involved in any sort of major decision like that? Have you ever been involved in a major business investment decision, Ms. Katz?

Ms. KATZ. I have not. I think we should—the entire committee is—

Mr. TAKANO. I appreciate your answer. Mr. Edwards?

Mr. EDWARDS. No, not as an investor but my first job out of college was with a major nuclear electric utility, so I have a background in—

Mr. TAKANO. Yes, but you were never involved in a major investment——

Mr. EDWARDS. No.

Mr. TAKANO. —decision? And you, Dr. Yonk?

Dr. YONK. I'm an academic that studies these things. I have not.

Mr. TAKANO. Okay. Mr. Reicher?

Mr. REICHER. I have, Congressman. I said earlier, raised $100 million with some colleagues to make investments in energy projects, and then at Google we made several investments that I had a part of.

Mr. TAKANO. So I think it's fair to say that of all the witnesses we have brought before us today, of the four, Mr. Reicher, you're the only one that's actually had experience actually raising private capital and working with large investments, high-stakes investments, investments that stood to lose a good sum of money. The others at the table are theorists, academics, or, you know, represent organizations that have an ideological commitment to—or an emphasis on very small government or a libertarian philosophy of government that kind of posits pure free markets.

But you, Mr. Reicher, have operated in an environment of reality, of actual pragmatic reality of having to contend with real market forces. And can you—well, tell me how does your experience in making the investment decisions you've made provide you with greater clarity in understanding the role of government in the market?

Mr. REICHER. Congressman, what I found in this energy project investment firm is that there were a lot of developers out there with interesting project investment needs. They would come to us and we'd ask the question, does this work in the laboratory? They'd say yes. Has it worked at demonstration scale? They'd say yes. Has it worked at commercial scale? They'd generally say no. That became the problem for us as the equity investors and for the banks as the providers of debt. Has it worked at commercial scale? If the answer to that is no, you're in real, real trouble. And that's the specific focus of this loan program, getting the first couple of projects built at commercial scale and then getting out of the way.

The carbon capture project you just heard about, get it built, show that you can turn pet coke into methanol and capture the CO_2, government helps to do that, and then get out of the way. We couldn't invest in so many of the projects that we saw—and I'll wrap up and say the following. When all was said and done, during the time I was there the biggest focus area of investment turned out to be corn ethanol, well-established, lots of plants built, you knew what you were going to get, you knew it would work, but was that advancing technology? It wasn't. It wasn't advancing cellulosic ethanol, a better way to do this.

Mr. TAKANO. So—and what you're describing there is not necessarily—you're talking about the private investors for the corn ethanol?

Mr. REICHER. Private investors. We were private investors. We couldn't take the risk and the banks couldn't take the risk of making the jump to the next not-fully-commercialized technology. There was too much at stake.

Mr. TAKANO. So in practicality, to advance research—not just ideas but ideas that have been proven in laboratories, ideas that have been proven in demonstrations, to actually have the possibility of creating whole new markets, whole new industries, whole new categories of activity, economic activity which would result in jobs, it often takes a government loan guarantee program to be able to move that forward.

Mr. REICHER. The Chinese certainly think that. They are investing heavily in all sorts of advanced technologies to get them into the marketplace. And that's why, as I said earlier, in many ways we are losing the race on energy technology to this country that has decided that commercializing energy technology of all sorts—renewables, fossil, nuclear—they're making that a big part of their future, and that's where I worry that if the government steps out of this, carefully, surgically focused, just commercializing the technologies, not financing them after you've demonstrated them, that's what I worry about here.

Mr. TAKANO. Mr. Chairman, my time has run out. Thank you.

Chairman WEBER. I thank the gentleman.

Mr. Marshall from Kansas, you're recognized for five minutes.

Mr. MARSHALL. Thank you, Chairman.

My first question for Ms. Katz, are you aware of the Department running any type of cost-benefit analysis prior to the approval of new DOE loans? And then do we do any type of follow-up on a yearly basis after them?

Ms. KATZ. I'm not aware of that, but I'm not an expert on DOE per se. My research has been on the—you know, the total of loans and loan guarantees across the economy.

Mr. MARSHALL. Any other panelists?

Mr. EDWARDS. You raise an interesting point, which is that the federal government requires cost-benefit analysis of new regulations over certain dollar values that are promulgated by departments. There is no requirement for cost-benefit analysis for federal spending programs, but in my view, there should be. These sorts of government investments should be subject to a detailed cost-benefit analysis.

Ms. KATZ. And certainly if the government had done a proper benefit-cost analysis on ethanol, we would have found that government investment in it was a horrible idea because it turned out to actually produce terrible environmental effects, as well as produce more carbon dioxide than saving carbon dioxide.

Mr. REICHER. Mr. Marshall, can I quickly say——

Mr. MARSHALL. Please.

Mr. REICHER. Let me emphasize the folks at the Energy Department who—the career folks who manage these programs, they have to do financial modeling and financial pro formas before they can make a loan. The proposer of the loan comes in with a financial model, with a financial pro forma. That gets reviewed. So I don't know about cost-benefit analysis in a policy. They're doing the right kind of analysis, which is a financial pro forma or financial model.

Dr. YONK. Mr. Marshall, might I just add that we do however see significant political pressures placed on these programs, at least in their historical context, that in fact there have been nudges from Administration officials to push for particular loans to be approved. And that illustrates that, while I have confidence that there is lots of this modeling going on, there is a large—there is an interjection of politics into these things that becomes problematic. And I might suggest this committee ask DOE in particular the very question you asked is what is that process they go through.

Mr. MARSHALL. Mr. Reicher, I guess I'm going to follow up on your statement. Are those pro formas, I guess that's what you're referring to, made public? Are they made available to us as well?

Mr. REICHER. I don't know.

Mr. MARSHALL. Okay. My last question I'll go back to Mr. Edwards. What options exist for the incoming Administration to reform the DOE loan programs and address taxpayer liability? What role can Congress play in these reforms?

Mr. EDWARDS. Well, I don't think Congress should appropriate any more money for these programs. I think the time for federal subsidies, if there ever was one, has passed. We've been subsidizing solar and wind for 40 years now. It's not a so-called infant industry anymore. It's a mature industry. We've heard today that there's lots of private investment, billions of dollars in these industries, and I think what Congress should move ahead with, broad-based tax reform, the Congressman was mentioning the methanol plant in his district. Those sorts of projects, if we did tax reform, they would attract more investment by private equity, by corporations if we reduce the tax cost of equity in the economy.

Ms. KATZ. And I would just say with all due respect to Mr. Reicher, the—our future is not—the direction we should not be going in is to be more like China. That's not what's going to help the United States.

Mr. REICHER. Can I just respond to Mr. Edwards? Let me just correct something. You don't build energy projects largely with equity. You build it with debt. You want to put as little equity in a project as you can because equity is expensive. You want to put as much debt on a project as you can because debt is cheap. Equity can cost you in an energy project 15, 20, 25 percent. Debt is in the 5 to seven percent range.

So this idea that somehow lots more equity is going to start flowing, that's good. I don't disagree because you have to put some equity in the project, but the thing that stumps these project developers is raising debt, getting a loan from a bank or issuing a bond, and that's the real struggle.

Mr. MARSHALL. I guess——

Mr. REICHER. The last thing I want to quickly say, looking ahead, the money is not there for solar and wind in the loan guarantee program. There's—the big money that's left, the remaining authority, $12.5 billion for advanced nuclear, $8.5 billion for advanced fossil. There's $4.5 billion for renewables and then there's a big chunk for advanced transportation. So to Mr. Edwards, this is not about—largely about solar and wind as we look ahead at this $41 billion of authority.

Mr. MARSHALL. A quick question. So through the years it seems like big lending institutions are less likely to loan money because of all the rules enhanced by Dodd Frank. Is that true or false? Do you think it's so much harder nowadays for some of these big projects to get funded?

And I'm over my time. I apologize if you don't have time to answer that question.

Chairman WEBER. No, I want to know the answer.

Mr. EDWARDS. I think that's true, but I would strongly disagree with Mr. Reicher's comment about debt and equity. It is a—private return is equity. You lower the tax on the marginal investment dollar, you will get more private investment by people like Warren Buffett and all kinds of energy projects is—equity is the tail that wags the broader dog. That is the return in the economy to private investors, but the vast trillions of dollars invested in the American economy every year is invested because people want to earn after-tax return. You lower taxes, you increase after-tax return, you get more investment.

Dr. YONK. There's no doubt you could get more equity in a project if you need it——

Chairman WEBER. If the gentleman would suspend, we need to move on. I apologize.

Dr. YONK. Mr. Chairman, could I just take six words to answer Mr. Marshall, and that is I think your question is in fact where the answer to many of these problems lies, and that is clearing the path for more of this sort of investment in both the regulatory side and cleaning up the subsidy side.

Chairman WEBER. Did anybody count those words? I——

Dr. YONK. They were more than six, but I'm an academic.

Ms. KATZ. The most important ones were six.

Dr. YONK. Six.

Chairman WEBER. I thank the panel.

The Chairman now recognizes Mr. McNerney for five minutes I think.

Mr. MCNERNEY. Well, I thank the Chairman. And I'll try to keep it to five minutes.

Mr. Reicher, the Loan Program—the Loan Programs Office is known to have a rigorous selection process. How would you characterize the application and selection process compared to the private sector?

Mr. REICHER. It's tough. And as I said, I think before you came, Congressman, many of these developers would rather get a loan from a bank than have to go to the DOE. So they have to do things to get these loans from the DOE like often an environmental impact statement that can take a lot of time. They have lots of charges. They've got to pay a credit subsidy cost; they've got to pay a credit-based interest spread; they now have a risk-based fee that has been imposed recently. This is tough stuff, so I think it's being rigorously managed and I think—I don't think the American taxpayer has a huge amount to worry about here because of the way this program is being run.

Mr. MCNERNEY. So that might help explain the two percent default rate?

Mr. REICHER. It does, and I think—that's why I think that this is a program because it has been well-run. I'm the first to admit there were mistakes—some mistakes made. There were some loans that went bad, but that's not how you look at a portfolio. Look at the overall portfolio. How do all the investments in the portfolio—how are they doing on a portfolio basis? I'd love to have an investment portfolio like this.

Mr. MCNERNEY. And banks really don't have the resources to carry out that sort of a rigorous process. Is that right?

Mr. REICHER. They often do not, and it's certainly the case when you're bringing in an untested technology, that's not what banks do.

Mr. MCNERNEY. So would you explain in clear terms, Mr. Reicher, the difference between a loan guarantee and a grant?

Mr. REICHER. A loan guarantee or a loan is——

Mr. MCNERNEY. That's kind of a rhetorical question.

Mr. REICHER. Yes, you've got to pay it back.

Mr. MCNERNEY. Forgive me.

Mr. REICHER. You get a loan for your house, you've got to pay it back. If your grandmother gives—writes you a check for $10,000, that's a gift.

Mr. MCNERNEY. So——

Mr. REICHER. That's a grant.

Mr. MCNERNEY. —are both the loan guarantees and grants necessarily government subsidies?

Mr. REICHER. I don't know if they're subsidies. I think if they're surgically applied, if they're rigorously reviewed, and if you pay the loan back, that seems like a fair distance from being a plain old subsidy, particularly if you pay it back and the government can go on and use that money for other things.

Mr. MCNERNEY. So are tax policies such as suggested by Mr. Edwards capable of distorting the economy maybe as much of some of these loan guarantees?

Mr. REICHER. Tax policy can help and tax policy can hurt. If you get it wrong, you can distort the market in a very serious way. So we play around with tax policy and sometimes it does a good thing for taxpayers if we play around with it, and sometimes it doesn't.

Mr. MCNERNEY. And loan guarantees don't have that big of an impact on the economy I would guess but maybe I'm wrong.

Mr. REICHER. As compared to grants, as compared to the cost of tax subsidies, they get paid back. I think that's the thing to answer.

Mr. MCNERNEY. So what was the intent of the loan guarantees that are in question? What was the original intent?

Mr. REICHER. Let me tell you that most of the ones we're talking about here were granted under the so-called section 1705 program. That was put in place in the depths of the recession in order to get people back to work. They were focused on so-called shovel-ready projects. They were ready to go. It was really hard to get a loan from a bank so the federal government stepped in. These projects got built.

Let me emphasize something. That program is over. It's over as of 2011. What we are focused on are the 1703 projects. Those you have to prove innovation. There's a whole set of things that make them quite different. So that's why I keep saying, looking ahead, this is the 1703 project—program, and I think we can do a lot with it for infrastructure.

Mr. MCNERNEY. So in my remaining time could you give any examples of successful energy generation as a result of these loan programs?

Mr. REICHER. Sure. You named the category. You know, we've heard about renewables. We haven't talked about several other—a major transmission project got financed using the loan guarantee program with an innovative technology. Boy, do we need transmission in this country. Our transmission is in rough shape. We need to expand it. We need to bring energy in from remote areas. So that's a great use. We didn't talk about a major storage project.

Electricity storage is key going forward, and a very innovative project got built, is functioning well, proved out a very important technology. Then, you heard the project in Mr. Higgins' district. Those kinds of carbon capture projects, big amount of future authority for doing those. We need those to work.

Mr. MCNERNEY. Thank you. Thank you, Mr. Chairman.

Chairman WEBER. I thank the gentleman for yielding back.

The gentleman from Kentucky, whose home is off the grid, is recognized.

Mr. MASSIE. I knew you'd call me out.

Mr. Reicher, what's the differential in the interest rate that these companies can get because of the loan guarantee versus if they had to go into the private market and borrow the money? Or is it such that some of these projects are so risky nobody would loan them the money?

Mr. REICHER. That is the big challenge, Congressman. Some of these projects have enough commercialization risk scaling up for

the very first time to a full-scale utility project that often you can't get a bank to make you a loan. If you can get a bank to make you a loan, here's the problem. Not only will they charge you a pretty high interest rate, but they'll give you a very short term for the loan. That doesn't work when you go out to get a power purchase agreement. You've got to pay back the whole thing in 5 or six years. So that's why these—this very targeted program exists.

Mr. MASSIE. Isn't that where venture equity would play? Because, you know, I had a startup and I went to banks and they weren't going to loan me the money, and so I went to the venture capitalists. And if you think the terms of the DOE are tough, you should check out the vulture—venture capitalists.

Mr. REICHER. Fair enough. Here's the answer to that in my view. Venture capitalists invest small amounts of money in very high-risk situations. They are investing in the early stage of these technologies. They've come out of the lab and you want to build the first demonstration projects. They are definitely not the sort that are going to put big amounts of money into actually scaling it up. So this notion that the venture capital world is somehow going to scale up these big energy projects for the first time, that's not what they do.

Mr. MASSIE. Well, you know, what's also true about venture capital is they fully expect a lot of their programs to fail——

Mr. REICHER. Yes, but——

Mr. MASSIE. —but since this is not how it is structured for the taxpayer, you know, a venture capitalist can write off nine failures with one good success. I'm not arguing that the DOE should become a capital investment firm, but because the taxpayer, they just lose one-to-one on all the nine losses and then they win back one-to-one on their win. If it were an equity investment, that's why this works in an equity environment and not in a loan environment. And I think some of these programs are so risky that no bank would loan you the money and for good reason, and nobody would loan you the money unless they had an equity stake and a chance at a multiple return on this. Dr. Yonk, do you want to speak to this?

Dr. YONK. Just I think what you're illustrating is what I described is the way capital moves in these regards and that is they're going—they know the program exists. They're going to often wait either for not just loan guarantees. They're also going to wait for grants and larger-scale loans.

So with due respect to Mr. Reicher, I think that, yes, he's right in describing what venture capitalists have done, but in large part that's a construction of both the regulatory and the subsidy system that exists today.

Mr. MASSIE. Ms. Katz?

Ms. KATZ. Yes, I would just add that the spread between the interest rates from—that DOE may offer and the private market does, that's just one of a number of types of differences. There are—there's a long list. I can tell you that there are longer maturities than private loans. There are deferrals of interest. There are allowances and grace periods. There are waivers or reductions of loan fees, higher loan amounts relative to the enterprise value. So there's a, you know, just a variety of elements on which they—

they're different than—the government loans are different than the private sector.

Mr. MASSIE. But at some cost to the taxpayer?

Ms. KATZ. Well, there's always a cost to the taxpayer in part because of the accounting method that the federal government uses. What they do is they try to determine what the actual cost of the loan is in the present value. That is what, you know, all of the future payments are going to bring in versus the cost. And I'll try not to get too technical, but what the federal government does is it ties the interest rate that they use in that calculation to treasuries, which is a below-market interest rate so it appears that the loan or the loan guarantee at the time the money is out is actually costing less than it really does.

Mr. MASSIE. So some of the costs are hidden or——

Ms. KATZ. In part.

Mr. MASSIE. Yes. Mr. Edwards, would you like to speak to this at all?

Mr. EDWARDS. No, I think Diane hit it on the head.

Mr. MASSIE. Okay. Well, I will yield back seven seconds to the Chairman, and thank you.

Chairman WEBER. I thank the gentleman.

I do want to close today by thanking our witnesses, all of whom, I'm sure, while you probably have never paid—well, you have not paid into investment schemes—is that the right word, Mr. Reicher—have probably paid taxes and have taken note that we do have a $20 trillion deficit, and all of you in my opinion should be concerned about that, I want to highlight today that we have heard concerns about how the DOE loan guarantee program can indeed hurt innovation. Some of it we can't measure, but it does especially for the little guy and it can distort the energy market.

So with that, I'm going to say thank you all for being here. I want to thank you for your testimony. I want to thank the members, all two of us, for our questions. And I want to say that the record will remain open for two weeks for additional comments and written questions from members.

This hearing is adjourned.

Mr. REICHER. Thank you, Mr. Chairman.

[Whereupon, at 12:16 p.m., the Subcommittees were adjourned.]

Appendix I

Additional Material for the Record

DOCUMENTS SUBMITTED BY SUBCOMMITTEE ON ENERGY
CHAIRMAN RANDY K. WEBER

February 15, 2017

The Honorable Randy Weber
Chair, Subcommittee on Energy
The Honorable Darin LaHood
Chair, Subcommittee on Oversight
House Committee on Science, Space, and Technology

Joint Energy Subcommittee and Oversight Subcommittee Hearing
Risky Business: The DOE Loan Guarantee Program

Dear Chairman Weber and Chairman LaHood:

Thank you for the opportunity to contribute to the House Committee on Science, Space, and Technology's joint hearing by the Subcommittee on Energy and the Subcommittee on Oversight on the future of the Department of Energy's (DOE's) loan guarantee programs.

As the committee is aware, the Department of Energy's loan guarantee programs authorized under Title XVII (Section 1703 and Section 1705) of the Energy Policy Act of 2005 and the Advanced Technology Vehicle Manufacturing (ATVM) direct loan program have either yielded failures (for example, Solyndra and Abound Solar) or merely protected the bottom lines of companies that did not need taxpayer handouts to begin with (for example, Ford and Nissan). Indeed, these programs have extended preferential loans to commercial giants like NextEra Energy Resources (a Fortune 200 company), Prologis (a global real estate investment trust), NRG Energy (a Fortune 500 company ranked 196th), and Cogentrix (at the time a wholly owned subsidiary of Goldman Sachs).[1]

I greatly appreciate the committee's continuing focus on these loan programs. More than $30 billion in loans and loan guarantees have been issued under the three programs since 2009, and taxpayers are potentially liable for most of that amount.[2] Programs under Sections 1703 and 1705 in particular have guaranteed $22 billion in loan guarantees since 2009.[3]

In addition, while the Section 1705 loan program expired in 2011, Section 1703 and ATVM still have billions of dollars in authorized funds remaining. As of FY2017, the DOE still has $24.9 billion in loan guarantee authority under 1703 and $13.2 billion

[1] Department of Energy, "Portfolio Projects," accessed February 13, 2017.
[2] Government Accountability Office, "DOE Loan Programs: DOE Has Made More Than $30 Billion in Loans and Guarantees and Needs to Fully Develop Its Loan Monitoring Function," GAO-14-367, May 30, 2014.
[3] Ibid.

3434 Washington Blvd., 4th Floor, Arlington, VA 22201 Phone: (703) 993-4930 Fax: (703) 993-4935 www.mercatus.org

under ATMV.[4] The potential exposure of taxpayers is substantial. Also, contrary to what some are claiming,[5] the programs are not profitable when considering the federal government's borrowing costs.[6]

As I and others have noted, the problems with loan guarantees like Sections 1703 and 1705 are much more fundamental than the cost of one or more failed projects.[7] In fact, the economic literature shows that every loan guarantee program transfers the risk from lenders to taxpayers, is likely to inhibit innovation, and increases the overall cost of borrowing.[8]

At minimum, such guarantees distort crucial market signals that determine where capital should be invested, causing unmerited lower interest rates and a reduction of capital in the market for more worthy projects. At their worst, loan guarantees introduce political incentives into business decisions, creating the conditions for businesses to seek financial rewards by pleasing political interests rather than customers. This is called cronyism, and it entails real economic costs.[9]

Loan guarantees are particularly attractive from a political perspective. Congress can approve billions of dollars in loan guarantees with little or no impact on appropriations figures or the deficit because such loans are almost entirely off budget. Moreover, unlike the Solyndra case, most failures either take years to occur or never occur; this is because the many of the companies were not risky borrowers in the first place and had plenty of access to capital—as with 90 percent of the Section 1705 loan program recipients.[10] This allows politicians to appease parochial interests by granting loans to local companies with few negative consequences. The projects will most likely succeed, or it will be years before the projects default.

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[4] Catalogue of Federal Domestic Assistance, "Federal Loan Guarantees for Innovative Energy Technologies," accessed February 13, 2017.
[5] Paul Krugman, "When Government Succeeds," *New York Times*, November 16, 2014; and Max Ehrenfreund, "Remember Solyndra? Those Loans Are Making Money," *Washington Post*, November 13, 2014.
[6] Donald Marron, "Spin Alert: Despite What DOE Says, Its Loans Are Not Making Money," *Forbes*, November 17, 2014; and Veronique de Rugy, "No, the Program That Gave Us Solyndra Is Obviously Not Profitable," *The Corner, National Review Online*, November 19, 2014.
[7] Veronique de Rugy, "Assessing the Department of Energy Loan Guarantee Program" (Testimony before the House Committee on Oversight and Government Reform, Mercatus Center at George Mason University, Arlington, VA, June 19, 2012). Also see Chris Edwards, "Energy Subsidies" (Downsizing the Federal Government, Cato Institute, Washington, DC, December 16, 2016); and House Budget Committee, "The Empty Promise of Green Jobs: The Costly Consequences of Crony Capitalism," September 22, 2011.
[8] Matthew D. Mitchell, *The Pathology of Privilege: The Economic Consequences of Government Favoritism* (Arlington, VA: Mercatus Center at George Mason University, 2012); and Veronique de Rugy, "A Guarantee for Failure: Government Lending under Sec. 1705" (Testimony before the House Committee on Oversight and Government Reform, Subcommittee on Regulatory Affairs, Mercatus Center at George Mason University, Arlington, VA, July 18, 2012).
[9] Mitchell, *The Pathology of Privilege.*
[10] de Rugy, "Assessing the Department of Energy Loan Guarantee Program."

It is also easy to understand why companies and company executives benefit from these loans and may seek them out. However, this should not obscure the fact that this preferential treatment comes at the expense of taxpayers, competitors, and consumers—and ultimately at the expense of our market and political system.

For all of the above reasons, the right thing to do is to permanently terminate these loan programs, along with all other energy subsidies. As Chris Edwards explains,[11]

> This energy revolution was driven by private innovation and competitive markets, and it has created environmental as well as economic benefits. Cleaner natural gas is replacing coal as a fuel source in U.S. electricity production. Over the past decade, coal fell from 49 percent of electricity production to 33 percent, while natural gas rose from 20 percent to 33 percent. . . .
>
> . . . The oil and gas revolution shows that businesses and markets can generate major innovations and progress with their own resources. Furthermore, investors and major corporations have stepped up to the plate and pumped billions of dollars into alternative energy technologies in recent years. The U.S. energy sector is vast, dynamic, and entrepreneurial, and it does not need subsidies to thrive.

With that in mind, a plan to reform the DOE's loan guarantee programs should:

- Cancel all remaining loan guarantee authority under Section 1703 and the ATMV program (approximately $25 billion for Section 1703 and $13 billion for ATVM).
- Abolish the programs permanently.
- Continue to appropriate funds to the DOE's Loan Programs Office, which would administer the wind-down of the loan portfolios ($15.7 billion in Section 1705 guarantees, $6.2 billion in Section 1703 guarantees, and $8.4 billion in ATMV). Alternatively, transfer the loan obligations to the Department of the Treasury to administer or auction them off to the private sector.

Eliminating these loan guarantee programs will level the playing field for all firms, end a cycle of counterproductive cronyism, and allow the crucial energy sector to continue to thrive and innovate, with beneficial effects on the environment.

Sincerely,

Veronique de Rugy
Senior Research Fellow
Mercatus Center at George Mason University

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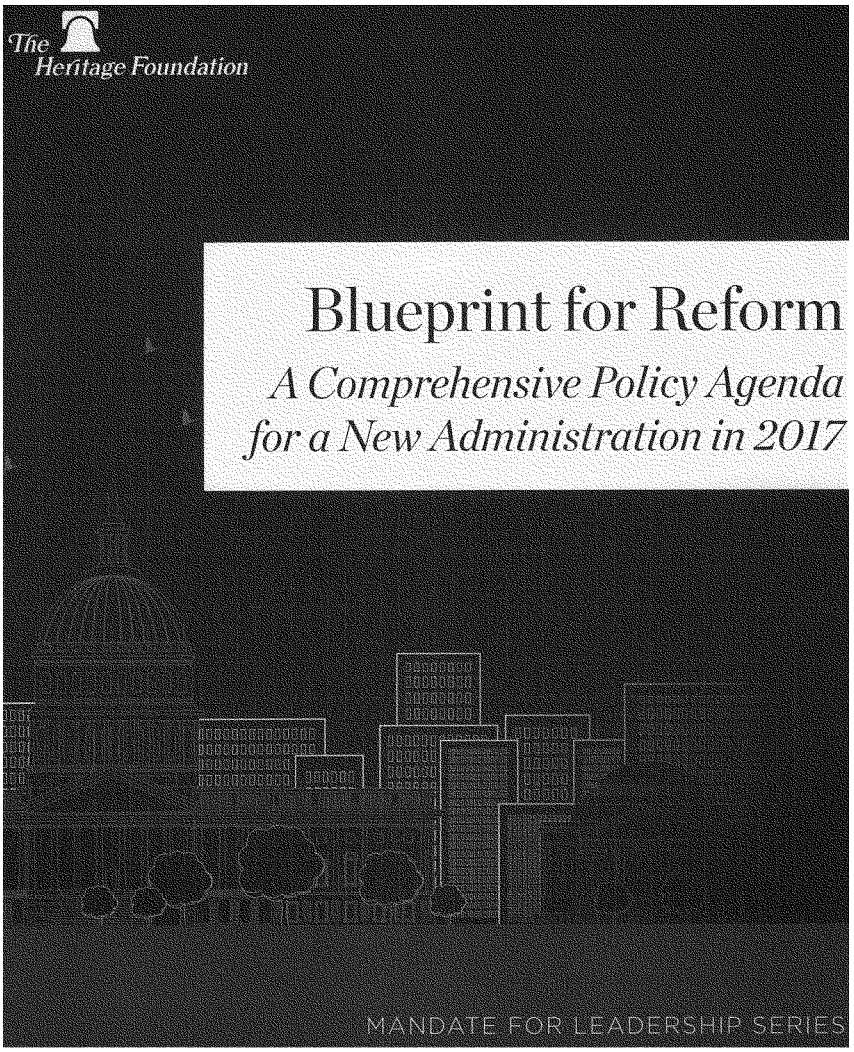
[11] Edwards, "Energy Subsidies."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minerals, or wind or solar power. Ideally, states should be given charge of managing resource development within their boundaries and off their shores.[2]

The federal estate is massive, consisting of some 635 million acres. The majority of this land is not classified as a national treasure, like Yellowstone or the Grand Canyon, but large swaths of open space with tremendous economic potential—as well as potential for environmental improvement. The federal footprint is even larger because limitations on federal lands often affect the use of adjacent state and private lands; government agencies lock up lands through informal designations and study areas. The next presidential budget should explore and begin the process of turning over more management of the federal estate to states and the private sector. Federal land should be categorized according to what can be sold to individuals and what can be transferred to state and local control.

In the meantime, the President's budget should make clear that the federal government will open all federal waters and all non-wilderness, non-federal monuments to exploration and production of all of America's natural resources. Congress should require that the DOI conduct lease sales if a commercial interest exists, whether for offshore oil or offshore wind. Congress should also force the DOI to take any steps within its authority to attract interest in federal lands, including streamlining bureaucratic processes or reducing royalties.[3]

Open access, however, means more than simply permitting energy exploration and development. Borders should not dictate whether or not an individual can sell a product, nor should they force consumers to pay artificially high prices for goods in the form of tariffs. Yet laws restrict opportunity, whether by encouraging unnecessary bureaucratic barriers to exports of liquefied natural gas or by imposing tariffs on solar technology. Freely importing and exporting energy and energy technologies would yield tremendous economic benefits, providing Americans with more opportunities to sell products to more customers and to buy cheaper goods and services from abroad. Free trade in energy also bolsters national security by increasing supply diversity and providing choices for allies; it will have beneficial geopolitical implications for every region of the world.[4]

ELIMINATE PREFERENTIAL TREATMENT FOR ALL ENERGY COMPANIES

In public policy, preferential treatment in the energy sector takes many forms. Over the years, Congress has implemented numerous policies that use the political process to support the production or consumption of one good over another, including direct cash grants, special tax treatment, taxpayer-backed loans and loan guarantees, socialized risk through insurance programs, mandates to produce biofuels or force energy conservation, tariffs, and energy sales at below-market costs. Politically connected energy companies received a big boost when President Obama signed the American Recovery and Reinvestment Act of 2009 into law.

Whatever shape the favoritism takes, the results are the always the same: The government delivers benefits to a small, select group and disperses the costs across families and consumers. Free market competition, not political favoritism through the government, should determine the allocation of resources.

In some instances, the federal government has squandered taxpayer dollars on economic losers, like the much-maligned solar manufacturer Solyndra. Even with a $535 million loan guarantee from the Department of Energy, Solyndra could not survive. The economic pain cuts deeper than wasted taxpayer money because government intervention allows Washington to direct the flow of private-sector investments. The number of investment opportunities is broad and expansive, but available capital is limited. Of course, investors must choose among the different projects, but government favoritism diverts limited capital by dictating who should receive it. This makes some projects appear less risky because they enjoy the confidence of the government.

Private investors sank $1.1 billion into Solyndra. Much of the private financing came *after* the Department of Energy announced that Solyndra was one of 16 companies eligible for a loan guarantee in 2007. The opportunity cost is not only the lost taxpayer dollars, but also the $1.1 billion that might have been invested elsewhere in the economy.

In other instances, the federal government has awarded subsidies to very profitable, well-established companies or ones that already enjoy federal, state, or local subsidies. The current and long-term success of these companies often depends on subsidies, which explains why they continually plea for more of them.

In cases where companies quite simply have an innovative, money-making technology, private actors should bear the full risk and reap the benefits of investing in such endeavors, rather than padding their bottom lines with taxpayer dollars.

The full report can be found here: http://www.heritage.org/budget-and-spending/report/blueprint-reform-comprehensive-policy-agenda-new-administration-2017

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