THE FISCAL YEAR 2020 DOE BUDGET

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY

OF THE

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HOUSE OF REPRESENTATIVES

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C O N T E N T S

WITNESSES

SUBMITTED MATERIAL

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[1] The report has been retained in committee files and also is available at https://docs.house.gov/meetings/IF/IF03/20190509/109433/HHRG-116-IF03-20190509-SD71415.pdf.

[2] The analysis has been retained in committee files and also is available at https://docs.house.gov/meetings/IF/IF03/20190509/109433/HHRG-116-IF03-20190509-SD121111.pdf.

[3] The report has been retained in committee files and also is available at https://docs.house.gov/meetings/IF/IF03/20190509/109433/HHRG-116-IF03-20190509-SD12411.pdf.

THE FISCAL YEAR 2020 DOE BUDGET

THURSDAY, MAY 9, 2019

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

The subcommittee met, pursuant to call, at 10:17 a.m., in room 2322, Rayburn House Office Building, Hon. Bobby L. Rush (chairman of the subcommittee) presiding.

Members present: Representatives Rush, Peters, Doyle, Sarbanes, McNerney, Tonko, Loebsack, Butterfield, Welch, Schrader, Kennedy, Veasey, Kuster, Barragán, McEachin, O'Halleran, Blunt Rochester, Pallone (ex officio), Upton (subcommittee ranking member), Latta, Rodgers, McKinley, Kinzinger, Johnson, Bucshon, Flores, Walberg, Duncan, and Walden (ex officio).

Staff present: Jeffrey C. Carroll, Staff Director; Jean Fruci, Energy and Environment Policy Advisor; Tiffany Guarascio, Deputy Staff Director; Omar Guzman-Toro, Policy Analyst; Zach Kahan, Outreach and Member Service Coordinator; Rick Kessler, Senior Advisor and Staff Director, Energy and Environment; Brendan Larkin, Policy Coordinator; John Marshall, Policy Coordinator; Lisa Olson, FERC Detailee; Tuley Wright, Energy and Environment Policy Advisor; Mike Bloomquist, Minority Staff Director; Jordan Davis, Minority Senior Advisor; Ryan Long, Minority Deputy Staff Director; Mary Martin, Minority Chief Counsel, Energy and Environment; Brannon Rains, Minority Staff Assistant; Zach Roday, Minority Director of Communications; and Peter Spencer, Minority Senior Professional Staff Member, Environment and Climate Change.

Mr. RUSH. I understand the Secretary has a hard stop at 12:30, so the committee hearing is called to order.

OPENING STATEMENT OF HON. BOBBY L. RUSH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

I want to thank everyone for today's attendance on the oversight of DOE's FY20 budget proposal, and I want to welcome the Secretary of DOE, Secretary Perry, back to this subcommittee.

Mr. Secretary, DOE's FY 2020 budget requests $31.7 billion, a $4 billion decrease from FY 2019 that was enacted, the number in 2019, and it includes extreme reductions to some critical programs. Federal investments in clean energy programs, power grid operations, Next Generation energy technologies, and economic development for tribal communities are drastically decreased in your proposal. Important departments such as the Office of Energy Effi-

ciency and Renewable Energy is reduced by 86 percent from FY 2019 levels, with the vast majority of these cuts, more than $700 million, coming from energy efficiency programs. Additionally, the budget proposal would slash the Office of Science, which funds the 17 national laboratories by $1 million from the FY 2019 enacted level, while also eliminating the Advanced Research Programs Agency: Energy, ARPA–E, in FY 2020.

Mr. Secretary, as you can imagine, many of these proposed cuts are nonstarters, as far as I am concerned, as these reductions would severely impact federally funded investments in clean energy research and development, harming our economy and global status, as leadership warrants in these particular areas.

However, another issue, Mr. Secretary, that I want to discuss with you today is the dire need for Federal investment in workforce training to help put thousands of Americans to work in good-paying jobs and careers. Mr. Secretary, just last month, Brookings released a groundbreaking and eye-opening study entitled, "Advancing Inclusion Through Clean Energy Jobs". Some of these key findings in this report found that employees in clean energy jobs earn higher and more equitable wages than all workers nationally with mean hourly wages topping the national average by 8 to 19 percent. The study found that clean energy jobs provide tremendous opportunities for low-income workers to increase their salaries by earning up to $5 to $10 more per hour compared to other jobs. Despite higher wages, the study found that many clean energy jobs actually have lower educational requirements, with close to 50 percent of these workers holding only a high school diploma, but earning higher wages than comparable peers in other industries.

Mr. Secretary, I look forward to hearing from you today as we discuss these and other important issues.

[The prepared statement of Mr. Rush follows:]

PREPARED STATEMENT OF HON. BOBBY L. RUSH

I would like to thank everyone for attending today's oversight hearing on DOE's FY20 Budget proposal and I would like to welcome Secretary Perry back to the subcommittee.

Mr. Secretary, DOE's FY2020 budget requests $31.7 billion, a $4 billion decrease from the FY2019 enacted level, and it includes extreme reductions to critical programs.

Federal investments in clean energy programs, power grid operations, Next Generation energy technologies, and economic development for Tribal communities are drastically decreased in this proposal.

Important departments such as the Office of Energy Efficiency and Renewable Energy (EERE) is reduced by 86 percent from FY 2019 levels, with the vast majority of these cuts, more than $700 million, coming from energy efficiency programs.

Additionally, the budget proposal would slash the Office of Science, which funds the 17 national laboratories, by $1 billion from the FY 2019 enacted level, while also eliminating the Advanced Research Programs Agency: Energy (ARPA–E) in FY 2020.

As you can imagine, many of these proposed cuts are nonstarters as far as I am concerned as these reductions would severely impact federally funded investment in clean energy research and development, harming our economy and global status as leaders in these areas.

However, another issue that I would like to discuss with you today is the dire need for Federal investment in workforce training to help put thousands of Americans to work in good-paying jobs and career.

Mr. Secretary, just last month Brookings released a groundbreaking and eye-opening study entitled: "Advancing Inclusion Through Clean Energy Jobs."

Some of the key findings in this report found that employees in clean energy jobs earn higher and more equitable wages than all workers nationally, with mean hourly wages topping national averages by 8 to 19 percent.

The study found that clean energy jobs provide tremendous opportunities for low-income workers to increase their salaries by earning up to $5-$10 more per hour compared to other jobs.

Despite higher wages, the study found that many clean energy jobs actually have lower educational requirements, with close to 50-percent of these workers holding only a high school diploma but earning higher wages than comparable peers in other industries.

Mr. Secretary, as you may be aware, the energy workforce overall is currently dominated by older, white, male workers, and this also holds true within the clean energy sector, as women make up less than 20-percent of workers in the clean energy production and energy efficiency sectors, and less than ten percent of these workers are African American.

Many of the recommendations for addressing these disparities are included in my workforce bill, HR 1315, including a focus on STEM education, aligning education and training with industry needs locally and regionally, and increasing apprenticeships and on-the-job learning.

So, I look forward to hearing from you, Mr. Secretary, on the importance of investing in a program to train underrepresented workers as a way to meet the needs of industry, while also helping families and communities by providing employment opportunity and promoting economic inclusion.

With that I yield the balance of my time and I now recognize my friend and colleague, Ranking Member Upton for 5 minutes

Mr. RUSH. And with that, I yield back and I recognize the ranking member of the subcommittee, my friend from Michigan, Mr. Upton, for 5 minutes.

OPENING STATEMENT OF HON. FRED UPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. UPTON. Thank you, my friend and chairman.

Secretary Perry, welcome. There is something about the Department of Energy that brings out enthusiasm about our Nation's energy and environmental future, and I think you demonstrate that enthusiasm better than just about anyone who has ever led that Department. And I welcome that enthusiasm and look forward to your testimony, obviously, this morning.

Over the last decade, we have emerged as the world's leading producer of oil and natural gas, and at the same time we lead the world in CO2 emission reductions, a fact that proves that energy production and environmental protection are not mutually exclusive goals. So, today we are more energy secure than at any point in our Nation's history. Fifteen years ago, we thought that we were running out, and I believe that we owe this dramatic turnaround to free market competition, American ingenuity, and certainly technological innovations that were driven, in part, through research conducted by the DOE.

Our energy abundance is supporting millions of American jobs and strengthening our economy, while at the same time providing our allies with a stable and secure new supplier. U.S. energy exports, especially LNG, also have the potential to help drive down emissions, which gives our trading partners another reason to do business with us.

The shifting patterns of energy supply and use, both here in the U.S. and around the world, present both challenges and opportunities. I bring this up because the energy revolution represents a new economic fact of life for us. More communities are reliant on the

supply of natural gas, for example, as more utilities use this energy for electric power. This raises another important issue for the Department, which is the core mission to ensure the reliable supply of energy to the public.

In recent years, we have worked with you to address electric critical infrastructure security, including cyber, to make sure that DOE has the statutory authorities to protect and respond to risks in bulk power systems. And I commend your continuing focus on that mission which you demonstrated in your formation of the Cybersecurity, Energy Security, and Emergency Response Office, CESER.

One area that is particularly of concern to most of us is the nexus between natural gas pipelines and electric-generating units. So, I would like to understand this morning what DOE is doing to assess risks in energy systems, particularly security and cybersecurity risks that threaten the supply of energy to our electricity systems. And while pipeline safety and security certainly falls under the jurisdiction of other agencies, DOE maintains the prime responsibility for ensuring the supply of energy. So, it is important to understand how you address these risks.

This work on energy security also involves what happens in an emergency. What happens when there is a major disruption at a major event that impedes the supply of energy? The CESER office addresses this, but you also have offices under other Department components that assist State energy offices. I would like to get a sense of your priorities for working with States and territories to ensure that they have the information and tools to respond in emergencies.

In the last Congress, committee members moved several bills that would have helped strengthen your authorities to coordinate and provide technical assistance to other Federal agencies, States, utilities, to help strengthen our defense against attack. This is an area that this committee will continue to press.

In Michigan, the electric power system is moving to more renewable energy. In fact, we will be at 40 percent by 2040. For this to work economically in the long term, technology is necessary to continue to drive down costs and to enable the reliable supply during peak electric demand. And I would like to understand how your budget aligns DOE research priorities to address the needs for a cleaner electricity system.

Finally, Mr. Secretary, there are other important priorities that are going to help our country develop and deploy the new clean technologies. As you know, one area of interest for this committee concerns nuclear energy, which provides one of the best paths to reducing greenhouse gas emissions. We have done a lot of work in this Congress. We intend to do a lot more. And on this point, I would much appreciate your proposal to include some funding to restart the defense of the Yucca Mountain license before the NRC.

I would also like to note that we have competing subcommittee meetings this morning, but we are missing our good Texas colleague, Mr. Olson, who went back yesterday to look at some of the storm and flood damage in your great State.

Again, Mr. Secretary, welcome. We look forward to working with you.

I yield back.

[The prepared statement of Mr. Upton follows:]

PREPARED STATEMENT OF HON. FRED UPTON

Secretary Perry, there is something about the Department of Energy that brings out enthusiasm about our Nation's energy and environmental future. And I think you demonstrate that enthusiasm more than most who have led the Department. I welcome your enthusiasm and look forward to your testimony this morning.

Over the past decade, we have emerged as the world's leading producer of oil and natural gas. At the same time, we're also leading the world in CO2 emissions reductions, a fact that proves that energy production and environmental protection are not mutually exclusive goals.

Today, we are more energy secure than at any point in our Nation's history. Fifteen years ago, we thought we were running out. I believe we owe this dramatic turnaround to free market competition, American ingenuity, and technological innovations that were driven, in part, through research conducted by the Department of Energy.

Our energy abundance is supporting millions of American jobs and strengthening our economy, while at the same time providing our allies with a stable and secure new supplier. U.S. energy exports, especially LNG, also have the potential to help drive down emissions, which gives our trading partners another reason to do business with us.

The shifting patterns of energy supply and use both here in the United States and around the world present both challenges and opportunities.

I bring this up, because this energy revolution represents a new economic fact of life for the United States. More communities are reliant on the supply of natural gas, for example, as more utilities use this energy for electric power. This raises another important issue for the Department, which has the core mission to ensure the reliable supply of energy to the public.

In recent years, we have worked with you to address electric critical infrastructure security, including cybersecurity, to make sure DOE has the statutory authorities to protect and respond to risks in bulk power systems. I commend your continuing focus on this mission, which you demonstrated in your formation of the Cyber Security, Energy Security, and Emergency Response office, (CESER).

One area that particularly concerns me is the nexus between natural gas pipelines and electric generating units. I'd like to understand this morning what DOE is doing to assess risks in energy systems, particularly security and cybersecurity risks that threaten the supply of energy to our electricity systems. While pipeline safety and security falls under the jurisdiction of other agencies, DOE maintains the prime responsibility for ensuring the supply of energy, so it is important to understand how you are addressing these risks.

This work on energy security also involves what happens in an emergency, what happens when there is a major disruption or a major event the impedes the supply of energy.

The CESER office addresses this, but you also have offices under other Department components that assist State energy offices. I would like to get a sense of your priorities for working with States and territories, to ensure they have the information and tools to respond in emergencies.

In the last Congress, committee members moved several bills that would have helped to strengthen your authorities to coordinate and provide technical assistance to other Federal agencies, States, utilities, to help strengthen our defenses against attacks. This is an area Energy and Commerce members will continue to press.

In Michigan, the electric power system is moving to more renewable energy. For this to work economically in the long term, technology is necessary to continue to drive down costs and to enable the reliable supply during peak electric demand. I'd like to understand how your budget aligns DOE research priorities to address the needs for cleaner electricity systems.

Finally, Mr. Secretary, there are other important priorities that will help the Nation develop and deploy new clean technologies. As you know, one area of interest for the committee concerns nuclear energy, which provides one of the best paths to reducing greenhouse gas emissions.

We have done a lot of work over the past several Congresses to ensure there is a framework for advanced nuclear energy, that we can more efficiently export U.S. nuclear technology, that we have a pathway for the spent fuel form our civil nuclear industry.

On this latter point, I very much appreciate your budget proposal to include some funding to restart the defense of the Yucca Mountain license before the NRC.

It seems to me, there is no quicker path to resolving the issue than getting a final license decision on the safety of Yucca Mountain. That will do more to inform public acceptance than anything else we can do.

Mr. RUSH. The Chair now recognizes the chairman of the full committee, Mr. Pallone, for 5 minutes for his opening statement.

OPENING STATEMENT OF HON. FRANK PALLONE, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Mr. PALLONE. Thank you, Chairman Rush.

Let me thank the Secretary for appearing here this morning. I do really appreciate your being here, but I am still frustrated and disappointed about the fiscal year 2020 Department of Energy budget because it is largely the same, what I call, out-of-touch document that we saw last year. The drastic cuts contained in President Trump's budget last year were rejected by Congress, and I expect that to be the case again this year. So, rather than talking about a budget that is essentially dead on arrival, I would like to discuss several energy policy issues, including energy efficiency, legacy site cleanup, nuclear waste, and cybersecurity.

Unfortunately, the Department's track record on efficiency standards for consumer products is not good. Since the beginning of the Trump administration, the Department has ignored 17 legally mandated deadlines to finalize efficiency standards for common consumer appliances. And rather than updating those standards, DOE has spent its time working to discard lightbulb efficiency standards. And this rollback will lead to years of unnecessary electricity generation and carbon emissions just to power inefficient and outdated lightbulbs. It is unclear who benefits from this, absent a handful of lightbulb manufacturers.

In fact, the electricity generators support the lightbulb efficiency, and 37 electric utilities sent a letter to DOE last week opposing the lightbulb rollback. They know that efficiency improvements reduce the need for new infrastructure and improve the reliability of the existing electricity supply.

I am also concerned about the Department's environmental management program which is tasked with cleaning up the legacy wastesites where nuclear weapons were developed and built. The Oversight and Investigations Subcommittee held a hearing on DOE's growing environmental liability just last week, which, as of this year, has climbed to a staggering $377 billion. The GAO highlighted serious mismanagement at these sites and included the Department's mounting environmental liabilities on its high risk list.

Now I recognize that this is a problem you did not create, Mr. Secretary. Unfortunately, the President's budget makes your job more daunting by cutting the environmental management program by over $700 million from last year's level. And this is concerning, and I hope we see better management of this program moving forward. We want to work with you to accomplish that goal.

We must also find a solution to the storage and disposition of commercial spent nuclear fuel that currently resides at our Nation's nuclear power plants. Each year more nuclear power plants

are ceasing operation. Until we come up with a Federal solution to this issue, that spent fuel will be stored onsite at those plants which no longer generate power. And this effectively freezes any efforts to redevelop those sites. So, we need interim storage solutions to bridge the gap until a permanent repository is licensed and constructed.

Mr. Secretary, I hope to work with you and my colleagues on both sides of the aisle to give the Department the authority it needs to store this spent fuel at interim storage sites until we can permanently dispose of it. I know that both Mr. Upton and Mr. Rush are similarly concerned.

Another area where I know we can work together is cybersecurity. I am troubled by the report last week that earlier this year there was, for the first time, the successful cyberattack on our electricity system. It was not a sophisticated attack and, thankfully, no consumer outages occurred, but that might not be the case next time. Our country's energy infrastructure is critical. We must ensure our Nation's electric system as well as the associated dams, railways, and pipelines are all protected from an attack.

So, I am concerned by a recent GAO report I commissioned that found the Transportation Security Administration's pipeline security program has troubling weaknesses. At a hearing we held on pipeline safety and security last week, GAO informed us that TSA has only four employees to oversee the security of our Nation's nearly 3 million miles of pipeline, and that is, obviously, unacceptable and frightening.

So, I support legislation introduced by Ranking Member Upton and Representative Loebsack that would allow DOE to develop a program to establish policies and procedures to improve the physical and cybersecurity of our Nation's pipelines. And I hope you work with us to enact that bill as well.

Again, Mr. Secretary, thank you for being here tonight.

With that, Mr. Chairman, I yield back.

[The prepared statement of Mr. Pallone follows:]

PREPARED STATEMENT OF HON. FRANK PALLONE, JR.

Secretary Perry, thank you for appearing before the committee this morning. While I appreciate you being here, I am extremely frustrated and disappointed that the Fiscal Year 2020 Department of Energy budget is largely the same flawed, out of touch document that we saw last year. The drastic cuts contained in President Trump's budget last year were roundly rejected by Congress and I expect that to be the case again this year.

So, rather than talking about a budget that's basically dead on arrival I would like to discuss several important energy policy issues, including energy efficiency, legacy site cleanup, nuclear waste and cybersecurity.

Unfortunately, the Department's track record on efficiency standards for consumer products is, abysmal. Since the beginning of the Trump administration, the Department has ignored 16 legally mandated deadlines to finalize efficiency standards for common consumer appliances. Rather than updating these standards, DOE has spent its time working to discard lightbulb efficiency standards.

This reckless rollback will lead to years of unnecessary electricity generation and carbon emissions—just to power inefficient and outdated lightbulbs. It's unclear who benefits from this, absent a handful of lightbulb manufacturers.

Not even electricity generators support this action. In fact, 37 electric utilities sent a letter to DOE last week opposing the lightbulb rollback. They know that efficiency improvements reduce the need for new infrastructure and improve the reliability of the existing electricity supply.

I'm also concerned about the Department's Environmental Management program, which is tasked with cleaning up the legacy waste sites where nuclear weapons were developed and built. The Oversight and Investigations Subcommittee held a hearing on DOE's growing environmental liability just last week—which, as of this year, has climbed to a staggering $377 billion. The Government Accountability Office (GAO) highlighted serious mismanagement at these sites and included the Department's mounting environmental liabilities on its "High-Risk List."

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Mr. Secretary, thank you for testifying before our committee today. I yield back.

Mr. RUSH. The gentleman yields back. The Chair now recognizes the ranking member of the full committee, Mr. Walden, for 5 minutes for the purposes of an opening statement.

OPENING STATEMENT OF HON. GREG WALDEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OREGON

Mr. WALDEN. Good morning, Mr. Chair.

Mr. RUSH. Good morning.

Mr. WALDEN. And thanks for having this hearing.

Good morning, Mr. Secretary. Welcome back to the Energy and Commerce Committee. We are delighted to have you here.

The Department of Energy's $32 billion budget proposal serves as a reminder of the broad range of defense, science, energy, and environmental activities that your agency pursues to perform its really important, critical I would say, national and energy security missions. The breadth of DOE's responsibilities is impressive, Mr. Secretary. DOE's work, which is conducted here in Washington, DC, and at national labs and field stations across the Nation, includes maintenance of our nuclear weapons, support for international nonproliferation programs, and nuclear propulsion work with the U.S. Navy. It includes the cleanup of Cold War era envi-

ronmental contamination and management/disposal of spent nuclear fuel and high-level radioactive waste.

DOE also supports cutting-edge, early-stage scientific research at our 17 national laboratories, including PNNL, which you and I got to visit in 2017. It establishes efficiency standards for appliances and equipment, conducts energy-related research/development, and demonstration across all forms of energy and technologies. It maintains the Strategic Petroleum Reserve and exercises authorities to respond to energy supply disruptions and maintain the resilience of our electric grid and pipeline systems.

DOE also provides central energy data collection and analysis through the Energy Information Administration, very valuable data for our public policy work. Managing this portfolio, as we all know, remains a challenge, which is why I believe that it is so important to stay focused on DOE's core missions.

During your time at the Department, Mr. Secretary, this committee, on a bipartisan basis, has sought to ensure that you have adequate resources and the statutory authorities required to align, manage, and fund programs to cost-effectively execute the Department's mission. Today, I hope you can update the committee on the progress you have made modernizing the Department of Energy and the challenges and opportunities that you see going forward.

Just a week ago, as you heard earlier, our Oversight Subcommittee examined the DOE's work to address environmental liabilities and what can be done to accelerate cleanup and save taxpayer money. This is of particular interest to me, as you know, given the Hanford site across the Columbia River from Oregon in my district. You and I saw firsthand the vast scope of the work that remains, and I would like to hear from you on how you plan to accelerate the cleanup at Hanford.

Hanford, as with other major cleanup sites, initially provided for our Nation's defense needs. In fact, over time it fostered technological and scientific capabilities that continue to benefit the Nation on energy, environmental, and security matters. The Pacific Northwest National Laboratory was established as an R&D complex at Hanford for the Manhattan Project. Now it serves a broader range of missions for the Nation. This technological and innovative capability that now threads through the Department's labs and field sites provides the tools for addressing future energy and security challenges.

You can see this in the tremendous advances in DOE's supercomputing capabilities that we talked about yesterday. Originally developed for weapons work, DOE supercomputers now promise tremendous advances across the agency's missions and national priorities, from carbon-free fossil energy to helping cure diseases. So, I am excited about the potential to utilize DOE's advanced computing to support the next wave of American innovation.

Now when you testified before us last year, Mr. Secretary, the committee had been moving legislation to help DOE enhance our energy security, spread the strategic benefits of our Nation's energy revolution, and further our drive to reduce emissions. For example, we worked to streamline the export of LNG and nuclear technology. We sought to enable future innovations that would lead to a more reliable, modern electric grid. We sought to increase DOE's

capabilities to prepare and respond to emergencies, including from extreme weather events. We sought to ensure DOE is able to develop the infrastructure for advanced nuclear energy currently being pursued by companies such as NuScale in Oregon and others.

So, I must say I am encouraged by the work you and your team are doing in support of transformative breakthroughs in carbon-free fossil energy, carbon capture technologies, advanced nuclear energy efficiency, advanced energy storage technologies, and modeling for increased energy resilience, all to lower greenhouse gas emissions and help consumers get affordable power.

I would like to understand how DOE could more effectively support innovation, how it can help bridge the gap between the lab and commercial development while minimizing taxpayer risk. What can DOE do to attract and harness private capital to help accelerate deployment of future clean technologies? I also look forward to learning about your priorities to enhance DOE's capabilities to ensure the reliable delivery of power, given ongoing threats from bad actors.

So, Mr. Secretary, how we harness DOE's incredible capabilities to support future energy innovation, security, and public interest, given ongoing budget constraints, will be our focus today, but I look forward to working with you on this and so much more going forward.

With that, Mr. Chairman, I yield back.

[The prepared statement of Mr. Walden follows:]

PREPARED STATEMENT OF HON. GREG WALDEN

Secretary Perry, welcome back.

The Department of Energy's 32-billion-dollar budget proposal serves as a reminder of the broad range of defense, science, energy and environmental activities the agency pursues to perform its important national and energy security missions.

The breadth of DOE's responsibilities is impressive, Mr. Secretary. DOE's work, which is conducted here in DC and at national labs and field sites across the Nation, includes maintenance of our nuclear weapons, support for international nonproliferation programs, and nuclear propulsion work for the U.S. Navy. It includes cleanup of Cold War-era environmental contamination, and management and disposal of spent nuclear fuel and high-level radioactive waste.

DOE also supports cutting-edge, early-stage scientific research at our seventeen National Laboratories, including PNNL, which you and I visited in 2017, Mr. Secretary. It establishes efficiency standards for appliances and equipment, and conducts energy-related research, development, and demonstration across all forms of energy and technologies. It maintains the Strategic Petroleum Reserve and exercises authorities to respond to energy supply disruptions and maintain the resilience of our electric grid and pipeline systems. DOE also provides central energy data collection and analysis through the Energy Information Administration.

Managing this portfolio, as we all know, remains a challenge, which is why I believe it is so important to stay focused on DOE's core missions.

During your time at the Department, this committee, on a bipartisan basis, has sought to ensure that you have adequate resources and the statutory authorities required to align, manage, and fund programs to cost-effectively execute DOE's missions.

Today, I hope you can update the committee on the progress you have made modernizing the Department and the challenges and opportunities you see going forward.

Just a week ago, our Oversight Subcommittee examined DOE's work to address environmental liabilities, and what can be done to accelerate cleanup and save taxpayers money. This is of particular interest to me, as you know, given the Hanford site sits across the Columbia river from my district. You and I saw firsthand the vast scope of the work that remains, and I would like to hear from you how you plan to accelerate cleanup.

Hanford, as with other major cleanup sites, initially provided for our Nation's defense needs. Over time it fostered technological and scientific capabilities that continue to benefit the Nation on energy, environmental, and security matters. The Pacific Northwest National Laboratory was established as an R&D complex at Hanford for the Manhattan Project. Now it serves a broader range of missions for the Nation.

This technological and innovative capability that now threads through the Department's labs and field sites provides the tools for addressing future energy and security challenges.

You can see this in the tremendous advances in DOE's supercomputing capabilities. Originally developed for weapons work, DOE supercomputers now promise tremendous advances across agency missions and national priorities, from carbon free fossil energy to helping to cure diseases. I am excited about the potential to utilize DOE's advanced computing to support the next wave of American innovation.

When you testified before us last year, the committee had been moving legislation that would help DOE enhance our energy security, spread the strategic benefits of our Nation's energy revolution, and further our drive to reduce emissions.

For example, we worked to streamline the export of LNG and nuclear technology.

We sought to enable future innovations that would lead to a more reliable, modern electric grid.

We sought to increase DOE's capabilities to prepare and respond to energy emergencies, including from extreme weather events.

We sought to ensure DOE is able to develop the infrastructure for advanced nuclear energy currently being pursued by companies such as NuScale out of Oregon.

I must say I am encourages by the work DOE is doing to support transformative breakthroughs in "carbon free" fossil energy, carbon capture technologies, advanced nuclear, energy efficiency, advanced energy storage technologies, and modeling for increased energy resilience, all to lower greenhouse gas emissions.

I would like to understand how DOE could more effectively support innovation, and how it can help bridge the gap between the lab and commercial deployment, while minimizing taxpayer risk. What can DOE do to attract and harness private capital to help accelerate deployment of future clean technologies?

I also look forward to learning about your priorities to enhance DOE's capabilities to ensure the reliable delivery of power, given ongoing threats from bad actors.

Mr. Secretary, how we harness DOE's capabilities to support future energy innovation, energy security, and the public interest given ongoing budget constraints, will continue to be our focus. I look forward to working with you on this.

Mr. RUSH. I want to thank the ranking member for yielding.

And now, it is my responsibility to introduce our witness for today's hearing, the honorable Rick Perry, who is the Secretary of the United States Department of Energy. Mr. Secretary, we certainly want to welcome you to the Energy Subcommittee, and we all look forward to your testimony and eagerly await your participation in this hearing.

So now, I will recognize the Secretary for 5 minutes for the purposes of an opening statement.

Mr. Secretary, you have been here countless times and you are well aware of the lighting system. So, we don't want to take time to explain something that you already know. So, with that, we recognize you for 5 minutes for an opening statement.

STATEMENT OF RICK PERRY, SECRETARY, DEPARTMENT OF ENERGY

Mr. PERRY. Mr. Chairman, thank you very much. And to the Members, thank you all for your kindness and hospitality, those of you that I have had the opportunity to be in your offices and in your districts as we are going forward.

Mr. Chairman, you have been so kind, as Members of both sides of the aisle, to allow us to show you a brief video that I think will be substantially more interesting than me going on here for a

minute and a half. But if I could, I would like to direct your attention over to——

Mr. RUSH. Hearing no objection, so ordered.

Mr. PERRY. Yes, sir, thank you.

[Video played.]

Mr. PERRY. Mr. Chairman, again, thank you for the opportunity to show that. I think the stuff you talked about, I reflect a lot of excitement about the Energy Department and the men and women who work there, the technology that comes out of that. And you are absolutely correct. You all have heard me say this before. This is the coolest job I have ever had in my life.

And I might add, Mr. Pallone, this is the most interesting job I have ever had in my life. Not the best, but the most interesting.

[Laughter.]

Anyway, to each of you, it is my privilege to be before you today and to respond to the 2020 budget request for the Department. The budget is a request to the American people, through you, the Representatives, and Congress to secure America's future through energy independence, scientific innovation, and national security.

As I have already said, this is an exciting time, exciting time to be at the helm of DOE. It continues to be a great privilege to serve as the 14th Secretary of Energy. I look forward to working with each of you as we go forward, passing a budget that invests in the Nation's priorities in energy and science and national security, while at the same time continuing our shared support of innovations that have led to America's world-leading, yet often overlooked progress in reducing energy-related emissions.

When I appeared before the committee last year, I committed to rebuild and restore our Nation's security, to protect our critical energy infrastructure from cyber threats, to improve the resilience and the reliability of the Nation's electrical system, to invest in early-stage, cutting-edge research and development, to advance our leadership in exascale and quantum computing, and to continue to seek a Federal storage repository for the Nation's spent nuclear fuel.

And concerning that last point, let me thank each of the members of the committee, certainly on both sides of this aisle, for you joined us in searching for a solution to deal with the waste disposal needs. I am proud to report that, since last year, DOE has advanced each of these goals that I just cited by investing in reliable, affordable energy, transformative innovation, national security. We are approaching the dawn of, as I made reference to in that film, the new American energy era, a time of energy abundance, security, and, yes, even independence.

This past fall I fulfilled a commitment to visit all 17 of the national labs, and I got to witness firsthand the brilliant work that is performed by these dedicated professionals.

Mr. RUSH. Mr. Secretary, I must say that you are on a hard deadline.

Mr. PERRY. Yes, sir.

Mr. RUSH. So, could you move——

Mr. PERRY. Rock and roll, sir. I am ready.

Mr. RUSH. OK. Sorry.

Mr. PERRY. No, sir.

Mr. RUSH. Meaning no disrespect. You are on a hard deadline here.

Mr. PERRY. I am working for you, sir.

Mr. RUSH. All right.

[The prepared statement of Mr. Perry follows:]

Testimony of Secretary Rick Perry
U.S. Department of Energy
Before the
U.S. House Committee on Energy and Natural Resources
Subcommittee on Energy
May 9, 2019

Chairman Rush, Ranking Member Upton, and Members of the Subcommittee, it is an honor to appear before you today to discuss the President's FY 2020 Budget Request ("Budget Request" or "Budget") for the Department of Energy ("the Department" or "DOE").

It continues to be a great privilege and an honor to serve as the 14th Secretary of Energy.

This Budget is a request to the American people through their representatives in Congress to secure America's future through energy independence, scientific innovation, and national security.

As such, it represents a commitment from all of us at DOE that we will honor the trust of our citizens with increased stewardship, accountability, and commitment to excellence. For too long, government success has been measured by how much we spend on it. This Budget Request makes clear that success will be measured by how effectively and efficiently government is able to manage the precious resources entrusted to them by the American taxpayer to achieve its mission.

When I appeared before this Subcommittee last year, I committed to protect our critical electric grid and energy infrastructure from cyber threats; improve resilience and reliability of the Nation's electricity system; make progress on the Federal Government's responsibility to dispose of the Nation's nuclear waste; focus resources on early-stage, cutting edge Research and Development (R&D); advance exascale and quantum computing; address responsibilities for the cleanup and disposition of facilities; and, rebuild and restore our Nation's security.

This FY 2020 $31.7 billion Budget Request for the Department of Energy ("Budget") focuses on advancing these commitments – from opening a New American Energy Era to sustaining our recent historic economic growth by investing in reliable, affordable energy, transformative scientific innovation, and national security.

The Department's world-leading science and technology enterprise generates the innovations needed to fulfill our missions. Through support of cutting-edge research at our 17 National Laboratories and at over 300 universities across the Nation, we are expanding the frontiers of scientific knowledge and laying the groundwork for new technologies to address our greatest challenges.

When I became Secretary of Energy, I made a promise to visit all 17 of the Department's National Laboratories. I am pleased to report that I have fulfilled that promise and have witnessed first-hand the innovative and brilliant work performed by the dedicated individuals at each of these sites across the Nation. The National Laboratories are doing outstanding work in many areas. Each has a unique, rich history of innovation across a broad scope of scientific expertise, and the record of collaboration across the National Laboratory system – which makes its impact greater than the sum of its parts – has bettered the lives of millions across the globe.

For example, in 2018, the National Laboratories won 32 of the prestigious R&D 100 Awards, including technologies regarding new materials, protecting the environment, incorporating renewable energy reliably to the electric grid, and sophisticated cybersecurity tools. These are just a few examples of the work the National Laboratories have done just last year to push the boundaries of research, development, commercialization, and national security.

I am especially proud of the work the National Laboratories are doing in collaboration with other federal agencies, universities, doctors, and researchers to harness the power of our world-class supercomputers to maintain America's leadership in High Performance Computing (HPC), advance Exascale computing, and push for breakthroughs in Artificial Intelligence (AI).

To do so, this Budget proposes nearly $11 billion in early-stage R&D that will focus the intellectual prowess of scientists and engineers on the development of technologies that the ingenuity and capital of America's entrepreneurs and businesses can convert into commercial applications and products to improve the lives and security of all Americans. The Budget also invests in laboratory infrastructure and test beds for future breakthroughs in energy. It prioritizes funding to maintain the world-class nature of national laboratory facilities and better facilitate private sector demonstration and deployment of energy technologies.

Securing Against Cyber Threats

In addition to nuclear security, our national security also depends on a resilient electric grid and successfully countering the ever-evolving, increasing threat of

cyber and other attacks on networks, data, facilities, and infrastructure. Among the most critical missions at the Department is to develop science and technology that advances these aims.

At stake is continued U.S. economic competiveness and leadership, as well as the overall safety and security of the nation. We need to understand the increasing and evolving natural and man-made threats and develop the tools to respond to those threats across our energy infrastructure.

To that end, the Budget provides $157 million for the Office of Cybersecurity, Energy Security, and Emergency Response (CESER) to develop tools needed to protect the U.S. energy sector against threats and hazards, mitigate the risks and the extent of damage from cyberattacks and other disruptive events, and improve resilience through the development of techniques for more rapid restoration of capabilities.

Securing against cyber threats means we must also protect against threats to the Department's own infrastructure in science, technology, and nuclear security. This Budget takes major steps to safeguard DOE's enterprise-wide assets against cyber threats. It provides $71 million for the Chief Information Officer directed funding to secure our own networks, modernize infrastructure, and improve cybersecurity across the DOE IT enterprise. Funding for cybersecurity in the National Nuclear Security Administration (NNSA) is increased to $208 million to enhance security for our nuclear security enterprise. In the Environmental Management program, we provide $37 million for cybersecurity at seven cleanup sites.

This Budget provides the resources we require to secure DOE systems and energy infrastructure.

Improving Grid Resilience

As we protect our energy infrastructure from cyber threats, we also must improve the resilience and reliability of the nation's electricity system. The Budget provides $183 million for the Office of Electricity to support transmission system resource adequacy and generation diversity. The Budget will explore new architecture approaches for electric transmission and distribution systems, including the development of the North American Energy Resilience Model that will provide unique and ground-breaking national-scale energy planning and real-time situational awareness capabilities to enhance security and resilience. The Budget continues to advance energy storage through the Advanced Energy Storage Initiative (AESI), including

development of a new Grid Storage Launchpad aimed at accelerating materials development, testing, and independent evaluation of battery materials and systems for grid applications. In addition, the Budget supports R&D at DOE's National Laboratories to develop technologies that strengthen, transform, and improve energy infrastructure so that consumers have access to reliable and secure sources of energy.

Addressing the Imperative of Nuclear Waste Management

The Budget includes $116 million, of which $26 million is in defense funds, to move ahead in fulfilling the Federal Government's responsibility to dispose of the Nation's nuclear waste. This request is dedicated to resuming regulatory activities concerning Yucca Mountain and initiating a robust interim storage program.

The Budget Request supports functions necessary to support regulatory activities, including legal support to represent the Department as well as responding to litigation and other legal matters. The Budget also provides for technical and scientific work necessary to support and respond to any challenges in the regulatory process. Resuming regulatory activities at Yucca Mountain and committing to a robust interim storage capability for near-term acceptance of spent nuclear fuel, our Budget demonstrates the Administration's commitment to nuclear waste management and will help accelerate fulfillment of the Federal Government's obligations to address nuclear waste, enhance national security, and reduce future burdens on taxpayers. This also will increase public confidence in the safety and security of nuclear energy, thus helping nuclear energy remain a significant contributor to the country's energy needs for generations to come.

Energy Independence and Innovation

The Budget requests $2.3 billion in funding for energy independence and innovation. Within the applied energy program offices, the FY 2020 Budget focuses resources on early-stage, cutting-edge R&D conducted by the scientists and engineers at our 17 National Laboratories who are striving to develop the next great innovations that will strengthen American competitiveness and transform society as these breakthroughs reach the private marketplace.

The Harsh Environment Materials Initiative (HEMI) is a new coordinated effort within the Offices of Fossil Energy R&D (FE), Nuclear Energy (NE), and Energy Efficiency and Renewable Energy (EERE) to use common investments. This effort will coordinate interrelated R&D in materials, sensors, and component manufacturing R&D for advanced thermoelectric power plants between FE and NE.

For example, NE's budget includes $23 million for the Nuclear Energy Enabling Technologies (NEET) Transformational Challenge Reactor program, which enhances the development of breakthrough technologies that provide the ability to manufacture small/micro advanced reactor components using additive manufacturing techniques. Investments will also be aligned with EERE's Advanced Manufacturing Office R&D in materials and manufacturing process research, as well as flexible combined heat and power systems.

The AESI is a coordinated effort across DOE that will accelerate the development of energy storage R&D as key to increasing energy security, reliability, resilience, and system flexibility technologies. The ASEI will focus DOE's efforts to take a broad, more holistic view of energy storage as a set of capabilities with temporal flexibility in the conversion of energy resources to useful energy services. The initiative will develop a coordinated strategy for aligning DOE R&D for cost competitive energy storage services.

The Budget supports, and makes for more efficient, programs focused on bringing technologies to the market in the Office of Technology Transitions, requesting a 7% increase from the FY 2019 enacted level. Through coordination with our Labs, these efforts will reduce costs to the taxpayer while at the same time providing an enhanced technology transfer program to transfer breakthroughs from the National Laboratories to the private sector.

Nuclear Energy

The Budget for Nuclear Energy focuses funding on early-stage R&D, such as the Nuclear Energy Enabling Technologies program, which includes $23 million for the Transformational Challenge Reactor, at Oak Ridge National Laboratory, to continue to develop an advanced manufacturing technique to demonstrate a new approach to nuclear design, qualification, and manufacturing of advanced reactor technologies.

The FY 2020 Budget includes $215 million for the Reactor Concepts Research, Development and Demonstration program. Within this total, the Budget provides $100 million to put DOE on a path to construct the Versatile Advanced Test Reactor, a facility that would enable development and testing of advanced fuels and materials for the next generation of commercial nuclear reactors. This is one of the highest priorities for the Department. The Budget also provides

$85 million for early-stage R&D on advanced reactor technologies, including $10 million for the Advanced Small Modular Reactor R&D subprogram.

Within the Fuel Cycle R&D program, the Budget requests $40 million for the high-assay low-enriched uranium (HALEU) Civil Nuclear Enrichment subprogram. This three-year cost-shared subprogram is designed to demonstrate a specific U.S. enrichment technology that could produce HALEU. We understand that multiple reactor designs under development by U.S. advanced reactor developers will require fuel containing HALEU. In addition, the Budget requests $36 million for the Fuel Cycle R&D program's early-stage R&D work in support of industry's development of light water reactor accident tolerant fuels.

Finally, the Budget for Nuclear Energy also supports a safeguards and security program with funding at $138 million for protection of our nuclear energy infrastructure and investments at Idaho National Laboratory facilities.

Fossil Energy Research and Development

The Fossil Energy Research and Development (FER&D) program advances transformative science and innovative technologies needed for the reliable, efficient, affordable, and environmentally sound use of fossil fuels. Fossil energy sources currently constitute over 81 percent of the country's total energy use and are critical for the nation's security, economic prosperity, and growth. The FY 2020 Budget focuses 89 percent, or $501 million, on cutting-edge fossil energy R&D to secure energy dominance, further energy security, advance strong domestic energy production, and support America's coal industry through innovative clean coal technologies.

FER&D will support early-stage research in advanced technologies, such as materials, sensors, and processes, to expand the knowledge base upon which industry can improve the efficiency, flexibility, and resilience of the existing fleet of coal fired power plants. The request also focuses funding on early-stage component research that will enable the next generation of high efficiency and low emission coal fired power plants that can increase the resiliency and reliability of the electric grid by providing low-cost reliable power 24/7.

Funding is also provided to support competitive awards with industry, National Laboratories and academia geared toward innovative early-stage R&D to improve the reliability, availability, efficiency, and environmental performance of advanced fossil-based power systems. For example, the Advanced Energy Systems subprogram will focus on the following six activities: 1) Advanced

Combustion/Gasification Systems, 2) Advanced Turbines, 3) Solid Oxide Fuel Cells, 4) Advanced Sensors and Controls, 5) Power Generation Efficiency, and 6) Advanced Energy Materials. While the primary focus is on coal-based power systems, improvements to these technologies will result in spillover benefits that can reduce the cost of converting other carbon-based fuels, such as natural gas, biomass, or petroleum coke into power and other useful products in an environmentally-sound manner.

Energy Efficiency and Renewable Energy

The Energy Efficiency and Renewable Energy budget requests $696 million, including the use of $353 million in prior year balances, towards maintaining America's leadership in transformative science and emerging energy technologies in sustainable transportation, renewable power, and energy efficiency.

The Budget emphasizes early stage R&D and other activities, which private industry does not have the technical capability to undertake. Knowledge generated by early-stage R&D to facilitate U.S. industries, businesses, and entrepreneurs to develop and deploy innovative energy technologies, and to gain the competitive edge needed to excel in the rapidly changing global energy economy.

The request funds $105 million for the AESI, which takes a holistic approach to energy storage and develops electric grid technologies to create flexible generation and load, thereby increasing the reliability and resilience of the U.S. electric grid.

The request supports DOE's Grid Modernization Initiative, which includes reliably integrating an increasing amount of variable generation into the electric grid through R&D infrastructure investments at the National Renewable Energy Laboratory (NREL) to accelerate the conversion of the National Wind Technology Center (NWTC) campus into an experimental microgrid capable of testing grid integration at the megawatt scale.

Strategic Petroleum Reserve

The Department of Energy is responsible for the Nation's energy security, and the Strategic Petroleum Reserve (SPR), one component of that effort, protects the U.S. economy from disruptions in critical petroleum supplies and meets the U.S. obligations under the International Energy Program. The Budget includes $174

million to support the Reserve's operational readiness and drawdown capabilities. The Department is requesting authorization to deposit into the SPR Petroleum Account up to $27 million in proceeds from the sale of one-million barrels of refined petroleum product (gasoline blendstock) from the Strategic Petroleum Reserve to fund the cost of drawdowns.

The Budget also proposes to disestablish the Northeast Home Heating Oil Reserve (NEHHOR). In its two decades of existence, the NEHHOR has not been used for its intended purpose, and the Administration believes the continued taxpayer-funded expense of maintaining the reserve is unwarranted, particularly as the existing commercial storage contracts are up for renewal in March 2020. TheBudget also proposes to disestablish the Northeast Gasoline Supply Reserve (NGSR). The NGSR has not been used since its establishment, and is not considered to be cost efficient or operationally effective. Proceeds of the combined sales of the NEHHOR and NGSR (estimated at $130 million in receipts, net of the $27 million retained for mandatory sale drawdown costs) will be contributed to deficit reduction.

Power Marketing Administrations

The Budget includes $78 million for the Power Marketing Administrations (PMAs). The Budget proposes the sale of the transmission assets of the Western Area Power Administration (WAPA), the Bonneville Power Administration (BPA), and the Southwestern Power Administration (SWPA) and to reform the laws governing how the PMAs establish power rates to require the consideration of market based incentives, including whether rates are just and reasonable. The Budget also proposes to repeal the $3.25 billion borrowing authority for WAPA authorized by the American Recovery and Reinvestment Act of 2009.

Leading World-Class Scientific Research

The Department of Energy is the Nation's largest Federal supporter of basic research in the physical sciences, and the President's FY 2020 Budget provides $5.5 billion for the Office of Science to continue and strengthen American leadership in scientific inquiry. By focusing funding on early-stage research, this Budget will ensure that the Department's National Laboratories continue to be the backbone of American science leadership by supporting cutting-edge basic research, and by building and operating the world's most advanced scientific user facilities, which will be used by over 22,000 researchers in FY 2020.

Support for Core Research and Facilities

We provide $921 million for Advanced Scientific Computing Research, a decrease of $15 million below the FY 2019 enacted level. This funding will continue supporting the Nation's world-class high-performance computers that make possible cutting-edge basic research, while devoting $500 million in the Office of Science to reflect the Department's plan to deploy an exascale computing system in calendar year 2021. The FY 2020 Request also supports quantum computing R&D and core research in applied mathematics and computer science, and high-performance computer simulation and modeling.

The Budget also provides $1.9 billion for Basic Energy Sciences, supporting core research activities in ultrafast chemistry and materials science and the Energy Frontier Research Centers. We will continue construction of the Advanced Photon Source Upgrade at the Argonne National Laboratory, and initiate the Advanced Light Source Upgrade project at the Lawrence Berkeley National Laboratory, and the Linac Coherence Light Source-II High Energy project at SLAC National Accelerator Laboratory. The operations of the light sources across the DOE science complex and supporting research across the Nation maintain U.S. world leadership in light sources and the science they make possible. The Budget also supports continued construction for Spallation Neutron Source Proton Power Upgrade and Second Target Station at Oak Ridge National Laboratory.

The Budget requests $768 million for High Energy Physics, including $100 million for construction of the Long Baseline Neutrino Facility and Deep Underground Neutrino Experiment at Fermilab, $30 million below the enacted FY 2019 level. We will continue to fund ongoing major items of equipment projects, including three new projects at the Large Hadron Collider: the High Luminosity Large Hadron Collider Accelerator Project; the High Luminosity ATLAS; and the High Luminosity CMS detector upgrade projects. By supporting the highest priority activities and projects identified by the U.S. high energy physics community, this program will pursue cutting-edge research to understand how the universe works at its most fundamental level.

The Budget for the Office of Science provides $403 million for Fusion Energy Sciences, including $296 million for domestic research and fusion facilities and $107 million for the ITER project to continue to support delivery of the highest priority in-kind hardware systems contributions. For Nuclear Physics, the budget provides $625 million to discover, explore, and understand nuclear matter, including $40 million for continued construction of the Facility for Rare Isotope Beams and operations of facilities. For Biological and Environmental Research,

the Budget includes $494 million to support foundational genomic sciences, including the Bioenergy Research Centers, and to focus on increasing the sensitivity and reducing the uncertainty of earth and environmental systems predictions.

Advancing Exascale Computing

As I discussed last year, the Department's leadership in developing and building the world's fastest computers faced increasingly fierce global competition over the last decade. Maintaining the Nation's international primacy in high-performance computing is more critical than ever for national security, economic prosperity, and a continued leadership role in science and innovation.

I am proud to say that, as of the present day, the Department is actively sustaining America's leadership in this vital area. As of November, the world's two fastest supercomputers were located at DOE National Laboratories – Summit at Oak Ridge and Sierra at Lawrence Livermore. In fact, the Summit system achieved the global number one ranking as the world's fastest system in June 2016, was delivered nine months ahead of schedule and $13.5 million below budget, and is another example of the DOE lab continued project management excellence. In all, the Department currently owns five out of the world's top ten supercomputers. In addition, teams from DOE's Oak Ridge and Lawrence Livermore National Laboratories captured the 2018 Gordon Bell Prize, the most prestigious award for achievement in high performance computing software and applications. These coupled achievements in both hardware and software are significant, since it is by sustaining integrated capabilities in hardware, software, algorithms, and applications – along with basic research in applied mathematics –that America will maintain leadership in this critical field.

To cement America's leadership position, the Budget includes $809 million to accelerate development of an exascale computing system, including $500 million in the Office of Science (Science) and $309 million in NNSA. This reflects the Department's plan to deploy an exascale machine for the Office of Science in calendar year 2021 at Argonne National Laboratory, a second machine with a different architecture in the 2021-2022 timeframe at Oak Ridge National Laboratory, and provides support for the procurement of and site preparation for a third exascale system, architecturally similar to the second machine at Oak Ridge, delivered to NNSA at Lawrence Livermore National Laboratory in FY 2023.

To achieve these goals, the Science/NNSA partnership will focus on hardware and software technologies needed to produce an exascale system, and the critical DOE

applications needed to use such a platform. This world-leading exascale program will bolster our national security by supporting the nuclear stockpile, while also supporting the next generation of scientific breakthroughs not possible with today's computing systems.

Quantum Information Science

Even as we prepare to deploy exascale systems, we are pursuing research in Quantum Information Science (QIS), an emerging multidisciplinary area that has the potential to define the next frontier in information processing and a range of other fields. Our QIS effort is genuinely interdisciplinary, a $168 million investment involving all six major DOE Office of Science program offices: Advanced Scientific Computing Research (ASCR), Basic Energy Sciences (BES), Biological and Environmental Research (BER), Fusion Energy Sciences (FES), High Energy Physics (HEP), and Nuclear Physics (NP).

The potential of QIS to contribute to a wide range of disciplines is striking. Quantum computing promises the capability to attack large problems that elude classical computing and to provide new insights into materials and chemistry through accurate modeling and simulation of quantum systems. In addition, QIS holds the potential of developing exquisitely sensitive quantum sensors, for applications ranging from biology to the effort to detect Dark Matter. Finally, QIS may hold the key to ultra-secure networking, at a time when cybersecurity is a mounting concern.

The Budget provides $40 million to ASCR, BES and HEP to establish a new QIS center, which would integrate universities with National Laboratories, through investments across all six Science program offices. We are seeking to sustain U.S. leadership in this important and highly competitive area.

Artificial Intelligence/Machine Learning

Artificial Intelligence (AI), including Machine Learning (ML) defines another critical cross-disciplinary activity, with the potential to contribute to advances across multiple fields. This is another rapidly developing area in which it is vital for America to maintain a leadership role.

In a world awash with data, AI holds the promise of harnessing and deriving new insights from massive data sets. The massive quantities of data generated by DOE Office of Science user facilities such as X-ray lights sources are believed to provide a major opportunity for the development of new AI applications for data analysis. It

is also believed that AI may provide a pathway to improving the performance of particle accelerators and other key facilities. The FY 2020 Budget provides $71 million for AI/ML spread across all six Science program offices for both the application of AI/ML to research and the development of new AI/ML approaches and algorithms as well as $48 million requested in the FY 2020 Budget for NNSA for AI.

Microelectronics

By virtue of its leadership in supporting high-performance computing, as well as its longstanding sponsorship of research in materials science, the DOE Office of Science has been a major contributor over the decades to the development of microelectronics. Science has helped lay the fundamental scientific foundation for advances in these technologies, while partnering with industry in the development of new systems requiring new chips. This role is becoming increasingly important as we approach the end of Moore's Law and stand at the threshold of what is likely to be a new era in microelectronics. In an important new initiative, the FY 2020 Budget provides $25 million for redoubled research efforts on microelectronics. The research will benefit from groundwork laid at an October 2018 DOE workshop on "Basic Research Needs in Microelectronics," bringing together top experts and co-sponsored by ASCR, BES, and HEP.

Biosecurity

As mentioned, back in 1986, the Department provided the original impetus and idea for the Human Genome Project, and later partnered with the National Institutes of Health, to successfully complete the sequencing of a human genome in 2000. Since then the Department's Office of Science has remained on the cutting-edge of genomics-based system biology, making major contributions to the continued advancement of the relevant technologies. These dual use technologies have now advanced to a point where they pose new and unprecedented security challenges. To address this growing challenge, the FY 2020 Budget includes $20 million for BER for research related to biosecurity.

Isotopes

One of the Department's important contributions to medicine and industry is the Isotope Development & Production for Research and Applications Program, known more simply as the DOE Isotope Program. The program, managed by Science's Office of Nuclear Physics, supports the production and development of production techniques, as well as radioactive and stable isotopes that are in short supply for

research and applications. In doing so, it provides a vital contribution to research, medicine, and industry. The Budget provides $5 million to initiate a construction project for a U.S. Stable Isotope Production and Research Center at ORNL.

Fulfilling Legacy Cleanup Responsibilities

The mission of the Department's Environmental Management (EM) program is to complete cleanup of legacy nuclear weapons development and research sites. It is the largest program of its kind in the world and represents one of the top financial liabilities to the American taxpayer. EM is working collaboratively with regulators, federal, state, and local governments, and others toward a future that drives cleanup toward completion safer, sooner and at a responsible cost. As EM is put on a sustainable path forward, the FY 2020 Budget Request provides the resources necessary to build upon recent successes and bring a renewed sense of urgency to the program for meaningful and measurable progress at projects and sites throughout the cleanup complex.

The Budget Request includes $6.5 billion for EM to address its responsibilities for the cleanup and disposition of excess facilities, radioactive waste, spent nuclear fuel, and other materials resulting from five decades of nuclear weapons development and production and Government-sponsored nuclear energy research. To-date, EM has completed cleanup activities at 91 sites in 30 states and Puerto Rico, and is responsible for cleaning up the remaining 16 sites in 11 states –some of the most challenging sites in the cleanup portfolio.

The Budget Request includes $1.4 billion for the Office of River Protection at the Hanford Site for continued work at the Hanford Tank Farms and to make progress on the Waste Treatment and Immobilization Plant. This budget will continue progress toward important cleanup required by the Consent Decree and Tri-Party Agreement to include a milestone to complete hot commissioning of the Low Activity Waste Facility by December 31, 2023. The Budget also includes $718 million to continue cleanup activities at Richland. The Budget continues River Corridor decontamination and decommissioning activities including remediation of the highly contaminated 300-296 waste site under the 324 Building. For Savannah River, the Budget provides $1.6 billion, $91 million above enacted FY 2019, to support activities at the site. This will include the Liquid Tank Waste Management Program, completing cold commissioning beginning operation of the Salt Waste Processing Facility, continued construction activities for Saltstone Disposal Unit #7 and #8/9 design and construction activities for Saltstone Disposal Unit #10-#12, and funding to support design and construction of the Advanced Manufacturing Collaborative facility.

The Waste Isolation Pilot Plant (WIPP) is essential for the disposition of transuranic defense-generated waste across the DOE complex, and the Budget provides $398 million to safely continue waste emplacement at WIPP. The Budget Request will continue WIPP operations, including waste emplacements, shipments, and maintaining enhancements and improvements, and progress on critical infrastructure repair/replacement projects, including $58 million for the Safety Significant Confinement Ventilation System and $35 million for the Utility Shaft (formerly Exhaust Shaft). These steps will increase airflow in the WIPP underground for simultaneous mining and waste emplacement operations.

The Budget Request includes $348 million to continue cleanup projects at the Idaho site, such as the Integrated Waste Treatment Unit, and to process, characterize, and package transuranic waste for disposal at offsite facilities. It provides $429 million for Oak Ridge to continue deactivation and demolition of remaining facilities at the East Tennessee Technology Park, continue preparation of Building 2026 to support processing of the remaining U-233 material at the Oak Ridge National Laboratory, and support construction activities for the Outfall 200 Mercury Treatment Facility at the Y-12 National Security Complex and design for a new On-Site Waste Disposal Facility to support cleanup.

For Portsmouth, the Budget Request includes $426 million to continue progress on the deactivation and decommissioning project at the Portsmouth Gaseous Diffusion Plant, safe operation of the Depleted Uranium Hexafluoride Conversion Facility, and construction activities at the On-Site Waste Disposal facility. At Paducah, the Budget Request includes $277 million to continue ongoing environmental cleanup and depleted uranium hexafluoride (DUF6) conversion facility operations at the Paducah site. In addition, the FY 2020 Budget Request supports activities to continue the environmental remediation and further stabilize the gaseous diffusion plant.

The Budget continues funding of $128 million to address specific high-risk contaminated excess facilities at Lawrence Livermore National Laboratory.

Together, these investments for EM will make significant progress in fulfilling our cleanup responsibilities while also beginning to address our high-risk excess facilities at NNSA sites.

National Security through Nuclear Security: Sustaining and Modernizing the Nuclear Stockpile and Infrastructure

Our national security rests upon the foundation of the Nation's nuclear security enterprise and the deterrent it provides. The Budget funds the overdue modernization of the nuclear stockpile and the aging infrastructure that supports it; strengthens key science, technology, and engineering capabilities that support stockpile modernization; reduces global nuclear threats through nonproliferation and counterterrorism initiatives; and designs and maintains safe and effective nuclear propulsion systems for the U.S. Navy for years to come.

The Budget fulfills the President's vision of rebuilding and restoring our Nation's security through investments in the Department's nuclear security mission. The Budget provides $16.5 billion for the National Nuclear Security Administration (NNSA). Of this amount, the Budget Request includes $12.4 billion for Weapons Activities. This $1.3 billion increase supports maintaining the safety, security, and effectiveness of the nuclear stockpile; continuing the nuclear modernization program; and modernizing NNSA's nuclear security infrastructure portfolio in alignment with the Nuclear Posture Review.

The Budget includes $2.1 billion for our ongoing Life Extension Programs (LEP), Major Alteration, and Modifications, a $197 million increase. I am pleased to report that the W76-1 LEP completed its last production unit in December 2018. Final deliveries to the Navy will be completed by the end of this fiscal year. The W76-2 Modification, the low-yield variant of the W76, is on schedule, on budget, and will be completed consistent with Nuclear Weapons Council (NWC) direction. We also continue to make progress on the B61-12 LEP and the W88 Alteration 370. That said, we are currently working through recently identified challenges that will impact delivery schedules and we are assessing options with the Department of Defense to mitigate delays. The Budget also supports the Air Force's Long-Range Stand-Off program through an increase of $244 million from the FY 2019 enacted level for the W80-4 LEP to deliver the first production unit in FY 2025 of the cruise missile warhead. The request includes $112 million for the W87-1 Modification Program, which will replace the W78, one of the oldest warheads in the stockpile, by 2030.

The Weapons Activities Budget request also includes $309 million for NNSA collaboration with the Office of Science on the development of exascale computer systems; $778 million for the protection of personnel, facilities, nuclear weapons, and materials across the Department's nuclear security enterprise; and $232 million for information technology and cybersecurity protection.

The infrastructure portion in Weapons Activities increases investments to modernize our nuclear infrastructure, improve working conditions of NNSA's aging facilities and equipment, and address safety and programmatic risks through facility and equipment recapitalization and the stabilization of deferred maintenance. In this Budget is $745 million for construction of the Uranium Processing Facility, which is needed to replace deteriorating facilities at the Y-12 National Security Complex, as well as $123 million for the High Explosives Science and Engineering Facility at Pantex, $27 million for a Tritium Finishing Facility at the Savannah River Site (SRS), and $32 million for a Lithium Processing Facility at Y-12. The Budget also includes $168 million to support the Department's commitment to finishing the Chemistry and Metallurgy Research Replacement Facility Project, which is necessary to support the pit production mission and other actinide activities at Los Alamos National Laboratory (LANL).

The highest NNSA infrastructure priority is re-establishing a plutonium pit production capability to meet military requirements, supported by numerous studies and analyses, of no fewer than 80 war reserve pits per year by 2030. Last May, the NWC endorsed NNSA's recommended alternative calling for plutonium pit production at LANL and SRS. This two-site approach bolsters the nuclear security enterprise's responsiveness and resiliency.

The Budget also includes $2.0 billion for the Defense Nuclear Nonproliferation program to reduce global threats from nuclear weapons. This critical national security program prevents the spread of nuclear and radiological materials, and technologies, advances technologies that detect nuclear and radiological proliferation worldwide, and eliminates or secures inventories of surplus materials and infrastructure usable for nuclear weapons.

The Budget invests $774 million at SRS in FY 2020, a 76 percent increase over FY 2019. NNSA will continue termination activities for the orderly and safe closure of the Mixed Oxide Fuel Fabrication Facility Project. The Budget will also continue to pursue a dilute and dispose strategy to fulfill the U.S. commitment to dispose of 34 metric tons (MT) of plutonium and modernize SRS infrastructure to support the tritium supply chain.

The Budget provides $372 million for Nuclear Counterterrorism and Incident Response, $53 million above the FY 2019 enacted level, to work domestically and around the world to improve our ability to respond to radiological or nuclear incidents, in conjunction with other agencies in a broader U.S. Government effort.

In the NNSA's Office of Naval Reactors, the Department has the ongoing

responsibility to provide militarily effective nuclear propulsion plants for the Navy and to ensure their safe, reliable and long-lived operation. The Budget provides $1.6 billion to support the operation of the Navy's nuclear-powered fleet, the continuation of the *Columbia*-class reactor plant design, refueling of the land-based prototype reactor, and the construction of the Naval Spent Fuel Handling Facility.

Today, nearly 45% of the Navy's major combatants are nuclear powered. The Department's role in propulsion plant design, spent fuel handling, and recapitalization is critical to the Navy's ability to conduct its missions around the globe.

Finally, the Budget includes $435 million for Federal Salaries and Expenses at the NNSA. This $25 million increase is essential to ensuring our world-class workforce of dedicated men and women can effectively oversee NNSA's critical national security missions.

Focusing Priorities on Core Missions

The Budget continues to focus the Department's energy and science programs on early-stage research and development at our National Laboratories to advance American primacy in scientific and energy research in an efficient and cost-effective manner.

Also, in line with Administration priorities, the Budget terminates the Advanced Research Projects Agency-Energy, known as ARPA-E, and the Department's Loan Programs, while maintaining necessary federal staff to oversee existing awards and loans. Termination of these programs will save over $850 million in FY 2020 alone while significantly reducing financial risk to the taxpayer moving forward.

Conclusion

In conclusion, I reaffirm my pledge that the Department of Energy, along with our National Laboratories, will continue to support the world's best enterprise of scientists and engineers who create innovations to drive American security, prosperity, and competitiveness. The President's FY 2020 Budget Request for the Department of Energy reflects the priorities to enhance our energy, economic, and national security today, while making strategic investments to accelerate the breakthroughs that will fuel America's tomorrow.

In the coming weeks and months, I look forward to working with you and your

colleagues in Congress on the specific programs mentioned in this testimony and throughout the Department. Congress has an important role in the path forward on spending decisions for the taxpayer, and I will, in turn, ensure DOE is run efficiently, effectively, and that we accomplish our mission-driven goals. Thank you, and I look forward to answering your questions.

Mr. RUSH. That concludes the opening statement, and I want to recognize myself for 5 minutes for the purposes of asking questions of our witness.

Mr. Secretary, as you made me aware, the energy workforce overall is currently dominated by older, white, male workers. And this is also true within the clean energy sector, as women make up less than 20 percent of workers in the clean energy production and energy efficiency sectors, and less than 10 percent of these workers are African-American. Many of the recommendations for addressing these disparities are included in my workforce bill, H.R. 1315, including a focus on STEM education, aligning education and training with industry needs locally and regionally and increasing apprenticeships and on-the-job learning.

Mr. Secretary, within the past month alone, there have been three different studies that have been released discussing the need for a younger, more diverse, trained workforce within the energy sector. There was the Brookings study that I cited in my opening statement, a report by the Solar Energy Industries Association entitled, "Diversity Best Practices Guide for the Solar Industry," and an Alliance to Save Energy study entitled, "Growth in Energy Efficiency Demands Investment in a Highly Skilled Workforce".

Mr. Secretary, during your time as Secretary, have you personally heard from companies within the energy sector regarding their dire need to find trained workers? Are you aware that the energy workforce overall is mostly comprised of older, white men and that many sectors are looking to diversify their labor force by going into previously underrepresented communities? Do you believe that it is worth Federal investment to support initiatives to accomplish this goal?

Mr. PERRY. Mr. Chairman, I am glad that you are excited and kept us focused on this issue of the potential in the clean energy sector in this country. According to the Bureau of Labor statistics, solar installers and wind technicians are projected to be two of the fastest-growing occupations in the U.S. as we go forward, and leading even the projected growth and demand for healthcare professionals. So, I think you are a spot-on in your focus on this, in developing that workforce.

American wind energy—Mr. Veasey, who is from my home State, he knows the work that we did together to expand the wind energy in the State of Texas. It produces more wind than all but five other countries, and an incredible impact into those rural areas where that showed up, and then, obviously, the jobs that get created, and what have you. It is a major job creator in America today. There are over 105,000 U.S. workers who have wind-powered careers. All 50 States are affected by this. And I think there are 242,000 U.S. workers that are employed in the solar side of it. So that is just good news, and we look forward to expanding that. Ninety percent growth in the solar side in the last 2 years in this country.

Mr. RUSH. Mr. Secretary, so you would think that this would be a priority for Federal investment to——

Mr. PERRY. Yes, sir. Yes, sir.

Mr. RUSH. OK. Thank you.

Mr. Secretary, both the majority and minority sides have been touch with your agency about obtaining data on the funding levels

for workforce programs that the Department currently conducts. Understanding your staff has been working vigorously to get us that information, but I really wanted to know and to remind you that we are still waiting to hear back from you. And it is important to understand that this is, indeed, a priority for Members of both sides of the aisle. Will you commit to this committee——

Mr. PERRY. Sure.

Mr. RUSH [continuing]. That you will make sure that we receive the data in a timely fashion?

Mr. PERRY. Yes, sir. Yes, sir. And we have a couple of programs of which you have been briefed, and your staff has been briefed on. The Equity in Energy is the name of the new program. It was called Diversity in Energy, but we changed it over to Equity in Energy. And you will have that data, and we are working hard.

And just as an addition, Mr. Chairman, these XLab projects that we are working on where we bring the private sector in to our national labs, as a matter of fact, I think there is one coming in Argonne. You will, obviously, have more than a passing interest in Argonne because of your home of residence there in Chicago. But, anyway, it is an artificial intelligence and machine-learning project that is going to be working in the early fall of 2019. So, we obviously will invite you and your staff to be there as we do that.

But a great opportunity for us, not only to showcase the clean jobs, but also to recruit those young men and women, a diverse workforce, and maybe prick their interest in science and technology, engineering, and in math, to bring them into a future that is going to be not only exciting, but, obviously, a great opportunity for them to better their lives.

Mr. RUSH. I want to thank you, Mr. Secretary.

The Chair now recognizes Mr. Walden, the ranking member on the full committee, for the purposes of questioning the witness.

Mr. WALDEN. Thank you, Mr. Chairman. I want to thank Mr. Upton, too, for yielding. I have a meeting I have to get to down at the White House.

Mr. Secretary, thanks again for being here.

Mr. PERRY. Sure.

Mr. WALDEN. Thanks for your leadership at the agency. We work with a number of presidential appointees on this committee, and you are one of the best we work with in terms of communication with your team, and going back and forth with us on these energy policy issues.

Now there is one you and I talked about last year, and I think probably the year before, and everything else. And it should come as no surprise, related to the proposal to sell off the Bonneville Power Administration and the idea of selling it off. So, the question is, the idea of selling off Bonneville Power Administration's electricity transmission assets and abandoning cost-based rates is broadly rejected by practically every Member of the Pacific Northwest Congressional Delegation in the House and the Senate. Can you assure me the Department of Energy will not sell off BPA unless Congress provides explicit authorization?

Mr. PERRY. I can assure you with great assurance that we will follow your direction, sir, and this committee, and Congress' direction.

Mr. WALDEN. Thank you, Mr. Secretary.

Now let's move on to innovation. I note this past week DOE announced a contract to build the Frontier supercomputer at Oak Ridge National Laboratory, which is anticipated to debut as the world's most powerful computer. Can you talk about the research benefits of DOE's supercomputer program?

Mr. PERRY. That will be difficult in a short period of time, but I will do my best and I will talk fast, which is a pretty good test for an Aggie.

Mr. WALDEN. For a Texan.

Mr. PERRY. But the breadth of what these supercomputers are allowing us to get answers for of questions that have vexed us in the past just because we did not have the computing capacity, we didn't have the bandwidth, if you will, to put all the data in to get the answers back. These computers, here is the speed of which they are, a billion billion calculations per second. I mean, I will be honest with you, I can't get my little mind around that, the ability to manage that much data.

But it gives us the potential in health care, for instance, to be able to find some cures for cancer, to go back through every dataset that has been done since time immemorial, on drug tests that ended up over in a pile. They were failures because we couldn't get to the final answer. Go back and take all of that data, and run it through these computers, because they are so powerful. And we will find new drugs to work on.

In brain science, and this is where Mr. McNerney and I were talking about it. I know of his interest in traumatic brain injury and the work that is being done there. We are in a partnership with the University of California, San Francisco, Dr. Geoffrey Manley out there, finding new solutions on traumatic brain injury, post traumatic stress, CTE, which obviously the professional football league is very interested in some of those studies. And that is just in the health care side.

Mr. WALDEN. What can you say about energy? Can we get to where coal could be burned with no emissions, do you think?

Mr. PERRY. Here is my example, Mr. Chairman. Fifteen years ago, people told us we had found all the energy that there was to be found, you know, just get used to it. We have found it all. Even if you find any more, you won't be able to afford to produce it. Well, that conventional wisdom was massively wrong. I will suggest to you, those that say you can't use coal, for instance, in a clean, almost emission-free way, they can be proven wrong, too. And it is going to be these supercomputers that are working with our scientists. And I will suggest to you, the private sector and our national labs in partnership to find some energy solutions to this incredibly abundant resource that we have in this country. So, you are absolutely correct.

Mr. WALDEN. Let me go to a different topic, if I could. We have spent a lot of time in this committee looking at nuclear waste storage. We appreciate your leadership in this, and we hope to renew that effort going forward, but, also, at how we harness new nuclear energy technologies. And so, I know that the Department is looking at doing some work on micronuclear as well as some of the other

proposals, NuScale, and others. In the 20 seconds I have left, can you just give us a quick update on small modular and micro?

Mr. PERRY. Yes, sir. The work that is being done in the agency, along with the private sector, INL, Idaho National Lab and NuScale, they are in a partnership out there. I know Bill Gates and his company, Terra Energy, they are a different technology, but these small modular reactors and these microreactors, the microreactor is even smaller from the standpoint of using these in our military and in places around the world.

And the small modular reactors also, not only are they smaller, they are cheaper, they are easier to build, and they are safer. The fuel that they use is safer. So, the future of clean energy has never been brighter than it is today.

Mr. WALDEN. Can you give me the horizon? Are we talking 2 years, 10 years, 30 years?

Mr. PERRY. 2025, if I am correct on that number, 2025 is the projected date on some of the SMRs to be out with their prototypes.

Mr. WALDEN. All right. Thank you.

Thank you, Mr. Chairman, for your indulgence.

Mr. RUSH. The Chair now recognizes the chairman of the full committee, Mr. Pallone, for 5 minutes for questioning the witness.

Mr. PALLONE. Thank you, Chairman Rush.

I wanted to go back to the lightbulbs, Mr. Secretary. You recently proposed to rescind rules that would extend 2020 lightbulb standards to the full range of bulb shapes and sizes commonly used in U.S. homes. And the effect of your proposed rule is to take back a standard that would save the average U.S. household about $100 per year, and by saving electricity, would deliver very large reductions in carbon emissions. The comment period on the proposed rule closed last Friday. So, can you tell me how many comments you received in support of this proposed rule and who submitted comments in support?

Mr. PERRY. Mr. Chairman, I will get that information to you. I don't have it at the tip of my—if I may, can I respond, just to kind of share with you what we are doing?

Mr. PALLONE. Well, look, you can get back to me with the comments. I mean, I have something that was prepared by staff that gives us some information, like a summary, about it. So, I wanted to discuss that, if I could.

Mr. PERRY. Yes, sir.

Mr. PALLONE. But if you would get back to me in answer to that previous question?

Mr. PERRY. Absolutely.

Mr. PALLONE. I appreciate it.

Now the summary I have—and I am not going to introduce it for the record because I would rather get your actual official document, if we could. But while the Department has been slow to get all comments posted so far, those opposing your rollback so far include more than 40 electric utilities; the U.S. Climate Alliance, which includes Republican and Democratic Governors from 24 States representing 60 percent of the U.S. population, and a wide range of consumer advocates, energy efficiency groups, and environmental groups. And also, 15 State Attorney Generals have opposed the proposal. To date—again, I only have the information so far—to date,

the only organizations on the record supporting your action are the lightbulb manufacturers and their trade association. So, you have more than 15,000 citizen comments so far have been filed, with the vast majority opposed to the rollback.

So, again, Mr. Secretary, why is it that at the same time that DOE has missed 17 congressionally mandated legal deadlines for updating a wide range of appliance standards, the Department is spending scarce time and taxpayer money on eliminating standards for lightbulbs that will save consumers money and cut carbon emissions? Why is it that you are so intent on going backwards on the lightbulb efficiency? Why has this become a priority?

Mr. PERRY. Mr. Chairman, I think the bigger issue from my perspective is the challenge with the way that the statute is written. I will tell you, we are working hard to meet our legal obligations on this, but the deadlines for issuing regulations, whether it is appliances or equipment, I have instructed the staff to develop a plan to address the missed deadlines and that plan is in the forthcoming spring unified regulatory agenda.

Mr. PALLONE. But, you see, Mr. Secretary, no one—I mean, I only have a limited amount of time, and I appreciate your being here—but no one seems to agree with your proposal, not the utility industry, not the 15 State AGs, not consumer advocates. As far as I can see, the only voice supporting your action is a handful of companies that want to keep on selling outmoded, grossly inefficient lightbulbs that are a bad deal for consumers and harm the environment. So, I just don't agree, and I don't really even understand your argument.

But, anyway, let me move on to the LNG. Mr. Chairman, we have only got a minute and a half here. Last December, DOE determined that liquefied natural gas export volumes to non-free-trade agreement countries equal to 52.8 billion cubic feet a day, a volume equal to 71 percent of U.S. demand, is inconsistent with the public interest under the Natural Gas Act. And DOE also stated it intends to approve LNG export applications of those countries up to this volume. And then, DOE has also approved LNG export volumes to free trade agreement countries equal to 58.1 billion cubic feet per day, and my understanding is that LNG export application approvals are for periods of 20 to 30 years.

My concern with this, because we are running out of time, is the impact of these approvals on domestic supply and pricing; that these approvals are going to have a greater demand for more pipeline infrastructure. The communities and landowners bear the cost of building out the support for this enterprise. Have you ever denied any export application for LNG? Not just you, but has the DOE ever denied an export application?

Mr. PERRY. I can't speak for prior administrations, but I can assure you that we have not, and if I am still the Secretary of Energy, we will not, because we have the most massive supply in the world, sir. The issue, if the question here is there are some folks over in the Northeast that are concerned about the availability or the cost of natural gas, it has got a lot more to do with the inability to build a pipeline across New York, for instance, to get into the Northeast than it does with our supply.

The American natural gas-producing regions of this country—and we have only seen the tip of the iceberg. That is not my quote. That is the quote of the International Energy Agency head, Fatih Birol, last week when I was in the EU, telling the Europeans that we have more gas than they can purchase. So, I would suggest that this country is really blessed to have this low-emissions, this clean-burning fuel, and being able to build the infrastructure out across the country, so that all Americans can enjoy that fuel.

The folks in the Northeast are paying 40 percent more for their residential and 60 percent more for their commercial electricity because of the inability to move that natural gas into those regions and, then, use it. And I haven't even talked about the negative effect on our environment because of the fuel oil that is having to be burned instead of natural gas.

Mr. RUSH. Mr. Secretary, we have a lot of Members who want to ask questions.

Mr. PERRY. Yes, sir.

Mr. RUSH. So, will you be a little bit more succinct with your answers?

Mr. PERRY. Yes, sir.

Mr. RUSH. All right.

Mr. PERRY. That one, I am just really passionate about, sir.

Mr. RUSH. Yes, I understand, but you have a hard deadline.

Mr. PERRY. Yes, sir.

Mr. RUSH. The Chair now recognizes the gentleman, the ranking member of the subcommittee, Mr. Upton, for 5 minutes.

Mr. UPTON. Well, thank you, Mr. Chairman.

I would like to get through three questions, if I can.

A number of decades ago, I worked for President Reagan, and I can remember him, when he signed the Nuclear Waste Policy Act, saying that this was going to be the bill that actually resolved the issue, certainly within the next 20 years. We are now 40 years later, and this committee, as you know, voted 49 to 4 in the last Congress, widely bipartisan, to move John Shimkus' bill, which we passed with a pretty good margin on the House Floor.

For us to finish the job, the one thing that we really need to spend money on, I think, is to complete the licensing process at the NRC. Do you agree that that is the case? And can you commit to trying to help us get to that final stage?

Mr. PERRY. Yes, sir. If you don't have the permitting process finalized, then you are not going to—this is a map; every one of those red States has waste, and that is your plan. That is the repository for America.

Mr. UPTON. And that is why we have to complete the licensing process.

Mr. PERRY. Yes, sir.

Mr. UPTON. We have to get that.

Mr. PERRY. If we don't finish that licensing—and, listen, I am not a Yucca-or-bust person. I am let's find a solution to this. Yucca is one of the solutions. But if you do not have a permitting process that is finalized, you are never going to be able to move this out of your States. And there are 38 of them here. Your States are going to be the ones that are the final solution for this.

Mr. UPTON. That is a good answer. That is a good answer. You can go to "Double Jeopardy" now, right.

There was a report earlier this week, a public report, that disclosed a cyberattack on March 5th. I don't know if you saw this story. "The Cybersecurity 202: a cyberattack just disrupted grid operations in the U.S. But it could have been far worse. A recently disclosed hack at an electric utility in the Western U.S. crosses a disturbing new line." What can you tell us about that a couple of months later?

Mr. PERRY. Yes. Well, we received the report about a denial-of-service condition that occurred at an electric utility. I think it was on or around the 1st of March of 2019. And the incident did not impact generation, the reliability of the grid, or cause any customer outages. We were in contact with that utility, and they are managing the incident coordination with their firewall manufacturer.

Mr. UPTON. Any lessons learned from that experience?

Mr. PERRY. Well, yes, when you get a direction to put a patch on your firewall, you need to put your patch on the firewall. I mean, it is pretty simple. They made an error. And so, we are trying to reiterate to the utilities, no matter what their size, when you get a directive to protect your firewall, you need to do it.

Mr. UPTON. And are you working with the EEI to make sure that they pass that word along to all their member companies as well?

Mr. PERRY. Yes, sir, and the Subsector Coordinating Council, the folks that deal with these issues, and our counterparts, if you will, in the private sector, yes, sir.

Mr. UPTON. So, as you know, we are currently working, I think, on a Pipeline and LNG Facility Cybersecurity Preparedness Act. I have introduced a bill, H.R. 370, which codifies some of what DOE is currently doing on the coordination side and by authorizing R&D in pilot demonstration projects. Has the Department looked to this bill at all? Can you offer some support, some guidance in terms of what we need to do to make sure that we diminish any threat of cyberattack on our Nation's pipeline system?

Mr. PERRY. Yes, sir. Obviously, we will give you any technical information, any technical help that we can on developing it. And whatever you all decide, we are going to implement. We are coordinating and working with any threats that are out there, best practices. We manage the information flow with the private sector, I think, in a fairly positive way, in a fairly transparent way, to mitigate any of the challenges that we have got to best practices. The investment incentives, the cost recovery practices in the energy sector, pipeline security, we touch all of those. And I think we have got, for pipelines and the electrical grid, I think we have got a good flow of information and we are as on top of this as we can be.

Mr. UPTON. I appreciate your leadership.

And I yield back.

Mr. RUSH. The Chair now recognizes Mr. Peters from California for 5 minutes.

Mr. PETERS. Thank you, Mr. Chairman.

Thank you, Mr. Secretary, for being here.

Last year we had a similar hearing where we were critical of the President's proposed budget. They cut a lot of things, and I think you were candid that some of this was not your idea. And ulti-

mately, we were able to restore some of the investments that I think were important.

Let me make two observations about that this year, and then, I had a particular question for you. The first is on ARPA–E. The Trump administration's continued attempt to fully defund ARPA–E, which is the basic research component of the Department of Energy, it just doesn't make any sense. It is inconsistent with your own initial video that talks about innovation. I think we would all like to get behind that.

One of the largest ARPA–E grants ever awarded was in my district to a company called Achates Power. They successfully developed and opposed-piston engine that creates more power with lower toxic emissions and increased fuel efficiency, and it is such a great advance that it is now on the way to being the future engine of many U.S. Army vehicles. And I don't think you would dispute that that was an important investment for the country. It is not the kind of thing we want to defend.

Second, with respect to carbon capture, as you may know, I introduced the USE IT Act with my colleague from West Virginia, Mr. McKinley. There is an example of a West Virginian and a Californian working together on energy and an environmental issue. I think that is a good idea. It focuses on the need for increased investment in carbon capture utilization and sequestration technology as well as direct air capture technology.

The International Panel on Climate Change, IPCC, has said that carbon capture is going to have to be part of any strategy to get us to net carbon zero by mid-century. The Department of Energy, your own handout here says that you want to reduce the cost of carbon capture utilization and storage. That is great, but the commitment is not reflected in a 65 percent cut to CCUS in this budget. I am not asking for a response on that, other than to tell you that it is obvious that it is inconsistent with your goals, Mr. Secretary, as they are stated.

But I did want to ask you a particular question about subsidies. Earlier this week, the IMF updated a working paper on global fossil fuel subsidies; reported the annual global subsidy for fossil fuels at $5.2 trillion. The United States contributes the second largest portion of that, behind only China, subsidizing energy efforts that are not part of our sustainable future. According to the report, quote, "Removing those subsidies would lower global emissions by 28 percent and deaths from air pollution by 46 percent." It is my understanding that the amount that the DOE proposes to subsidize fossil fuels is $489 million. Is that your understanding?

Mr. PERRY. If that is what your numbers show, sir. I don't know that off the top of my head, but——

Mr. PETERS. This is from the handout.

Mr. PERRY. Yes, sir. Yes, I would stick with that.

Mr. PETERS. And I would just ask you, how is it appropriate for us to subsidize parts of the fossil fuel industry that are so mature? Is that really the right role for government? And I am asking you as a rock-ribbed conservative Texan. Is that really the way we want to use the money, government taxpayer money, to subsidize a mature industry like fossil fuel extraction?

Mr. PERRY. Here is what I see, sir. I see the United States and our fossil fuel industry, particularly through the development of our natural gas, then turned into liquefied natural gas—we drove down the emissions in the State of Texas by a substantial margin. I will just give you the numbers quickly. Sixty percent on SOx, 50 percent on NOx, almost 20 percent on the carbon dioxide side of it, in the period of time from about 2007 through 2015, while I was the Governor there, while we were leading the Nation in the creation of jobs and wealth, I might add. That occurred because of the transition that we did from old, inefficient power plants to clean-burning natural gas.

So, I will make the statement—and I think we will stand by it—that the tax incentives, the other ways that they calculate a subsidy of the fossil fuel energy, that will have a massive amount of impact as American LNG goes to Europe to take out old, inefficient power plants and transition away from coal plants in Germany, for instance. So, I think that the tax subsidies that occur to continue to get American technology into these countries and American natural resources, like our LNG, is absolutely a good investment of our tax dollars.

Mr. PETERS. Mr. Secretary, just so we are not confused, I am not even talking about the tax subsidies. This is direct spending on subsidies out of the Department of Energy.

Mr. PERRY. I still support them, sir.

Mr. PETERS. And I would say, from my perspective, and I think if you look at your goals, to be able to spend $489 million on ARPA–E, which was $366 million last year, is a lot more cost-effective.

And I yield back.

Mr. RUSH. The Chair now recognizes Mr. Latta for 5 minutes.

Mr. LATTA. Well, thank you, Mr. Chairman.

And, Mr. Secretary, thank you very much for being with us today. Good to have you back.

The Department of Energy has important responsibilities to secure the Nation's energy infrastructure against all hazards, including severe weather, reduce the risk of potential cyberattack, and to assist with energy restoration and recovery efforts. DOE's newly created Office of Cybersecurity, Energy Security, and Emergency Response leads these efforts.

And I would like to kind of follow up on the ranking member's questions a little bit on strengthening. I know you talked about the situation with the patch that should have occurred, but would you talk about your efforts to strengthen the Nation's energy infrastructure against cyberattacks?

Mr. PERRY. Sure. That is the reason that the CESER office was stood up. The Department of Energy is the sector-specific agency dealing with our electrical grid. We obviously work with our partners at DHS and at U.S. DOT on the pipeline side of it, too. But the SCADA systems and the cybersecurity aspects, cybersecurity is an integral part of energy security. And that is assessing the risks, the vulnerabilities that occur, both by natural disasters and by manmade. So, it is not all about the manmade attacks, if you will, the viruses that get put in place. This is also about how are we going to deal with hurricanes; how are we going to deal with polar

vortex that comes in and knocks out—how you manage and have this diverse portfolio.

I think one of my jobs is to make sure that Americans understand that, if we don't have this baseload of electricity out there that is 24/7, and frankly, onsite, which is basically either nuclear or coal, because all the others are interruptible in some form or fashion. But I think it is good to have that conversation with Americans, that if we had a triple whammy, if you will, if we had a polar vortex and we had a cyberattack that occurred at the same time, along with a physical attack on a pipeline, how that could massively affect the Northeast, for instance, the city of New York with the millions of people that live there.

So, we want to make sure that Americans know, No. 1, that we have the technical ability to deal with this; that we are very good at analyzing and blocking the attacks that come, and we keep our private sector partners advised of this. And we have a number of our private sector utility types that come in that we have the ability to brief them on classified information about what is happening in the cybersecurity front.

Mr. LATTA. I appreciate that because I know in my district and when I go across the State of Ohio with the folks that are not only producing the power, but transmitting that power, the amount of time and energy, and all, that they are taking now just because of the cyber threats that they face every day, and it is interesting, when you talk to the customers out there, they don't realize what is being transferred over just to try to make sure that those threats aren't done. And I am glad and it is very important that information is transmitted back to all these individuals and companies that you deal with.

If I could, in my last minute, real quick, if I may, I am also very interested in the ENERGY STAR program, which you may know had the appliance portion managed by DOE from 1994 to 2009. In 2009, the previous administration moved the appliance manufacturers into have a dual-management that is split between DOE and EPA. And so, these companies out there now are faced with duplicative reporting requirements and a lot more red tape that is added up to about $35 million annually, according to the Association of Home Appliance Manufacturers. And just in my last 30 seconds, would it make more sense and fit with the administration's goal to cut that red tape to return that management back to DOE?

Mr. PERRY. I am sorry, as your last question again, sir? I was distracted. I apologize.

Mr. LATTA. Would it make more sense to have DOE on the ENERGY STAR split between EPA and DOE, have it just being underneath the DOE?

Mr. PERRY. Yes, sir.

Mr. LATTA. I appreciate that answer.

Mr. Chairman, my time has expired and I yield back.

Mr. RUSH. The Chair now recognizes Mr. Doyle for 5 minutes.

Mr. DOYLE. Thank you.

Secretary Perry, welcome back to the committee.

Investment in research and advanced technologies, it is critical if we are going to reduce harmful emissions from fossil energy sources like coal and gas. And in your testimony you mentioned

your commitment to R&D, particularly for fossil energy. But the DOE budget cuts funding for fossil energy programs by 25 percent, including 24 percent to the fossil energy research and development, which is vital for funding the National Energy Technology Labs in Pittsburgh and in Morgantown, West Virginia.

Mr. McKinley and I had sent a letter requesting $100 million increase in this category, and what we got was $178 million decrease. I would just like to say that what you say your goals are and what your budget says are diametrically opposite, and it is puzzling to see where the commitment is.

Let me also echo what Mr. Peters says. It is craziness to eliminate ARPA–E. I mean, this is a program that is focused on high-risk, high-reward innovation, particularly when it is clear that the industry is not going to take on this kind of risk and other DOE offices haven't quickly produced this type of early-stage, high-risk technology. Cutting this program makes absolutely no sense. And again, it seems contrary to the goals that you state that the Department has.

Now let me give you a compliment. I am glad to see that your budget focuses on energy storage. I have introduced the Energy Storage Tax Incentive and Deployment Act to expand the investment tax credit to encompass battery storage technologies. I think that is a critical component needed to expand our use of renewables and strengthening our grid. So, I appreciate your focus on this initiative and I look forward to working with you on that.

Let me ask you, Secretary Perry, yesterday Exelon announced that Three Mile Island would prematurely retire in September. This means the loss of carbon-free baseload power and it means the loss of a lot of good-paying jobs. And we know that, as nuclear plants are prematurely being retired, this energy is being replaced by coal and natural gas, which is putting more greenhouse gases up into the air. Now I have had concerns with the NOPR proposal or the FirstEnergy 202(c) proposal, but I still support the nuclear industry because we can't meet our climate change goals and obligations without it. So, tell me, what are other options that are available to address this issue for nuclear power plants across the country that are starting to close down prematurely?

Mr. PERRY. Mr. Doyle, we totally agree with you on your observation about you cannot meet your goals, no matter where you may land in the spectrum out there, for the fight to reduce emissions without nuclear. So, you ask what some of the options are, and I think they are twofold.

One, having been a Governor, I think it would behoove the States that have nuclear plants to look at whether or not they want to at the State level subsidize those plants. Listen, I don't necessarily think that the word "subsidy" is a bad term. I believe that it is up to the people to decide, do you want to have these options, this diversity of energy sources? Nuclear is, I think, one of the most important ones.

So, that is on the old plants that are there today and to extend their life cycles. And those can be done, and they can be done safely. How we deal with that waste is part of it, but the other side of this is——

Mr. DOYLE. Yes, but, Mr. Secretary, it is beyond the ability of a lot of States to do what you are suggesting. And your responsibility, as Secretary of the Department of Energy, is for our national energy portfolio. We know that nuclear is about 25 percent of that portfolio, and that if we start to lose—we are not building new plants because they cost so much money—if we start to lose existing ones prematurely, our greenhouse gases go nowhere but up.

I want to ask you one final question. Worker safety is a priority of mine, especially for workers employed in environmental remediation and decontamination, because they have an uncreased risk of exposure to harmful substances. Incorporating robotics into remediation for hazardous or radioactive material can not only increase the efficiency of remediation, but it protects workers also. What is the Department doing to incorporate robotics into cleaning up sites?

Mr. PERRY. Yes, sir, we are, obviously, working with that. As a matter of fact, we have some projects. Fukushima is one of those that the Department is working with the folks. I actually was over there a year-plus ago to observe at an appropriate distance——

Mr. DOYLE. I see our time is up. I am going to respect Mr. Rush. Thank you, Mr. Secretary.

Mr. PERRY. So, the robotics side of it, we are working with that. So, our national labs are working with that.

Mr. RUSH. The Chair thanks the gentleman, and the Chair now recognizes Mrs. McMorris Rodgers for 5 minutes.

Mrs. RODGERS. Thank you, Mr. Chairman.

And welcome, Secretary Perry. I, too, want to join in applauding your enthusiastic leadership at the Department of Energy to lead the drive to a new American energy era.

And energy innovation is the key. On this committee, we are regularly debating the best ways to promote new American energy. And today, because of American ingenuity, we are celebrating energy independence. We are celebrating a booming economy, and we are also celebrating the fact that we are leading the world in bringing down harmful carbon emissions.

In eastern Washington, I am proud to represent many who are on the forefront of these energy solutions, research and development, production and storage. Right now, there is an exciting partnership between Washington State University and PNNL.

I just wanted to ask you to share some of the details, some of the work that is being done at the Department of Energy right now on grid modernization space or within grid modernization, and how the work of PNNL is benefitting those efforts. I also, in that line, wanted just to ask you what you believe needs to be done to ensure that the United States remains on the forefront of innovation and grid modernization, and do you fear that other countries may ultimately surpass the United States in this field?

Mr. PERRY. Thank you.

A great example of what we are doing, I think, and it kind of goes to Mr. Peters, when you talked about ARPA–E, and I do have a rather strong commitment to the whole concept of public-private partnerships and working those together. And sometimes the budget doesn't reflect the commitment that I have, that the agency has, and through some of our cross-cutting. And this is one of the great

examples of it, of the private sector working with us. At Idaho National Lab, for instance, we actually operate a grid out there, a standalone grid where we can go in and break things and put viruses on, and to really put these electrical grids to the test. And we have got very capable private sector partners.

And so, one of the things we are focusing on is resilience modeling, you know, grid services that energy storage could provide for us in this case; you know, advanced sensors. There is the institutional support that comes along with that. I think we have some $200 million at DOE in FY16 through '18 for those types of services.

And again, the Grid Modernization Initiative is something that we certainly support. The Grid Modernization, GMLC, Lab, $40 million for some foundational work from our applied energy program. So, we have got multiple offices, and this is kind of our philosophy, particularly on the area that ARPA–E and the folks that support ARPA–E and that concept of advanced research, this is a great example of some of the foundational work that DOE is still involved with, and I think it doesn't get counted towards ARPA–E conceptually, but it is the type of cross-cutting management that we try to do at DOE that keeps these types of programs alive and going, although the old ARPA–E structure, the money doesn't flow through it.

Mrs. RODGERS. OK. Thank you.

On another note, I just wanted to give you—others have brought up Hanford. I wanted just to ask you in the time remaining what you believe could be done, should be done to ensure that the site is cleaned up in a timely and cost-effective manner.

Mr. PERRY. Yes, and we are making some progress. I mean, that was one of the biggest frustrations that I saw when I came to DOE, was the massive amounts of money that had been done in the past. There hadn't been a baseline study done on that thing for, I think, the previous 9 years. And we went in and did that, and it was a shocking amount of money that is going to be needed. But we are making progress.

For instance, I know Chairman Walden cares about that Columbia River, as do you. The last reactor is going to be cleaned up. We are going to be able to go announce the last reactor in the basin of the Columbia River this fall. So, we are making some progress there, the low-level waste facility over there. I mean, we are ready to move some of that material out of the region and go to either some interim, or, obviously, I am looking for some permanent wastesites in this country as well.

So, I think we are making some pretty darn good progress out there. We have got a couple of those tunnels now grouted and filled. And so, there are some good stories. It is going to be a long time and it is going to cost a hell of a lot of money.

Mrs. RODGERS. OK. Thank you.

Mr. PERRY. But we are making some good progress.

Mrs. RODGERS. And thanks for being here.

I yield back.

Mr. RUSH. The Chair recognizes Mr. Sarbanes for 5 minutes.

Mr. SARBANES. Thank you, Mr. Chairman.

And thanks, Secretary, for being here.

Mr. PERRY. Sure.

Mr. SARBANES. You said a moment ago that sometimes the budget doesn't reflect the commitment you have and the agency has on certain things.

Mr. PERRY. Yes.

Mr. SARBANES. So, how do we solve for that here? Because the budget is obviously reflecting something. And I guess you are between a rock and a hard place, the rock being your personal commitment, if I can give you credit for that, and wanting to invest in these things, and the hard place being orders that are coming from someplace else in the administration, where that commitment is not as strong.

So, I am looking at the Office of Energy Efficiency and Renewable Energy, which has done some great work over the years. I mean, I think some of the estimates on the return on investment there, that it has netted about $230 billion for the taxpayers, which is just incredible. But the budget you have brought here today would cut that office by 86 percent.

And then, you look at the Solar Energy Technologies Office. Again, they have done terrific work. It has been an economic driver, generating economies, employing over 240,000 Americans, $17 billion of investment in the Nation's economy. And these are award-winning numbers by any measure, helping to keep driving the cost, commercial cost, of solar energy down because of the continuous attention and focus that that office brings. And that office in your budget would be reduced by 70 percent.

Last year when you were here, we were talking about the importance of the Solar Energy Technologies Office's work, how it was helping to make solar electricity more affordable. In Baltimore, we have been working on a project that DOE was a partner in to bring this opportunity to low-income homeowners, create a workforce pipeline in the solar industry for people in some of the hard-hit parts of Baltimore City, et cetera.

So, I guess the first question is, do you agree that this Solar Energy Technologies Office has done good work and helps to improve affordability, reliability, and performance of solar technologies on the grid? And how can they continue to do that good work if they are going to experience, according to the budget request you are making, a 70 percent cut in their resources?

Mr. PERRY. The short answer is, yes, sir, I do think that that office and the whole of EERE and what they do—and as a matter of fact, in March, we announced the largest-ever solar funding opportunity. It was $130 million in new research to advanced early-stage solar technologies.

Speaking specifically to this line item that you make reference to, the Solar Energy Technologies Office, we had a FOA reissue and it went through the process. And on the 25th of March, we announced, I think, $36 million worth of projects there.

So, there are two things that I would like to just lay out for your consideration. One is you have made reference to, and you are absolutely correct, the historic progress and the historic winds, if you will, that EERE has had historically. And now, we are seeing the industry, both solar and wind, become substantially more mature and be able to stand on its own two feet, so to speak, and not be

requiring the amounts of dollars that we had historically. So, I hope there is some recognition about the shifting of dollars has been because of the maturing of the wind and the solar energy.

As a matter of fact, since 2016, since this administration has come into office, there has been a 90 percent increase in the growth of the solar——

Mr. SARBANES. Let me just interrupt because I have got 5 seconds. I understand your argument about it matures and maybe the investment doesn't have to be at the same levels. But I think if you maintain that investment, you will keep us on the cutting edge. We will be more competitive compared with our peers around the world than if we start to pull back from that investment. So, I hope you will reconsider this as we move forward.

And I yield back.

Mr. RUSH. The Chair now recognizes the gentleman from West Virginia, Mr. McKinley, for 5 minutes.

Mr. MCKINLEY. Thank you, Mr. Chairman.

And, Mr. Secretary, welcome again back to this, and thank you.

There are several things I would like to run past you a little bit. I liked your opening film clip about energy independence in the new era. Can you give us a perspective, however, of what is happening in New England? Because I don't know that we can suggest, or should be offering, that New England is energy-independent. Especially last year in Boston Harbor there was an LNG tanker from Russia providing LNG gas to New England, and the fact that other New England States and across the country were importing 73 terawatt hours of electricity from Canada. That, in and of itself, doing some rough math, represents about 9 percent of the population in this country of America is getting its electricity from Canada. So, could you address a little bit, just briefly, on that? Because I have got two other questions.

Mr. PERRY. Mr. McKinley, I think what you bring up here is really important, and I touched on it a little earlier when I think Mr. Pallone and I were having our discussion. But being able to deliver energy, U.S.-produced energy, to the totality of the United States is really important. What the President talked about in his Executive Order on infrastructure was, I think, spot-on, of focusing on our ability to deliver the energy all across this country. And by and large, that is going to be in the form of natural gas. It is going to be in the form of nuclear energy, and it is going to be in the form of coal-powered energy flowing from, you know——

Mr. MCKINLEY. But we are at the discretion, unfortunately, as we are finding out—that is my second question—of how States are interacting with the 401 permitting process. We have got now four States—New York, Washington, Maryland, and now Oregon—that have stepped in and said they are going to use this Federal permitting process to prevent us from using fossil fuels or crossing fossil fuels in their State. I am just wondering, where is the administration in the pushback about this commerce clause? Is that troubling——

Mr. PERRY. Yes.

Mr. MCKINLEY [continuing]. The administration?

Mr. PERRY. Yes, sir, it is. As a matter of fact, the President talked about it yesterday during the Cabinet meeting, Mr. Chair-

man. He brought it up. Sonny Perdue and myself are both former Governors. And I wrote a book about the 10th Amendment. I am kind of on the record of being a pretty strong proponent of States being able to decide what is in their best interest.

With that said, I think it does beg the question, is it in America's national security for a State to block a pipeline that is going to have an impact from a national security standpoint? At that particular point in time, I think both the Commerce Clause and the national security of this country trumps a State being able to stop a pipeline going across, for whatever reason that might be.

And not even to mention what it is doing to the citizens of the Northeast from the standpoint, when they are having to pay 60 percent more for energy, when the emissions are going up because they are having to use fuel oil instead of natural gas, I mean, not only are they affecting the environment in a very negative way, their citizens are having to pay more expensive energy.

So, this isn't just about this issue of is it OK for the Governor of New York to stop a pipeline going across the State. The citizens of New York need to be engaged in this conversation as well about the cost of their energy. And then, all of the people of the Northeast need to be talking about here is what you are doing to our environment because you choose to block a natural gas pipeline going across your State.

Mr. MCKINLEY. Thank you. So, I am hoping the administration gets active in joining other States that are trying to fight back against this. I know we have got the Crow Tribe in Montana is trying to ship gas or coal across, export it, and they are being blocked.

But let me close in the 10 seconds I have on, can you give us an update of what is going on with the status of petrochemical complex in the Appalachia?

Mr. PERRY. Sure.

Mr. MCKINLEY. I know the President has called for a study to see if that is not something for energy independence——

Mr. RUSH. The gentleman's——

Mr. PERRY. It is going forward.

Mr. RUSH. Thank you, Mr. Secretary.

Mr. MCKINLEY. Thank you.

Mr. RUSH. Let me remind Members, please be succinct with your questions. We have 18 Members who have not asked questions, and we have a hard conclusion at 12:30.

Mr. PERRY. Yes, sir.

Mr. RUSH. So, please.

The Chair now recognizes Mr. McNerney for 5 minutes.

Mr. MCNERNEY. I thank the chairman.

I thank Secretary Perry for coming here this morning. I appreciate your diligence in running the Department and, also, your passion about traumatic brain injury. I hope we get to work together on that issue.

Mr. PERRY. Yes, sir, absolutely, we will, sir.

Mr. MCNERNEY. Well, I am sure you can know that I am not thrilled about the Department of Energy's proposed budget. A 10 percent reduction in environmental management, an 8 percent reduction in the Office of Science, 86 percent reduction in energy efficiency and renewable energy. My gosh, a complete elimination of

RPE. None of these are acceptable, and Congress will create its own budget that looks a lot more like last year's. I am sure you are aware of that.

So, tell me, how committed is the Department of Energy, and how committed are you, to reducing carbon emissions?

Mr. PERRY. I think our record, I will stand on our record, sir. Not only did I bring to the agency, as my work as the Governor of Texas, the State that was reducing emissions as much as any State in the Nation, but this country is doing it as well. So, we have got a great story to tell about our emissions reduction. I think we can help the world by selling them American LNG and by getting our products, not only our natural resources, but also our technology and our innovation——

Mr. MCNERNEY. Well, I mean, LNG sounds good, but LNG has fugitive emissions, both at the wellhead and throughout the system.

Mr. PERRY. Yes, sir.

Mr. MCNERNEY. Emissions of natural gas are worse by a factor of 20 maybe than carbon. So, we have a lot of cleaning up to do. We are not there where we need to be, and I am sure you understand that.

Let me ask you a question about cyber. I have introduced two cyber bills on grid security with my friend, Bob Latta. And that will promote a partnership with industry to mitigate physical and cyber risks. So, how did the CESER office learn about the March 5th denial-of-service attack on the SCADA system? That affected Western States. And when did they notify the utilities to be more watchful?

Mr. PERRY. Well, we were in contact with the utilities. And I will suggest to you we have very timely—I can't tell you time and hour at this particular point in time. I can get that to you as best I can. But we not only facilitated contact with the Department of Homeland Security and their hunt and incident response teams and the FBI——

Mr. MCNERNEY. So, is that how you learned about the attack? How did you learn about the attack? How did the Department of Energy learn about the——

Mr. PERRY. Our Emergency Management Office was contacted.

Mr. MCNERNEY. Well, it is clear that we should work with industry, government and industry, to create public-private partnerships to make the utilities more secure.

And in a desire to move on, as I mentioned, the budget would cut the Renewable Power Office by 86 percent. That is disappointing to me personally since I spent a career developing renewable energy. Specifically, however, the budget intends on ending the origination of new loans in the Loan Program Office. However, Congress has been repeatedly funding this office at over $20 million a year. Has the office continues to process loan applications and do due diligence on the applications, as Congress intended?

Mr. PERRY. Yes.

Mr. MCNERNEY. Good. I am glad to hear that. Thank you.

Mr. PERRY. Succinct.

Mr. MCNERNEY. We are following the chairman's——

Mr. PERRY. We are making progress, Mr. Chairman.

[Laughter.]

Mr. MCNERNEY. Thank you.

Nuclear waste, I have been a strong voice in dealing with nuclear waste. We have nuclear waste, a lot of nuclear waste, around the country sitting in poorly secured sites. Any solution, however, absolutely must work with nearby communities, which we have seen fail in the past. However, on October 10th, 2018, the DOE issued a public notice about the way it interprets the words "high-level nuclear waste". If this were suddenly reinterpreted or reclassified, then the DOE could dispose of it in less secure sites. Can you tell us how much high-level radioactive waste the Department is considering reclassifying?

Mr. PERRY. Mr. McNerney, here I think what is really important for us to have a conversation about and be very open, this issue is about identifying not where waste comes from, whether it is from a weapons program or whether it is from a civil nuclear program. And that is how we decide where this waste goes at this particular point in time. I think it makes abundant good sense for us to identify this waste by its radioactivity levels rather than where it comes from. And that is what we are talking about doing, is being able to put waste where it needs to be, based on its radioactivity and the strength of that radioactivity, rather than where it came from. And that is what we are trying to decide.

Mr. RUSH. Thank you, Mr. Secretary.

Mr. MCNERNEY. I yield back.

Mr. RUSH. The Chair now recognizes the gentleman from Illinois for 5 minutes.

Mr. KINZINGER. Thank you, Mr. Chairman.

And, Mr. Secretary, thank you again for being here.

I am concerned about the news this week that our European and NATO ally, Romania, is now seriously considering doing business with a Chinese state-owned enterprise, China General Nuclear Power Group. Just this week, the Romanians signed a preliminary agreement with the Chinese to refurbish and build multibillion-dollar nuclear reactors in Romania. We have American companies vying for the project that have been shut out by the Romanian government because of this growing Chinese influence in Bucharest. To make matters worse, these two new Romanian nuclear reactors near the Black Sea sit merely 30 miles from Camp MK, where we have boots on the ground. Mr. Secretary, from a national security standpoint, do you have concerns with the Chinese investment in the energy infrastructure of our NATO allies such as Romania?

Mr. PERRY. Yes.

Mr. KINZINGER. Luckily, the agreement between Romania and China is not yet finalized. So, how can we engage with our partners in Romania to ensure that the bidding process for these projects is fair and transparent?

Mr. PERRY. We are headed back over in that part of the world the first week of June. I was just back from Brussels, meeting with the Deputy Prime Minister of Romania this last week. We are in active engagement with our allies and our friends in the European theater on the U.S. engagement on civil nuclear projects. It is incredibly important for the future of the U.S. civil nuclear industry to be engaged there, to be partners with them, to develop the new

technologies. Because if we don't, then at some point in time—and the challenges that we face in America today are pretty abundant and pretty clear, when we have only got one project that is ongoing today building a new reactor. It is why small modular reactors and the work that we are doing on funding those small modular reactors is so important going forward. So, yes, sir.

Mr. KINZINGER. Excellent. Thank you.

And this question, you can take as much time as I have left to answer it. But the U.S. is now predicted to be a net energy exporter, as you have well noted. That is a stunning turnaround from about 15 years ago, when we thought our own resources were dwindling and we would be forever reliant on foreign energy.

U.S. sanctions on Iran's oil export, which come into full force this November, would not have been possible were it not for the shale boom in the U.S. I understand that you have been actively engaged with your counterparts in the world's major oil-supplying nations, and that you have expressed confidence that we can offset any potential disruptions in supply. How has America's energy abundance strengthened our hand diplomatically as we deal with global threats such as Iran? And you could even add maybe Venezuela into that.

Mr. PERRY. I think most of us, even in this room, don't understand the leverage that the United States now has. When I talked to, for instance, our European allies in the EU last week, they understand, maybe better than we do, the leverage that Russia has over those countries. One of the reasons that the Russians fight our LNG coming into Europe is so that they can be the dominant source of energy to those countries. And Ukraine will share with you, and other countries as well, that the Russians will cut off your gas supply if it is in their best political interest at any given time.

So, the U.S., our message isn't you have got to buy U.S. gas. Ours is there needs to be a diversity of supply, a diversity of routes, and a diversity of suppliers.

Mr. KINZINGER. And let me just say, you know, kind of piggybacking on that, I want to thank you for your leadership with the European allies at the Three Seas Initiative Business Forum in Bucharest in September. I appreciate the Department's recent creation of the Partnership for Transatlantic Energy Cooperation.

Mr. PERRY. Thank you.

Mr. KINZINGER. I would like to just mention, in short, a bill that we passed out of the House, the European Energy Security and Diversification Act. In short, it would help both U.S. as well as European and Eurasian countries attain energy security diversification and improve supply routes and energy infrastructure through partnerships. Thankfully, it passed the House in March with overwhelming bipartisan support, and it awaits action in the Senate. If the bill is enacted, I would just ask you to commit to working with Congress and the State Department, and any other relevant agencies, to coordinate a national strategy for European energy diversification.

And, Mr. Secretary, I deeply appreciate your service and your leadership.

And I yield back my still remaining 5 seconds.

Mr. PERRY. Thank you, sir.

Mr. RUSH. The Chair now recognizes the gentleman from New York for 10 minutes.

Mr. TONKO. Thank you, Mr. Chairman.

Mr. RUSH. For 5 minutes.

Mr. TONKO. Thank you, Mr. Chairman.

Secretary Perry, thank you for being here. I appreciate the work you are doing at the agency, although, like many of my colleagues, I do have concerns about the President's budget.

Mr. Secretary, you have made a point to visit all of our national labs. And from a New York perspective, focusing on Brookhaven, I can say the research being done is truly cutting-edge.

In recent months, we have been having a good, bipartisan dialog about how energy innovation can play a role in our Nation's clean energy transition and contribute to greenhouse gas emissions reductions. In the past, you have testified that spurring innovation is a part of DOE's core mission. Do you believe that DOE must continue to play an important role in funding RD&D——

Mr. PERRY. Yes, sir.

Mr. TONKO [continuing]. To support the United States' private sector in making innovative energy breakthroughs?

Mr. PERRY. Yes, sir.

Mr. TONKO. Well, we all agree that innovation can unlock tremendous opportunities, including creating jobs, empowering consumers, lowering energy costs, and reducing pollution. But, in many cases, when we talk about innovation, we mean breakthroughs in less proven technologies. This requires riskier investments, and DOE can play an important role in shaping that risk. We should also accept that not all research projects are going to work out. When it comes to research failure, it is often a down payment on success.

So, Mr. Secretary, setting aside the President's budget request, do you believe that it is a good thing for DOE to make investments in riskier, emerging technologies and processes; for example, the type of work done by ARPA–E?

Mr. PERRY. Yes, sir.

Mr. TONKO. ARPA–E is really the proven model for incubating innovation. I want to provide one example where I believe these investments are essential. Last year, ARPA–E initiated the DAYS project, which is focused on long-duration energy storage. In my mind, technology development and cost reductions in storage, particularly long duration, are absolutely necessary for us to achieve ambitious clean energy goals. Mr. Secretary, do you believe ARPA–E has played a constructive role in identifying energy challenges and helping to find solutions and foster innovation?

Mr. PERRY. Yes, sir, there have been programs that ARPA–E funded that certainly made progress in that direction.

Mr. TONKO. Thank you.

Mr. PERRY. Not all of them.

Mr. TONKO. Thank you.

We have other big challenges just around the corner. Low-emissions industrial products, cleaner fuels for aviation and shipping, battery recycling and disposal, direct air capture technology development. DOE needs to lead the efforts in these areas, and I would

be eager to work with the Department and other Members on these issues.

Now I understand, you know, I heard your exchange with some colleagues about solar technology and the like, but I also want to focus on the role DOE can play in reducing costs to encourage deployment of existing technologies. For example, DOE has identified inconsistent permitting requirements and processes as a significant cost of residential energy installations. The patchwork of permitting requirements across thousands of local jurisdictions causes unnecessary delays and adds administrative costs. This not only increases energy prices for consumers, but also stifles homeowner and business investment in these technologies, such as rooftop solar. Other countries like Germany and Australia have sought ways to streamline permitting. The average cost of a residential solar installation, for example, in Australia is less than half the cost in the United States.

So, Mr. Secretary, DOE and NREL have worked on reducing these permitting costs. Do you believe DOE or another Federal entity can continue to play a role in helping to streamline the permitting process itself for residential energy systems?

Mr. PERRY. Yes, sir.

Mr. TONKO. Can you give us any examples of how they might be able to work with us, the agency itself or others?

Mr. PERRY. Yes, and certainly, I think you all have a role to play in that as well from the standpoint of analyzing where there may be some duplication of effort, where there are some places that we can cut back on the regulatory side without there being a cost. You know, do a cost-benefit analysis of the rules and regulations that Congress puts into place. I think, having been a member of a legislature and having been a chief executive in a State, I can assure you that there is probably a legitimate conversation that can be had about Federal regulations and how those could be streamlined.

The President is focused on that. He has given all of us in his Cabinet a clear directive to look at the regulations that you have where you can reduce the regulation and, obviously, not affect the public safety or the reason that it was put there. If it was a good reason, leave them alone. But, if not, reduce them. So, I think there are some great opportunities of us continuing to make progress on that.

Mr. TONKO. We look forward to working with you and NREl and get the President to believe in climate change.

Mr. RUSH. The Chair now recognizes the gentleman from Ohio, Mr. Johnson, for 5 minutes.

Mr. JOHNSON. Thank you, Mr. Chairman.

And, Mr. Secretary, it is good to see you here today.

Mr. PERRY. Thank you, sir.

Mr. JOHNSON. Several topics to talk with you about. You and I have discussed the emergence of NGL opportunities within the eastern and southeastern Ohio region, a region of the country that has become known as the Shale Crescent. Your Department and others have put out studies showcasing the economic advantages of investing in this region, where companies can build directly on top of the NGL feedstock, which can result in an increase of steady, reliable jobs. Factors like market proximity also make this region an

extremely compelling economic opportunity, as roughly 70 percent of North American polyethylene and 77 percent of North American polypropylene is within a day's drive of this region, my district. These two factors, among others, greatly lower the production cost of ethylene and polyethylene.

So, my question to you is, what else can Congress or DOE do to ensure these opportunities are fully realized? I mean, is there a need to increase our focus on workforce development or ensure smart regulations are in place to encourage the safe development of these opportunities? What else should we be thinking about or looking at?

Mr. PERRY. Yes, certainly that is two of the areas that we should be focused on. But the key here is to put a plan together. There are four States, in particular—your home State, West Virginia, Pennsylvania, and Kentucky—that have extraordinary opportunity to both deliver products to this country that are very important, and the value-added side of that that comes with that, the jobs that get created, using the feedstock that you are actually sitting on top of.

So, this is not one of those where the Government needs to go, well, here is "X" numbers of hundreds of millions of dollars. This is one of those where we need to tell those companies, look, government is going to get out of your way. And I am confident that those four States also have that goal as well. So, you are not at loggerheads with the States in this case. You know, we talked about some challenges with States relative to pipeline transferring across their States. But this one is, we don't have that type of—we are going to be sending Mark Menezes, who is our Under Secretary, in the coming weeks to meet with the States on these.

So, I think what those States need to hear is that the Federal Government is going to be a very good partner. We are going to be not in their way. We are going to remove any hurdles that are there. We have obviously met with the folks in West Virginia already. We will come and work with Ohio and Pennsylvania and Kentucky as well.

I don't think there is a more important project in the U.S. than to see that development of a petrochemical, a duplicative petrochemical industry, because the State of Texas could have a hurricane that could have massive impact on that, not only that region, but also that industry.

Mr. JOHNSON. We certainly agree on that, Mr. Secretary. We have seen studies that indicate that as much as 45 percent of our Nation's natural gas needs will be produced by that Shale Crescent region by 2040. I mean, there are a lot of energy resources there.

Shifting gears just real quick, you and I have also talked about, and your budget funds, a demonstration project that can help ensure we have a domestic enrichment capability for our emerging HALEU needs, as well as a domestic enrichment capability to help meet our national security needs. You and Representative Kinzinger talked about that a few minutes ago.

As you know, Piketon, Ohio has a long tradition of helping the U.S. meet its national security needs by working on these domestic enrichment capabilities. Can you discuss briefly the importance of this project in your budget request?

Mr. PERRY. Yes, sir. To have a stable, growing, small modular reactor industry, advanced reactors, we are going to have a high-assay, low-enriched uranium source. Obviously, at Piketon there is a project there that is working on that. I think the DOE is funding some of that effort there.

Every advanced reactor under development is going to require this. So, having that access to that HALEU is very important. So, the Department intends to contract with Centrus that is in Piketon.

Mr. RUSH. Thank you, Mr. Secretary.

The Chair now recognizes Mr. Loebsack for 5 minutes.

Mr. LOEBSACK. I thank you, Chairman Rush, Ranking Member Upton, for holding this important hearing today.

And thank you, Mr. Secretary, for being here today. Often when you are here, I note that you and I have something in common, and that is all the wind energy that we produce in our respective States. We are doing more every day, and I thank you for supporting that——

Mr. PERRY. Yes, sir.

Mr. LOEBSACK [continuing]. Both in your State and nationwide. It is very, very important.

My home State of Iowa, as you know, leads the Nation in biofuels production. Right now, there is a significant concern in the biofuels community, which includes our corn and soybean farmers, surrounding the drastic increase in the number of so-called small refinery exemptions that have been issued under this administration. And I think we have talked about this briefly before.

As you know, the small refinery waiver process requires that the EPA consult with the Secretary of Energy in the review of exemption petitions. And unfortunately, we still have essentially no transparency regarding this process. So, my first question, Mr. Secretary, is, has the DOE submitted its recommendations to the EPA for the 40 pending small refinery waiver requests for compliance for the year 2018?

Mr. PERRY. Yes, sir. April 26th is the date that we transmitted over to EPA the—I think there were 37 petitions.

Mr. LOEBSACK. Thirty-seven?

Mr. PERRY. Yes, sir.

Mr. LOEBSACK. OK. Thank you. I do appreciate that.

Question two: last month, Administrator Wheeler testified that EPA has taken the advice of DOE on all but one waiver application, contradicting press reports the EPA has disagreed many times in the past with DOE's recommendations. I am talking about historically. Please confirm how many times EPA's decision to grant a waiver request since 2016 has contradicted DOE's recommendation, if you could.

Mr. PERRY. Yes, let me give you the high level here.

Mr. LOEBSACK. Sure.

Mr. PERRY. I will get back with you with a specific number. But we give guidance to EPA after analyzing a small refinery's petition to determine if there is disproportionate economic hardship.

Mr. LOEBSACK. Right.

Mr. PERRY. So, you know, I will get you the specific number of times that we have said yes and they have said no.

Mr. LOEBSACK. And I realize it is supposedly refineries that produce 75,000 barrels, and we have a lot of concerns, obviously, because we think it is much larger refineries that have been granted these exemptions in the past as well. And this is a concern, it is a bipartisan concern that a lot of us have, especially in corn and soybean country. But I would like to request you provide us with a list of refiners that have received the waivers from the EPA in cases where DOE recommended a denial. And thank you for providing that information.

A number of companies that receive waivers are publicly traded, as you know, publicly traded firms that report on the waivers they have received in their SEC filings. Since the information from these companies is disclosed, at least to the SEC, why does the DOE need to treat similar information as confidential business information? Clearly, it is not. Can you answer that question?

Mr. PERRY. Let me get back with you on that.

Mr. LOEBSACK. OK. All right. That would be great, if you would. I would really appreciate it.

The fourth question, on April 12th, EPA released a request for comment on a proposal to make some information regarding small refinery waivers available to the public, some information. However, it appears that EPA has walked back this proposal under pressure from the White House and the oil industry. And, Mr. Secretary, was DOE consulted in the development of this proposal and in the decision to walk back this attempt to provide even a basic level of transparency?

Secretary PERRY. Yes, I am going to share with you that that is an EPA question. That one really is not in my purview.

Mr. LOEBSACK. But we would like you to clarify, if you would, whether DOE was consulted on that? And if you need to look into that further, that is fine.

Mr. PERRY. What I will tell you is that we get asked about the issue of seeing if there is a substantial hardship that these waivers would—that is our role here. I am not sure we get into the area that you have just mentioned, sir.

Mr. LOEBSACK. Well, we are just trying to track down, obviously, and provide as much transparency as possible——

Mr. PERRY. Yes, sir, absolutely.

Mr. LOEBSACK [continuing]. For what happens with these small refinery exemptions. And I know DOE does have a role to play in all of this.

Mr. PERRY. Yes, sir.

Mr. LOEBSACK. So, the transparency issue, we will continue to follow up with you on that.

Just final comments I would like to make. Mr. Chairman, a prolific number of small refinery exemptions issued has undermined the renewable fuels standards, caused significant demand destruction across the biofuel industries, and has hurt our farmers. The EPA, under this administration, has not denied a single waiver request, and the number of refineries applying to be exempted from their obligation continues to increase each year, despite falling RIN prices. It is very frustrating, obviously. I am going to continue to pursue this relationship that you folks have with the EPA on this issue. And I thank you for your testimony.

Mr. PERRY. Sure.

Mr. LOEBSACK. And I yield back, Mr. Chair.

Mr. RUSH. The Chair now recognizes Mr. Bucshon for 5 minutes.

And the Chair would ask the Members, if you could—we have got about seven, eight Members now—if you could quickly to your questions? You don't have to use your entire 5 minutes.

Mr. BUCSHON. Thank you, Mr. Chairman.

I am an "all-of-the-above" energy supporter.

And, Secretary Perry, thank you for being here.

As you know, solar power electricity is growing at a rapid pace. According to the Solar Energy Industries Association, solar has ranked first or second in new electric capacity additions in each of the last 6 years. After reaching 1 million solar panel installations in 2016, 2 million installations are projected to hit in early 2019 and 4 million by 2023.

In Evansville, Indiana, we have two 2-megawatt universal solar projects and an additional 50-megawatt facility scheduled to be in operation by 2020. My point being, there are a lot of solar panels operating in the field today. I understand, with the normal life expectancy between 20 and 30 years for these solar panels, it may not be on the forefront of many people's mind, but I worry about how we will properly recycle and/or dispose of solar panels at the end of their lifecycle. Solar panels, as you probably know, harbor several toxic chemicals, including cadmium compounds, silicon tetrachloride, and lead, which, if not disposed of or recycled properly, can be harmful to the environment and extremely wasteful. As of right now, most solar panels in the United States at the end of their lifecycle are landfilled, unless specified by State law.

Secretary Perry, is the DOE aware of any recycling procedures or guidelines in place today by either the manufacturers or the end-users for when these panels reach the end of their lifecycle?

Mr. PERRY. I am not aware of any at this particular point in time, and I think there is, obviously, some additional research that is going to be required to understand just how these systems are being handled, not only by the owners, but by the waste management operations. If they are going to end up in, whether it is—or however they are going to be. So, I think there are good points you make, sir, and I think the national labs and the private sector, and probably in conjunction with some States as well that have a preponderance of these, finding some public-private partnerships to work together and come up with some solutions.

Mr. BUCSHON. Because my understanding, the Europeans in Europe do have a process that is included in the manufacturing process that also relates to end-of-the-lifecycle disposal of those. And right now, I am working on draft legislation that would ask the Department of Energy, in consultation with EPA, to conduct a study on the environmental impact and analysis of the disposal procedures in place for solar panels at the end of their full cycle. Is that something that you think the DOE might be supportive of?

Mr. PERRY. Yes, sir.

Mr. BUCSHON. Thank you very much. I do think that it is important, when we look at any source of energy, we look at the entire lifecycle of that product. Again, I support an "all-of-the-above" energy approach, but in this particular area this is just one example,

I think, where we are not looking at the entire lifecycle and the overall not only economic, but environmental impact of a way that we generate energy.

With that, Mr. Chairman, I yield back.

Mr. RUSH. The Chair thanks the gentleman.

The Chair now recognizes Mr. Welch for 5 minutes.

Mr. WELCH. Thank you very much.

And thank you, Mr. Secretary.

I want to ask you about energy efficiency. I want to ask you about some impounded money that would help on energy efficiency. First of all, I want to say, it is very dispiriting that we are not making the progress on energy efficiency that both sides know is really good. We can bring down carbon emissions. We can save homeowners and businesses money. And all of the efficiency measures usually require local labor. So, I know as a former Governor, that would be very important to you. And I don't necessarily think it is you. I just don't know what the stall is.

The administration has been consistent in its efforts to strip funding from the ARPA–E program. And the GAO found that the Department of Energy was impounding funds from ARPA–E in 2017. And this is very concerning. The President's budget proposed using $350 million of funding Congress had previously appropriated to help the Office of Energy Efficiency and Renewable Energy in FY 2020. And I know that the Department has authority to carry over funds between fiscal years to support research efforts, and I understand funding delays can happen, but it is starting to appear that this is much more like an impoundment. Can you address that and tell us how we are going to get that money in the pipeline? That has been appropriated. Go ahead, Mr. Secretary.

Mr. PERRY. Yes, sir. I just wanted to make sure—you used the term "impounded" some dollars, and I want to, just for the committee——

Mr. WELCH. No, it is looking that way to me.

Mr. PERRY. Yes, sir.

Mr. WELCH. All right? At a certain point, it goes from repurposing to——

Mr. PERRY. You are interested in the results——

Mr. WELCH. Exactly.

Mr. PERRY [continuing]. Whether you use the word "impoundment," or whatever.

Mr. WELCH. That is exactly right.

Mr. PERRY. And I just want to share with you, from my perspective, when we came in, you know, I obviously, a new administration, new to the job, and I wanted to take a look at these programs. And that is one of the reasons these dollars didn't flow. I will take full responsibility. It was me getting up-to-speed on these programs, knowing where these dollars were going to be spent. With that said, they now have been released and gone forward.

Mr. WELCH. Well, I would like to see what those projects are because my understanding is that money is not getting out the door. Whether it is going to Mr. Bucshon's district or my district——

Mr. PERRY. Yes, sir.

Mr. WELCH [continuing]. That is all intended to try to make progress——

Mr. PERRY. Yes, sir.

Mr. WELCH [continuing]. On energy efficiency.

Let me ask you about the appliance standards. There is always debate about that, and there are some improvements in the appliance standard program that can be made. Mr. Latta and I have been working to try to do that.

But the bottom line here is these efficiency standards where you set a requirement that all manufacturers have to meet have saved homeowners and businesses a lot of money. In fact, because there has been no action on these standards, like the lightbulb standards——

Mr. PERRY. Yes, sir.

Mr. WELCH [continuing]. Individual States like Vermont, and now other States, are adopting the Federal standard and getting the benefit of that. But there is obviously an advantage all around if this is Federal. Can you tell me what you are doing about these efficiency standards?

Mr. PERRY. Yes, sir. And here is what I would ask you, Mr. Welch. One of the things that I found when I got to the agency and we were looking at this specific was that I think that the statute needs to be revisited. I think there are some cumbersomeness that has been put into place. I think there are some hurdles in place.

Mr. WELCH. Right.

Mr. PERRY. And I told somebody, I said, listen, the way this thing is written, because you can never back up a standard, is that I think there is more time being taken than needs to be taken on this because we are more interested in getting it right than we are getting it fast.

Mr. WELCH. All right. Let me just make a suggestion. I am always open to improving the standard. OK? And I would be willing to work with my colleagues and with you——

Mr. PERRY. Let's do this.

Mr. WELCH [continuing]. But the standards have made a difference. You know, there are about 2.7 billion lightbulb sockets where, if we use those, it is going to save homeowners about 100 bucks a year. That is real money in Vermont, and I know it is for some of your folks in Texas.

Mr. PERRY. Yes, sir. Let's work on this together.

Mr. WELCH. But let's not kill any notion of standards because we can make progress there.

Mr. PERRY. Yes, sir.

Mr. WELCH. And then, finally——

Mr. PERRY. I don't think that is what—that is certainly not my intention.

Mr. WELCH. All right. Well, I am going to follow up with your office.

Mr. PERRY. Yes, fir.

Mr. WELCH. Finally, the DOE loan program, there is about $5 billion in that. That actually gets out and works well. So, let's get it out the door.

Thank you, Mr. Chairman.

Mr. PERRY. Yes, sir.

Mr. WELCH. I yield back.

Mr. RUSH. The Chair now recognizes the gentleman from Texas, Mr. Flores, for 5 minutes.

Mr. FLORES. Thank you, Chairman Rush and Leader Upton, for hosting today's meeting.

Howdy, Secretary Perry. It is great to have you in front of the committee again, and it is also great to have a fellow Texan leading the Department of Energy, a State that has done more than any other to reduce emissions, at the same time becoming a leader in energy production for this country. That has done two things. It has made the U.S. a net energy exporter over time, and, also, we are part of the overall emissions reductions in the United States, which leads the world in emissions reduction among industrialized countries.

So, three quick things. The first one has to do with nuclear energy. You talked about the impact of small modular reactors, microreactors, and advanced nuclear reactors when it comes to helping to decarbonize the environment. As you said also, one of the essential elements of that is to have a new fuel, high-assay, low-enriched uranium, to do that. Can you expand on the importance of HALEU to be able to put these reactors into service and, also, the impact it has on decarbonizing the environment?

Mr. PERRY. Sure. Mr. Flores, I think it is really important that we recognize that the project that we are working on in Piketon on the HALEU is the only domestically owned source of HALEU. So, that is one of our reasons to be focused on that.

But these small modular reactors, we truly believe that that is the answer to being able to have a reasonably priced, sustainable civil nuclear program in the United States. So, having that fuel available by a domestically owned company is very important. I mean, without the fueling, then you are wasting your time with all of the other work that you are doing.

So, your question about SMRs, they are linked together. You can't have one without the other. The SMR programs are going to go forward. I have got a lot of faith that America will lead the world in nuclear power. And when we do that, we will be able to sell this innovation to the rest of the world and be able to get old, inefficient greenhouse, massive-producing power supplies out of the world's fleet out there and doing our part not just for the United States, but for the entire world from the standpoint of emissions reduction.

Mr. FLORES. Mr. McNerney and I introduced legislation in the House that actually passed the House unanimously last year to help create that structure for HALEU, and I am hoping that we can do that again and, also, get it to the Senate; get it to the President's desk. Your Department provided good advice to us in terms of the structure of that legislation. So, we hope to get that back on the table before too long.

I would like to talk about another issue to expand on what Mr. Bucshon was talking about in terms of the environmental impact of silicon-based PV panels. That is a concern in terms of the environmental impact at the end of their lives. You don't have to respond to this. This is just a question. People seem to think that lithium batteries are the way to go when it comes to trying to make intermittent sources of electricity, to make them part of a baseload

power supply. Lithium has a variety of environmental issues that are part of it, a part of the end-of-life problems——

Mr. PERRY. Yes.

Mr. FLORES [continuing]. When batteries are disposed of. And so, I would ask your Department, if you would, to be looking at this in the future. It is going to be more of an EPA issue, but the DOE is obviously going to have a seat at the table. So, keep that in mind in your future plans.

Mr. PERRY. EPA has probably has the back end of it. The front of it is come up with innovative ideas and new compounds, so that EPA doesn't have a problem.

Mr. FLORES. Yes, that is a good idea. I like that.

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

Mr. RUSH. The Chair thanks the gentleman.

The Chair now recognizes Mr. Schrader for 5 minutes.

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

And thank you for being here, Mr. Secretary. I apologize—I was in another meeting—for dashing up and down.

I would like to take a little bit of time discussing my favorite topic, the Power Marketing Administrations, specifically the 2020 budget proposal. At page 8 of your testimony, you state, "The budget proposes the sale of the transmission assets of Western Area Power Administration, the Bonneville Power Administration, and the Southwestern Power Administration, and to reform the laws governing how the PMAs establish power rates to require the consideration of market-based incentives, including whether rates are just and reasonable."

This is exactly the same testimony that we had in the 2019 budget. And I think last year, when you came before the committee, we chatted about this a bit. And at the time, you said, "I'm reminded of a Kenny Rogers song when he talked about you need to know when to hold them and when to fold them. Congress has been very clear about the issue. I will be more than happy to carry the message back." So, the obvious question, Mr. Secretary, is, were you able to follow up, take that message back, and was it just not received?

Mr. PERRY. I can't answer whether it was received or not. It was given.

Mr. SCHRADER. All right. Well, I appreciate that, and I am going to give you a little more ammunition.

Mr. PERRY. But I will go on the record one more time in saying that I suspect that the outcome is going to be the same this time as it was in 2018 and 2017.

Mr. SCHRADER. Congress does have the ability to dispose of what the taxpayers' use of our——

Mr. PERRY. I know how to salute, sir.

Mr. SCHRADER. Well, let me help you a little bit here. Nine members of this committee, including my fellow Northwest colleagues, Mrs. McMorris Rodgers and Ranking Member Walden, have asked our colleagues in the administration to please reject this misguided proposal. As a Member in the Northwest, I remain concerned about the administration's continued insistence on this.

It seems ill-advised for several reasons. It is a nonprofit Federal wholesale utility and power marketer. It receives no congressional appropriations. It doesn't cost the taxpayer. It must recover its costs with revenues that it earns from selling wholesale power and its transmission services.

BPA provides approximately half the electricity used in the Pacific Northwest, operates three-quarters of our high-voltage transmission grid. Selling these assets would just fragment the grid, cause national security issues. Requiring BPA to sell at market rates would essentially be the death knell of BPA. The whole goal here is to have low-cost energy, low-cost opportunity for our municipalities as well as our industry partners. They sell the power at cost. That is an advantage economically to individuals and to businesses in the Pacific Northwest.

We have had some problems with natural gas. Certainly, it is competitive, putting pressure on BPA, the Bonneville Power Administration. And we also have increased costs with mandated spill to take care of the fish and wildlife mitigation out there. Fully a third of our electric bill goes for fish mitigation. Without BPA, the Federal Government would be having to pick up those costs.

And frankly, at this point in time, it is really exciting. The Bonneville Power Administration has entered into this historic agreement with fish groups, industry groups, municipalities, to share the Columbia River in a way that allows for increased marketing opportunities to our neighbors to the south that require a lot of energy during different times of the day, during different times of the year. And you get a lot of fish passage that heretofore has been a problem with the dams in the river. So, it is an historic opportunity to get us out of the courts and into the power generation business and into the fish passage business, where all boats rise at the same level.

So, I would just ask us to ask you to do the easiest thing in the world. Just leave us alone at the end of the day, sir.

Mr. PERRY. Yes, sir.

Mr. SCHRADER. And with that, I yield back, Mr. Chair.

Mr. PERRY. Mr. Schrader, could I just share with you one thing? We just left Oak Ridge, and I would like to bring to your office and show you some technology there on new turbines for hydro that they are working on at our national labs, in conjunction with the private sector.

Mr. SCHRADER. All right.

Mr. PERRY. So, I would like to bring those to you.

Mr. SCHRADER. Excellent.

Mr. RUSH. The Chair now recognizes the gentleman from Michigan, Mr. Walberg, for 5 minutes.

Mr. WALBERG. Thank you, Mr. Chairman.

And thank you, Secretary, for being here, and I appreciate your work.

I appreciate very much the increased dollars that have been put in for CESER. I think it is an important function, as we are considering this week in the House potentially a supplemental disaster funding package, and potentially more hurricanes coming in the season that we can expect. How important is it that DOE have the resources to proactively plan for and deploy resources to respond

to emergency situations in carrying out this mission as the sector-specific agency for the energy sector?

Mr. PERRY. Yes, very important, sir. I mean, obviously, this is one where the game never stops getting played, where the bar is moved higher. Every time we come up with a patch or a way to deflect those that would do nefarious deeds to our national security through our electrical grid, they come up with a new way to attack it. So, it is a never-ending—this is just as important as what the DoD does on keeping this country safe through the work that they do.

Mr. WALBERG. I appreciate that. And representing the energy district for Michigan on the banks of Lake Erie with nuclear and all of the rest, we appreciate knowing that.

Would DOE be better positioned to carry out these functions in the long term if the Assistant Secretary position responsible for the functions were made permanent in your organization?

Mr. PERRY. Yes, sir, I think so.

Mr. WALBERG. Then, let me cut to the chase and ask if you would commit to working with Chairman Rush and myself on our important legislation to elevate and ensure that these critical functions will continue to be led by an Assistant Secretary.

Mr. PERRY. In the appropriate way for me to participate, yes, sir.

Mr. WALBERG. I appreciate that.

I yield back.

Mr. RUSH. The Chair thanks the gentleman.

The Chair now recognizes the gentlelady from Arizona, Ms. O'Halleran, for 5 minutes. No, no, I am sorry. The gentleman from Arizona, Mr. O'Halleran, for 5 minutes.

Mr. O'HALLERAN. Thank you, Mr. Chairman.

Thank you, Secretary Perry, for appearing before the committee today to discuss the critical work underway at the Department of Energy to modernize and support our economy.

Americans deserve access to reliable and efficient energy resources, and I firmly believe the U.S. should always strive to lead the world in innovation within the energy sector. It is no secret that solar energy technologies are rapidly advancing. It is also no secret that Arizona leads the Nation in total days of sunshine per year. With the abundance of sun my State has to offer, we are at the forefront of the energy transition, and I am looking forward to working on legislation that advances resilient, grid-scale storage technologies.

According to the Department's 2020 budget request, energy storage can effectively buffer increased variable supply and demand in our electric grids. While the Department has invested significantly in research for grid-scale storage technology, how will the proposed Advanced Energy Storage Initiative supplement other research across the Department also related to energy storage?

Mr. PERRY. Mr. O'Halleran, less than 90 days ago, we were outside of Phoenix, or Tucson, at a facility visiting that solar-top-generated power that was going into the batteries, I mean, an Arizona Power Service, APS, project out there. So, they are a model for some of the Southwestern States to look at from the standpoint of generation and storage of electrical power.

Mr. O'HALLERAN. Thank you, Secretary.

Beyond research and tax incentives, are there other ways Congress could further help storage technologies become scalable into electric utility markets? Are targeted pilot projects with local communities a possibility?

Mr. PERRY. Yes, sir, well, obviously, the work that is being done at some of our national labs, I totally believe that the holy grail of battery storage will be found in the not-too-distant future, and I will suggest it will be a public-private partnership with a national lab, a DOE national lab, and some private sector partners.

Mr. O'HALLERAN. I would be interested in visiting one of your laboratories also.

While our energy market continues to evolve, I continue to maintain an "all-of-the-above" approach to energy policy. However, I am mindful of the impacts felt in communities when a coal-fired power plant closes. My district is home to the Navajo Generation Station, which is facing hardship. In fact, it is going to be closed. Its closure would simply devastate the Navajo and Hopi Tribes.

Secretary, in terms of helping communities have access to the resources they need for an economic transition of displaced workers in these dire situations, what role can DOE and Congress play? Cuts to the Tribal Energy Loan Guarantee Program are not going to help us.

Mr. PERRY. Yes, sir, I think one of the ways—and this gets back to Chairman Rush's effort on clean energy jobs. The transition, if the decision is made to shut that plant down, I think the focus on the diversity of that workforce and being able to bring those individuals into some of the clean energy jobs is one of the alternatives that we can do, too.

And the other side of it is that, hopefully, the innovation that you are going to see out of, again, DOE labs dealing with the usage of coal, and the technologies that come of that, can keep that plant going and be able to be a source of energy and a source of innovation for the country.

Mr. O'HALLERAN. It will be interesting to see what those programs look like——

Mr. PERRY. Yes, sir.

Mr. O'HALLERAN [continuing]. Since the plants are scheduled for closure across the entire Western United States fairly quickly——

Mr. PERRY. Yes.

Mr. O'HALLERAN [continuing]. Within the next 10 years.

Mr. PERRY. Yes.

Mr. O'HALLERAN. Thank you, Secretary, for providing your insight into these critical issues facing the energy sector. As a member of this committee, we will continue to work on ensuring the Department continues to advance American leadership in energy policy. And I look forward to trying to understand the entire Department's focus on renewables and the ability to address the considerable impact climate change has in our society.

Mr. PERRY. Yes, sir.

Mr. O'HALLERAN. And thank you, Secretary.

Mr. PERRY. Thank you, sir.

Mr. RUSH. Mr. Secretary, I know you have a hard stop. I know you have a hard stop this morning at 12:30. We have three more

Members. Can you indulge us? If they will be brief, can you indulge us?

Mr. PERRY. And I will be brief, too, sir.

Mr. RUSH. All right.

Mr. PERRY. I promise.

Mr. RUSH. The Chair now recognizes Mr. Duncan.

Mr. DUNCAN. Thank you.

Thank you, Secretary Perry, for being here, and thank you for taking some extra time. I know you had a hard break.

Back in March of this year, President Trump released an Executive Order on coordinating national resilience to electromagnetic pulses. A key component of the President's strategy is enhancing grid resiliency and hardening, which you mentioned in your testimony, and I couldn't agree more. Securing our Nation's electric grid infrastructure is vital to our Nation.

But, down in Charleston, South Carolina, Clemson University—go Tigers—and private partners like Duke Energy have established the eGRID facility. It is providing a platform for innovating and validating and testing multimegawatt electrical grid components and real grid conditions without the risk to the wider grid. This capability is needed to facilitate the rapid introduction of new technologies in our grid system. There is no other facility in the country with the capabilities of the Clemson-Duke Energy eGRID, and the project is way ahead of anyone else in the Nation.

I believe grid resiliency is critical to our national security, but I am also a fiscal conservative and I don't believe we should duplicate tax dollars and spending. The obvious choice for completion of the testbed is at the eGRID facility in Charleston, in conjunction with Clemson University. It is the most efficient and effective use of taxpayer dollars.

Secretary Perry, are you familiar with the work being done at that facility?

Mr. PERRY. Yes. This North American Energy Reliability and Resiliency Model, I think it is a $30,000 program that I am looking at here—excuse me—$30 million. I missed it by a few zeroes there.

Mr. DUNCAN. Have you visited that facility?

Mr. PERRY. No, sir, but——

Mr. DUNCAN. I know it is Clemson University and I know of Texas A&M, but I want to invite you to come.

Mr. PERRY. Texas A&M is playing Clemson this fall. So that seems like it might be a good time for me to come visit. What do you think, sir?

[Laughter.]

Mr. DUNCAN. I look forward to hosting you in South Carolina and, hopefully, down in Charleston for that.

Mr. PERRY. I have been there before. I hope the outcome is different than it was the last time we were there.

Mr. DUNCAN. Right.

Mr. PERRY. I am speaking from a Texas A&M perspective, of course, sir.

[Laughter.]

Mr. DUNCAN. Let me shift gears because I want you to come down to Charleston, and we are going to make that happen, because it is important for our Nation. The threat of natural or man-

made EMPs, and just where our grid system, this is a vital component. There is also a drivetrain facility, which you will see, testing all of the wind turbines for all the dynamics that the wind can put on those. It is a neat facility. I was down there Tuesday. And you will find it fascinating, and you will understand how important that is to the Nation, just like H Canyon is at Savannah River Site.

And I think you visited the Savannah River Site. H Canyon is a chemical separation facility. It is vital to pit production.

Mr. PERRY. Yes, sir.

Mr. DUNCAN. New missions at the Savannah River Site that I know you support, the transition from MOX over to pit production is important. You have mentioned that. I want to tell you, I stand with you on that for the folks down at the Savannah River Site.

In the interest of time, I just want to mention one last thing. It is something you and I agree with. A national solution to a national problem, and that is Yucca Mountain. A hundred and twenty-one sites around this country currently hold commercial spent fuel. We also have defense waste sitting at places like Savannah River and Hanford. Yucca Mountain is the law of the land, and I support the Nuclear Waste Policy Amendments Act. And I know you do as well. I look forward to working with you and John Shimkus and others to get Yucca Mountain back on track.

And I want to give you an opportunity to comment on either Yucca Mountain, or anything you would like to, for this last couple of seconds.

Mr. PERRY. Yes, sir. We have spent $8 billion on Yucca Mountain. We spend $2 million a day keeping it right here. That is the plan right now. And I don't think that is what Americans want to see. I think they want to have a permanent repository. The law of the land, you are correct, is Yucca, but we can't get an answer on whether Yucca is the right place or some other place is the proper disposal site unless we have the permitting process going forward. So, we can stand up in front of Americans and say we have found a solution to this $2-million-a-day problem that we got, but also here is our solution to it; here are the sites that we need to look at. And we can't do that unless the permitting process at NRC goes forward and DOE.

Mr. DUNCAN. I will just remind this committee that ratepayers paid for the construction and operation fees for Yucca Mountain. In South Carolina, that has amounted to $1.3 billion—not tax dollars, ratepayer dollars. And it is the same way in all the States. There is nuclear waste is sitting on the shores of Lake Erie in Ohio, sitting on the shores of Lake Keowee in South Carolina, and other places that we don't want to see anything negative happening. Yucca Mountain is a national solution to a national problem and something we need to support the Secretary on and get Yucca Mountain back, because, as he said, and I have said, it is the law of the land.

And with that, Mr. Chairman, I yield back.

Mr. RUSH. The Chair now recognizes the gentlelady from California, Ms. Barragán, for 5 minutes.

Ms. BARRAGÁN. Thank you, Mr. Chairman.

Secretary Perry, in 2017, the Department of Energy finalized and published a comprehensive policy to incorporate environmental jus-

tice into the decisionmaking process at the Department. Secretary Perry, do you know what environmental justice means?

Mr. PERRY. I can tell you what it means to me.

Ms. BARRAGÁN. What does it mean to you?

Mr. PERRY. Environmental justice to me is being able to pay an electrical rate that I can afford and at the same time knowing that the emissions are not going up because of a decision that is made. I see environmental justice being attacked every day when the folks in the Northeast have to pay an exorbitant amount of money for the cost and the emissions are going up. To me, that would be a——

Ms. BARRAGÁN. Mr. Secretary, let——

Mr. PERRY [continuing]. Social and an economic injustice.

Ms. BARRAGÁN. OK. Mr. Secretary, I represent a district that is a majority minority. It is 88 percent Latino, African-American. They disproportionately have the burden of injustices that are happening from air pollution, from the lack of efficiency, not investing enough in energy efficiency. But let me tell you, your own report here says the Department of Energy defines environmental justice as, quote, "the fair treatment and meaningful involvement of all people with respect to development, implementation, and enforcement of environmental laws, regulations, and policies". That is directly from this report here from your Department, and your photo is right in the front here.

So, what progress has your Department made in achieving these goals in the 2 years since it was published?

Mr. PERRY. I would suggest we are making progress.

Ms. BARRAGÁN. OK, well, you know, that is not a very specific answer. I would like to know what specific progress you are making. Just to help remind you of the goals here, goal No. 1 says to fully implement Executive Order 12898, the "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations". Goal No. 3 says, "to minimize climate change impacts on vulnerable populations". Many of those populations are just like my district, low-income, communities of color.

And I would like, if you could, please, to make sure that you follow up with me on what progress your Department has made. Unfortunately, your answer just that you are making progress doesn't help us know what it is you are working on.

Mr. PERRY. Well, can I expand then? I am just trying to follow the chairman's lead and be as concise as I can be.

When you look at what the United States is doing from the standpoint of reducing emissions, I think that goes right to the heart of what you are talking about. That goes right to the heart of, if your constituents care about the emissions going down, the United States and what we are doing with liquefied natural gas—as a matter of fact, I would think it would make sense to go across the State of California and export that gas off the West Coast somewhere, so they can go and impact the rest of the globe somewhere. So, all of those things collectively I think go to the heart of what you are talking about from the standpoint of environmental justice.

And if we are going to be serious about this, we can't block an emission-reducing fuel like natural gas from going across New York

into the Northeast. You can't block that type of fuel going across your State to keep it from going to somewhere in the world. I mean, you can't, on the one hand, talk about environmental justice, and then, say, "Oh, but we can't send any of this fuel across our state because, for whatever reason, we don't like that particular fuel."

Ms. BARRAGÁN. Mr. Secretary, will you commit to giving me in writing something about what you are doing on environmental justice in your Department, to just supplement what you said here today?

Mr. PERRY. Sure. Absolutely.

Ms. BARRAGÁN. That would be great. I just want to say, look, I know a lot of my colleagues have talked about the cuts to research and development. I am a firm believer that we need to fund, adequately fund, investment in renewable energy programs. Because if we don't, it is going to put the U.S. at a geopolitical disadvantage, considering how aggressively some other nations are phasing out fossil fuels. And I think there is a great tie here to environmental justice, and given time, maybe we can have this conversation another time.

Mr. PERRY. We will do it.

Ms. BARRAGÁN. Thank you, Mr. Secretary.

Mr. PERRY. Thank you.

Mr. RUSH. The Chair now recognizes the gentleman from Virginia, Mr. Griffith.

Mr. GRIFFITH. Thank you very much, Mr. Secretary. I know it has been a long day. I apologize that I have not been here for the entire hearing. I have been upstairs working on trying to figure out ways to lower drug prices in another subcommittee, and that is important as well. You are doing great work. We appreciate you. When you come to testify, it is usually one of my favorite days. So, I really do regret that I have not been able to be here all day.

And I would just have to say that there is a lot of great stuff going on. Now I am concerned about cuts to research. I think there needs to be more money on research, but that needs to be a parity between our fossil fuels and making sure that we are finding the best ways that we can use them. As you know, the rest of the world is not going to stop using fossil fuels, even if we do.

And one of the things that is interesting is, a couple of years ago, you all gave a research grant for trying to separate rare earth minerals from coal.

Mr. PERRY. Yes.

Mr. GRIFFITH. Well, here is what happened. It has just been really exciting, and I have just learned about this in the last couple of weeks. I have been talking about it everywhere I go.

They haven't got that perfected. In fact, Dr. Yoon at Virginia Tech, who I greatly respect, said they weren't ready to go to phase 2; that DOE was working on it. They were hoping you all might go to phase 1.5 on that. But they have licensed that technology to steel mills in India. Why? Because, as a part of their research, they are separating things from coal and they can separate out the dirtier coal from the cleaner coal, the higher-carbon coal. And now, we have got steel plants in India that are going to use that technology to get a higher grade of coal to burn, to make their steel, which

means that they are lowering their carbon footprint because of technology financed, in part, by the Department of Energy at Virginia Tech and other places. And that is progress.

When you say we are making progress, I don't know how you could ever list out everything that you all are doing because, as we work as a nation, both on renewables and on fossil fuels, to make it better, to burn it cleaner, to do more, we are going to find things that benefit the rest of the world as well. And we should be able to export that. I congratulate you on that.

Are there any things that you all can do to help us export those technologies as they come up? Because when we are dealing with climate change and we are talking about CO2 in the atmosphere, we are not talking about just the United States or the State of Virginia.

By the way, thanks for stealing our coach at Virginia Tech, my district, but that is all right, to Texas A&M in basketball.

[Laughter.]

Mr. PERRY. A good man.

Mr. GRIFFITH. He is a good man.

But we can do a lot for the world if we will export American technology——

Mr. PERRY. Yes.

Mr. GRIFFITH [continuing]. To the rest of the world, so they can lower their carbon footprint. Because the Indians are going to burn coal, no matter what. The Sub-Saharan and African nations have plenty of coal. They are going to burn it. What say you?

Mr. PERRY. Absolutely.

Mr. GRIFFITH. And is there anything that you can do to help us export that technology as we come up with it?

Mr. PERRY. It is really interesting, as I was having the discourse previously and we were talking about our European friends who are getting out of the natural gas—or, no, excuse me—they are getting out of the coal. They are going to all renewables, et cetera. And, you know, they criticize us for leaving the Paris Accord.

Yet, what I tell them is, I said, when you all have the reductions in emissions that the United States has, then you can lecture me about getting out of the Paris Accord, but until you do that, please don't. And then, when you close the door, they say, "And by the way, how can we buy some of that LNG?"

So, I mean, they get it, that it is the United States' ability to deliver liquefied natural gas. It is our ability to deliver technology like you are talking about to help lower emissions around the world. That, I will suggest, is the absolute definition of environmental justice.

Mr. GRIFFITH. And you are absolutely right. And as a part of that, we also keep rates low.

Mr. PERRY. We do.

Mr. GRIFFITH. I thank you very much.

And I yield back.

Mr. RUSH. The Chair thanks you, Mr. Secretary, for your participation in today's hearing. And now, Mr. Secretary, I know you have to leave. You really were gracious with your time, and thank you so very much for your participation.

Mr. PERRY. Thank you, Mr. Chairman.

Mr. RUSH. Thank you.

Now the Chair wants to remind Members that, pursuant to committee rules, they have 10 business days to submit additional questions for the record to be answered by the witness who has appeared.

And I ask, Mr. Secretary, if you will respond promptly to any such questions that you may receive.

The Chair has a unanimous consent request to enter into the record the following submissions: a study from the Brookings Institute entitled "Advancing Inclusion Through Clean Energy Jobs," a report by the Solar Energy Industries Association entitled "Diversity Best Practices Guide for the Solar Industry," and an article from the Alliance to Save Energy entitled "Growth in Energy Efficiency Demands Investment in a Highly Skilled Workforce."

Hearing no objection, so ordered.

[The Alliance to Save Energy article appears at the conclusion of the hearing.[1]]

Mr. RUSH. The subcommittee now stands adjourned.

[Whereupon, at 12:49 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

[1] The Brookings Institute study and the Solar Energy Industries Association report as well as a Department of Energy FY 2020 Budget in Brief report have been retained in committee files and also are available at https://docs.house.gov/Committee/Calendar/ByEvent.aspx?EventID=109433.

ALLIANCE TO SAVE ENERGY
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04/29/19 : Ben Evans

Growth in Energy Efficiency Demands Investment in a Highly Skilled Workforce

Photo credit: Marcela Gara, Resource Media

Workforce development gets a lot of attention in the energy sector, and a recent national energy employment report demonstrates why so many people are talking about it – including in Congress.

Overall, the American energy sector employs more than 4 percent of the national workforce and outperformed the economy as a whole when it comes to job growth. The sector added 151,700 jobs in 2018, representing 7 percent of all new hires in the U.S., according to the **U.S. Energy and Employment Report**.

Efficiency Led the Way in 2018

What's remarkable is that roughly half of those new energy jobs came in energy efficiency. And according to the report – which is based on exhaustive survey data from around the country – there is strong demand for more, especially when it comes to energy efficiency.

Energy efficiency employed more than 2.3 million Americans in 2018, the report found, projecting a growth rate of 7.8 percent this year.

In what is both a troubling sign and an enormous opportunity, 84 percent of construction employers in energy efficiency reported that it was somewhat difficult to very difficult to hire new, qualified employees, even with projected growth of more than 8 percent in 2019. Construction represents the largest sector of jobs within energy efficiency, employing more than 1.3 million people.

The report – an incredibly valuable resource compiled by the National Association of State Energy Officials and the Energy Futures Initiative – shows clearly that the market is ready, and investments in energy efficiency continue to grow, but the current labor force cannot meet the demand largely due to a lack of experience, training, and technical skills across applicants.

Progress Toward a "Green Collar" Workforce

What can be done to help train an expanding energy efficiency workforce and prevent future worker shortfalls? Many policymakers are recognizing that training programs could help ensure job growth, though they have not agreed on a solution.

Earlier this month, a U.S. House subcommittee held a hearing focused on a suite of **eight bills** aimed at achieving efficient and cost-effective energy infrastructure, buildings, and homes while supporting investment in a diverse, "green collar" workforce.

One of the featured bills – sponsored by subcommittee chairman Rep. Bobby Rush (D-Ill.) – seeks to prepare a new generation of workers, including in energy efficiency, by creating a nationwide energy workforce development program. The program would invest in improved education and training for energy-related industries, including manufacturing, engineering, construction, and retrofitting jobs. It would focus on underserved groups including women, ethnic and religious minorities, veterans, and unemployed energy workers.

We hope Congress will find a bipartisan path forward on training the next generation of energy efficiency workers. The evidence indicates that if we do, good jobs and economic opportunity will be there, particularly for underserved communities where unemployment is high. And if we don't, the lack of skilled workers will act as a limiter of both economic growth and energy efficiency improvements.

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QUESTIONS FROM THE HONORABLE FRED UPTON (R-MI)

Q1. In this year's budget, the Department launched a "MoonShot" RD&D effort across the Department of Energy's research offices, called the "Advanced Energy Storage Initiative (AESI)." It appears to be a crosscutting initiative with aggressive and achievable goals for cost competitive grid-scale energy storage services. This is great to see, as the Department has historically tackled some of the nation's most complicated energy challenges by aligning the American innovation machine's robust resources and competencies towards an ambitious "goal." These moonshots yielded breakthroughs like hydraulic fracturing, the MRI machine, and more recently 6 cent per kilowatt-hour (kWh) solar to society.

Q1a. These types of goals can accelerate breakthroughs and ensure the efficient use of taxpayer resources. Wouldn't it be beneficial for the Department to launch similar RD&D initiatives for critical technologies like advanced nuclear and carbon capture for coal and gas as well?

A1a. The Department of Energy is well known for launching initiatives like the "MoonShot" which make highly effective use of taxpayer dollars. For example, the Office of Fossil Energy recently launched the Coal FIRST initiative—to develop the coal plant of the future needed to provide secure, stable, and reliable power. The Coal FIRST power plant of the future will have zero or near zero CO2 emissions. The Coal FIRST initiative will make coal-fired power plants in the future more adaptive to the modern electrical grid. The initiative will integrate early-stage R&D on power plant components with currently available technologies into a first-of-a-kind system. Through innovative technologies and advanced approaches to design and manufacturing, the initiative will look beyond today's utility-scale power plant concepts (e.g., base-load units) in ways that integrate with the electrical grid in the United States and internationally. Coal FIRST technologies also aims to increase U.S. exports, create domestic jobs, and support our partners' abroad—reducing energy poverty in Africa and Asia, and providing affordable electricity, and opportunities for economic prosperity, to people worldwide. Many of the technologies developed for Coal FIRST will have applicability for natural gas-fired power plants since they share many of the same technologies and processes. For example, more efficient turbine technologies that are of interest for Coal FIRST could

also have applicability for natural gas plants. Additionally, carbon capture technologies deployed as part of Coal FIRST will also help mature these technologies and could make them available for natural gas-fired facilities with some modifications to adjust for natural gas-fired conditions.

DOE envisions that the future coal fleet may be based on electricity generating units possessing many of the following traits:

- High overall plant efficiency (40%+ HHV or higher at full load, with minimal reductions in efficiency over the required generation range)
- Small (unit sizes of approximately 50 to 350 MW), maximizing the benefits of high-quality, low-cost shop fabrication to minimize field construction costs, and project cycle time
- Near-zero emissions including carbon dioxide
- Capable of high ramp rates and minimum loads commensurate with estimates of renewable market penetration by 2050
- Integration with thermal or other energy storage (e.g., chemical production) to ease intermittency inefficiencies and equipment damage
- Minimized water consumption
- Reduced design, construction, and commissioning schedules from conventional norms by leveraging techniques including but not limited to advanced process engineering and parametric design methods for modular design
- Enhanced maintenance features including technology advances with monitoring and diagnostics to reduce maintenance and minimize forced outages
- Integration with coal upgrading, or other plant value streams (e.g., co-production)
- Capable of natural gas co-firing.

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Q2. I was one of the primary authors of the American Medical Isotope Production Act (AMIPA). AMIPA was intended to help drive conversion from Highly Enriched Uranium (HEU), which the Nuclear Threat Initiative has called "one of the most dangerous materials on the planet," https://www.nti.org/newsroom/news/new-roadmap-minimize-and-eliminate-heu/ to non-HEU in the medical space. Over the last year, we have seen severe disruptions in the supply of non-HEU from overseas reactors which has adversely impacted U.S. patient care. https://www.cardiovascularbusiness.com/topics/cardiovascular-imaging/nuclear-imaging-labs-brace-tc-99m-shortage

Q2a. Would you give us a status report on AMIPA progress, and where we stand with respect to conversion to non-HEU in the medical isotope space and what more Congress and the Administration could be doing to increase use and domestic production of non-HEU?

A2a. The Department is continuing to implement a technology neutral program to support domestic projects for the production of non-HEU-based supplies of molybdenum-99 (Mo-99), as directed in the AMIPA. The program passed a key milestone in November 2018 when one of DOE/NNSA's cooperative agreement partners, NorthStar Medical Radioisotopes, began producing its non-HEU-based Mo-99 for patient use in the United States. Additionally, in Fiscal Year (FY) 2019, DOE/NNSA awarded four new cooperative agreements totaling $60 million in federal funding to NorthStar Medical Radioisotopes (to scale-up its existing project), SHINE Medical Technologies, Niowave, and Northwest Medical Isotopes to further expand non-HEU-based domestic production capacity. These awards were in response to FY 2018 congressional direction to issue a Funding Opportunity Announcement and competitively award new cooperative agreements. Globally, all major Mo-99 producers have converted to using non-HEU targets for Mo-99 production, with the exception of the Institute of Radioelements (IRE) in Belgium. IRE anticipates that they will obtain all the necessary approvals to begin selling non-HEU-based Mo-99 to its U.S. customers in the first quarter of calendar year

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2020. This will initiate IRE's phased conversion process that will result in full LEU-based production by the end of 2022.

Q2b. Would you please include information concerning whether the Department met its goals/directives?

A2b. The Department will meet its goal of supporting the establishment of a reliable domestic supply of Mo-99 without the use of HEU when at least two domestic producers can supply sufficient quantities of Mo-99 to meet U.S. demand. Based upon the estimated schedules of our cooperative agreement partners, U.S. industry should be able to produce sufficient quantities of Mo-99 to meet U.S. demands in 2022/2023.

Q2c. In addition, please report on your preparations and evaluations with the Secretary of Health and Human Services to 2019 concerning joint certification about the ban on the export of highly enriched for purposes of medical isotope production, pursuant to Section 134 (f) of the Atomic Energy Act.

A2c. The Department is working with the U.S. Food & Drug Administration (FDA) to review the market supply of medical radioisotopes, including Mo-99 and iodine-131, to determine if there is a sufficient supply available to satisfy the domestic market. In consultation and coordination with the FDA and the Nuclear Regulatory Commission, the Department is assessing whether there is a sufficient supply of Mo-99 and other medical isotopes produced without the use of HEU available to meet the needs of U.S. patients. The conclusions drawn from the assessment will be used to determine whether the Department of Energy and Department of Health and Human Services will be able to make the joint certifications necessary for the ban on HEU export licenses for medical isotope production to take effect or whether the Department will propose that the period to issue such licenses will be extended for up to six years.

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QUESTIONS FROM THE HONORABLE ROBERT E. LATTA (R-OH)

Q1. I am a supporter of DOE's efficiency standards, but I think we need to be realistic about the challenges and opportunities facing the program. The law originated in the 1970's and 80's. You are doing what you can to improve the standard setting process through a new "process rule" rulemaking, but I believe it is time that Congress modernize the law to reflect the realities of today.

Q1a. What are you doing to improve transparency in the rulemaking process so consumers can be confident that the new products they purchase meet their expectations for quality, convenience, and energy efficiency?

A1a. DOE relies on robust stakeholder input to ensure that affected households and businesses will benefit from any new standards, and that new standards will not reduce product performance or utility. Stakeholders can comment on DOE proposals during the preliminary and proposed rule stage, and can participate in public meetings in person or via webinar. These opportunities to engage are made public through notices in the *Federal Register* and emails to DOE's Appliance and Equipment Standards Listserv, which members of the public can join through DOE's website. The data and expertise that stakeholders provide at these stages inform the Department's rulemaking efforts to evaluate whether a standard will save a significant amount of energy and is economically justified and technically feasible. In addition to public meetings, and open comment periods, DOE allows for ex parte communications by any stakeholder at any point in the rulemaking process. Stakeholders regularly use this process to express concerns to DOE on a variety of rulemaking topics.

To ensure transparency into the analysis it performs, the technical and analytical tools DOE uses to assess the costs and benefits of any potential standard are available for download on the Appliance Standard Program's website. Additionally, to provide further clarity for interested parties, DOE maintains a website of information services on the appliance and equipment standards program.

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Because stakeholder perspectives are such a crucial component of the rulemaking process, the Department is proposing amendments to its Process Rule to enhance opportunities for stakeholder participation and to improve transparency and certainty in its rulemaking process. In looking to improve its process, DOE has requested comment on an early assessment review process of the potential energy savings, technological feasibility, and economic justification of a new or amended standard, which would help minimize the resources DOE and stakeholders spend on rulemakings that do not meet all three of these criteria.

Another proposed change to the 1996 Process Rule requires the Department to finalize test procedures 180 days before proposing a new energy conservation standard. This sequencing of rulemakings is critical to ensure certainty in the rulemaking process and allow manufacturers to gain experience with the new test procedure, evaluate engineering designs, and test products. This process improvement will better enable stakeholders to participate in the standards rulemaking phases by contributing data and helping to assess the impacts of potential standards on product design, product costs, energy use and consumer utility.

Further, DOE's proposed Process Rule would be binding on the Department, further enhancing stakeholder certainty. DOE should be held accountable for complying with its own procedures so that the public will have confidence in the transparency and fairness of DOE's regulatory process.

Q1b. As Congress considers ways to improve the standard setting process, will you commit to working with us and providing technical assistance?

A1b. Yes, the Department will provide technical assistance to Congress's efforts to further improve the department's rulemaking process.

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QUESTIONS FROM THE HONORABLE TIM WALBERG (R-MI)

Q1. As industry and the markets continue to transition to cleaner technology-based solutions, we must also think more holistically about the transition toward electric vehicles and what it means for our environment. While we want to be good stewards of our earth, we must look at the cradle-to-grave impacts of other renewable resources—just like has been done with coal and nuclear resources.

Q1a. Is the Department undertaking any initiatives or early-stage research to understand how advanced batteries—like those in electric vehicles— degrade and could be re-used or recycled?

A1a. The Department of Energy (DOE) is aware of the increasing importance of this area and is currently investigating strategies at every level of the battery material supply chain to reclaim, recycle, and reuse materials for next-generation batteries. In FY 2019, DOE obligated $10M for innovative cathode materials R&D for technology advancement through the Office of Energy Efficiency and Renewable Energy (EERE) **to Reduce, Recycle, and Recover Critical Materials in Lithium-Ion Batteries**.

These efforts focus on material and technology substitutes that reduce or eliminate the need for critical materials and cost-effective recovery of materials through recycling. For the next-generation cathode material research, EERE has made the goal to reduce cobalt, the highest long-term supply chain risk for lithium ion batteries, to less than 5% by weight of the cathode. This work will center on cobalt substitution methods and new exploratory chemistries that are completely cobalt free.

For end of life batteries, EERE has two ongoing initiatives: the Battery Recycling Prize and the ReCell Center. The Lithium Ion Battery Recycling Prize is a competitively-awarded $5.5M initiative from FY 2018 and FY 2019 appropriations, for innovative ideas to collect, store and transport discarded lithium ion batteries to recycling centers. In FY 2019, DOE obligated $5M for the ReCell Center at the National Labs focused on recovery of all materials in end-of-life batteries to decrease barriers to recycling lithium ion batteries and potentially lower the cost of next generation batteries. In addition, the ReCell Center is investigating cost-effective methods to reuse spent electric vehicle (EV) batteries for other applications such as stationary storage.

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Within the ReCell Center there are four major research focus areas: direct recycling, other material recovery, design for recycling, and modeling and analysis.

- Direct Recycling - Focuses on recovery of composite cathode materials to be used in next generation batteries to eliminate the processing of new material based on their elemental components.
- Other Material Recovery - Focuses on recovering all non-cathode components of lithium ion batteries. An expanded set of recoverable products could create a recycling infrastructure that is less reliant on the cathode economics alone and increase the profitability of recycling overall.
- Design for Recycling - Investigates battery designs capable of meeting rigorous performance standards required for EV batteries while also making recycling less onerous.
- Modeling and Analysis - Investigates the feasibility as well as the cost and energy impact of all processing efforts underway.

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QUESTIONS FROM THE HONORABLE RICHARD HUDSON (R-NC)

Q1. I have Fort Bragg in my district, the epicenter of the universe. With the largest military installation in the world in my backyard, I look for every opportunity to support our men and women in uniform both during and after their service. As you know, Congress provided DOE with new energy security authorities and responsibilities under the FAST Act, including a requirement to identify and protect defense critical infrastructure. I understand that DOE's Office of Electricity is underway with several significant new initiatives, including the development of a North American energy model, which will help us identify interdependencies and potential risks.

Q1a. What are some of the major takeaways from your work on defense critical infrastructure, and what concerns you the most about the state of our bulk power grid and electricity generation fleet generally?

A1a. DOE's Office of Electricity (OE) leads the DCEI effort by working with industry, the Department of Defense (DoD), the Department of Homeland Security, and other relevant Federal agencies. OE is currently working with the necessary electric utility stakeholders to analyze the critical transmission path that serves each critical defense facility, while also working with DoD to identify energy resilience solutions on-site. As you are aware, nearly every military installation receives its electricity from the civilian power grid, which has a high degree of reliability. However, the resilience of the grid that serves these critical locations is much more difficult to quantify given the threat landscape and numerous interdependencies on different infrastructures, equipment, and supply chains.

The bulk-power system (BPS), which is the lifeline for every critical infrastructure sector, is complex and interdependent. The damage of one piece of equipment, whether from a cyberattack, physical attack, or natural disaster, can have deleterious, cascading effects across critical infrastructure sectors. One of the major takeaways OE has identified is the lack of awareness of how the BPS has evolved over the last two decades—specifically, the transition in electric generation modalities, which has inadvertently increased both the cyber and physical threat attack surface. I would note that the 2019 World Wide Threat Assessment, authored by former Director of National

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Intelligence, Dan Coats, highlights the persistent cyber threat from nation-state actors on pages 5-6.

OE staff were recently at Fort Bragg with local utility personnel, DoD staff, and Federal Energy Regulatory Commission staff, to identify opportunities for improving the resilience of the base. There are numerous opportunities to improve the overall resilience of Fort Bragg that will be replicable at various other critical defense facilities. We are presently evaluating resilience investments and attempting to identify funding sources for such investments.

Q1b. Could you supply the committee updated information you defense critical infrastructure work, and could we arrange a briefing for myself on this topic, given the Fort Bragg is in my district?

A1b. I would be happy to brief your office and the Committee regarding OE's efforts on DCEI to date, and to describe how we envision the initiative moving forward.

Q2. As the representative Fort Bragg, I am very interested in how we can improve the safety and security of our soldiers in the field and our military installations. As you know, I had an amendment included in the NDAA for DOE to develop guidelines for a pilot program for the deployment of micro reactors at critical DOE and DOD sites. It is my understanding the final report will be ready by August and I look forward to reading it.

Q2a. Can I count on you for providing this committee and myself all the necessary technical assistance we need to put future deployment plans into action?

A2a. The Department believes that microreactors have the potential to address unique energy reliability and resiliency challenges for both defense and commercial applications such as: electricity and process heat supplies for remote and off-grid communities and industrial locations or electricity supplies for disaster and emergency relief operations.

The Department's Office of Nuclear Energy (NE) is actively leveraging its decades of nuclear reactor research and development experience to enable the development of micro reactor technologies. NE remains closely engaged with the Department of Defense (DoD) Office of the Under Secretary of Defense for Acquisition and Sustainment and the

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DoD Strategic Capabilities Office (SCO) to finalize the report on the requirements for a microreactor deployment pilot program as directed in the fiscal year (FY) 2019 National Defense Authorization Act (NDAA). Also, NE is actively coordinating near-term, national laboratory-led, cross-cutting technology development activities that could support future DoD microreactor demonstration and deployment efforts.

The Department continues to provide DoD and U.S. industry the technical expertise and programmatic support of its national laboratories and federal RD&D programs to facilitate the deployment of these innovative technologies.

Q3. Secretary Perry, I know my time is running out. I am a big supporter of DOE's Energy and Manufacturing workforce development initiatives. Could you please follow up with me and this committee on conducting a full audit of all DOE workforce development activities, including a description of the workforce development program or project name, target audience or program focus, funding level, statutory authority, and program status?

A3. Workforce development is a department-wide effort to cultivate a more diverse workforce that is equipped to thrive in the next generation of energy jobs.

Pursuant to Public Law 95-619, the Office of Economic Impact and Diversity (ED) is authorized to implement programs which impact underrepresented minority communities. To this extent, ED's programs are focused on ensuring that minorities can participate fully in the energy sector. For example, ED recently launched the Equity in Energy Initiative. This initiative seeks to expand the participation of underserved communities in the energy workforce such as Native Americans, women, veterans, and formerly incarcerated persons to ensure America's energy independence. In recent months ED has also organized separate Equity in Energy Discussions all around the country for Asian American and Pacific Islander, African American, and Hispanic stakeholders. ED's workforce development activities include the following:

Florida International University (FIU): ED funds the "Mission to Market for Inclusive Economic Development Program" at FIU at a funding level of $260,000/year. The target

audience is undergraduate and graduate students. Program Status: Active.

STEM Scholastic and Research Support for 21st Century Workforce at Morehouse College. Funding Level: $250,000/year. Target Audience: Undergraduate and graduate students. Status: Active.

The Cooperative Development Energy Program at Fort Valley State University: ED has been funding the STEM Careers in Energy Program since 1983. The target audience is 9th grade through graduate school. Funding: $100,000. Program Status: Active.
The Next Generation of Entrepreneurial Managers' Project at the University of Houston and Texas Southern University. Funding: $180,000/year. Target Audience: Undergraduate students. Status: Active.

Building Capacity through Partnerships at Tougaloo College. Funding: $75,000/year. Target Audience: Undergraduate. Status: Active.

Thurgood Marshall College Fund (career development program). Funding: $75,000/year. Target Audience: Undergraduate students. Status: Active.

Additionally, DOE has supported paid STEM internships for minority and female students through the Office of Fossil Energy, paid internship opportunities for community college students at DOE labs through the Office of Science, an online career map to illustrate potential career pathways to the bioeconomy through the Bioenergy Technology Office, free online accredited training courses through the Federal Energy Management Program, established pipelines between DOE labs and minority-serving institutions in STEM disciplines through the National Nuclear Security Administration's Minority Serving Institution Partnership Program (MSIPP), solar energy industry relevant training for active duty military through the Solar Energy Technologies Office's Solar Ready Vets Program, traineeships in advanced manufacturing and composites through our Office of Energy Efficiency and Renewable Energy, the VETS2TECH summit to help veterans fill critical STEM workforce shortages at national labs, and the Wounded Warrior Career

Development Program through Sandia National Lab.

DOE seeks not only to diversify and improve the nation's workforce, but its own workforce as well. DOE's Chief Human Capital Officer (CHCO) is responsible for strategically aligning the agency's workforce to its missions by recruiting, developing, training, and managing a highly skilled, productive, and diverse workforce. With a dual focus on strengthening technical competence while developing the critical leadership skills needed for career advancement, DOE has a wide-range of programs and resources available to help employees achieve their development goals. The Department's robust Learning Management System helps ensure the technical competency of DOE's workforce by providing tools to assess training needs and an expansive catalog of courses to strengthen job-related skills and support upskilling and reskilling.

As further evidence of the Department's commitment to workforce development, an advisor to the Secretary has been hired to work specifically on DOE's role in workforce development for veterans and transitioning active duty service members. A senior advisor was also hired last year to assess future workforce and skills needs of the DOE enterprise.

Moreover, cybersecurity workforce development is a national priority outlined in the President's National Cyber Strategy, and further reinforced by Executive Order 13870, "America's Cybersecurity Workforce." Through DOE's State, local, tribal, and territorial workforce development efforts through organizations like the National Association of State Energy Officials (NASEO), DOE is developing a multifaceted approach including online training, playbooks, workshops, and guidance. This builds capacity throughout the sector and guarantees the state energy officials DOE engages with regularly have the necessary skills and resources needed to prepare for, and respond to, energy disruptions of significance, including cyber emergencies.

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QUESTIONS FROM THE HONORABLE JEFF DUNCAN (R-SC)

Q1. Secretary Perry: First let me "thank you" for including budget dollars for the Advanced Manufacturing Collaborative (AMC) building to be located at the University of South Carolina-Aiken campus in South Carolina. The AMC will not only allow experts in emerging technologies to collaborate with industry, academia and government to improve manufacturing in the Nation but also will assist the DOE complex by accelerating technology development for the cleanup mission. This will be a "game changer" for the local region in my state and certainly a "win/win" for the public private sectors. Do you have a comment or two about the importance of this facility to DOE-EM?

A1. The AMC will remedy a critical portion of the outdated infrastructure of the Savannah River National Laboratory (SRNL). The construction of an approximately 60,000 square foot modern facility will include chemistry laboratories, engineering fabrication laboratories, a high bay, industrial space, and staff offices.

AMC will be a part of SRNL in a collaborative manufacturing approach with industry and academia to include key topics like process intensification, process modeling, smart manufacturing, additive manufacturing, robotics, and virtual reality.

The AMC will enable the SRNL to translate a range of proven, advanced manufacturing technologies from the commercial, chemical, and industrial manufacturing sectors into DOE processes, plans and missions to significantly improve the Office of Environmental Management's (EM) ability to manage risk, improve worker and public safety, reduce costs, and accelerate the cleanup of legacy radioactive waste. The AMC will help to develop the next generation workforce with unique skillsets in chemical processing and manufacturing critical to the successful completion of the EM cleanup mission.

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