

**THE PRESIDENT'S BUDGET REQUEST FOR
THE DEPARTMENT OF ENERGY FOR
FISCAL YEAR 2021**

HEARING
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
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THE PRESIDENT'S BUDGET REQUEST FOR THE DEPARTMENT OF ENERGY FOR FISCAL YEAR 2021

TUESDAY, MARCH 3, 2020

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The Committee met, pursuant to notice, at 9:55 a.m. in Room SD-366, Dirksen Senate Office Building, Hon. Lisa Murkowski, Chairman of the Committee, presiding.

OPENING STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

The CHAIRMAN. Today we will take up the President's Fiscal Year 2021 budget request for the Department of Energy (DOE). Secretary Brouillette, welcome back to the Committee. This is our chance to focus on some of the areas that we, as a Committee, consider to be important priorities here.

As you know, we have an energy bill that is before us on the floor that, as I look to many of the priorities that we have outlined as they relate to innovation and security—cybersecurity, grid security, modernization, workforce—of course, all that happens in the innovation space, you are it. You and your team at DOE will be the men and women that are really helping to move this country forward to that next best step, that paydown on climate change, as Senator Manchin says, but this is really about how we can take the views and visions and translate them through the budget process in your department.

The Department's request focuses on a number of key challenges that cut across the agency, including grid modernization, energy storage and plastics innovation. I am particularly interested in DOE's new critical minerals initiative which will bring the Office of Science and the Applied Energy Offices together to help rebuild a stable, sustainable supply chain in the United States.

I have long sounded the alarm about our nation's dependence on foreign minerals. According to the U.S. Geological Survey (USGS), the U.S. imports more than 50 percent of its supply of 46 different minerals, including 100 percent of 17 of them. If our goal of leading the world on emerging technologies such as energy storage and electric vehicles is to be realized, then that has to change. We can't surrender the front end of the supply chain and hope to somehow recover the rest. I am glad to see the Department utilizing so many of its assets to address this problem.

Now even as I welcome new cross-cutting programs, I am disappointed the President, again, proposes to eliminate or deeply cut funding for innovation-focused programs at DOE. This is where we really need you to lean in, so these reductions are discouraging. For the last three years Congress has rejected the request to eliminate successful programs like ARPA-E and reduced funding for the Office of Energy Efficiency and Renewable Energy. I have not checked with any of my colleagues here this morning, but I can pretty much bet that everyone is going to encourage you that ARPA-E and what happens at ARPA-E is important to this country, important for the world and, certainly, we are going to encourage you to look again at that budget.

It is critical that we maintain our commitment to energy research and development. Doing so will help keep energy affordable, strengthen our national security and help us address environmental challenges such as climate change. We only have to look at the global nuclear energy market to see what happens when U.S. influence wanes. Other countries step right up. They are eager to fill the void and establish energy-fueled economic relationships that can span generations, so we don't want to leave that space for them to take it over.

The Administration's proposed cuts to many of these R&D programs, I think, are cause for concern. New, potentially breakthrough technologies are being developed in our national labs and our universities. We must ensure that our research programs are adequately funded so that those technologies can be realized, moved to the market and exported to the world.

I would also remind everyone listening this morning that energy R&D is hardly the driver of our federal deficits. In recent years it has accounted for less than 0.1 percent of federal outlays and yet, even at that level, it still delivers significant, significant, benefits for our nation.

A lot more to be discussed here this morning, but I am pleased that you are with us here today, Secretary Brouillette, to talk about the President's priorities and what we can be doing together.

With that, I turn to my Ranking Member, Senator Manchin.

**STATEMENT OF HON. JOE MANCHIN III,
U.S. SENATOR FROM WEST VIRGINIA**

Senator MANCHIN. Thank you, Madam Chairman, and thank you, Secretary Brouillette. It is a pleasure to welcome you to your first budget hearing before this Committee as the Secretary of Energy.

Secretary Brouillette, I want to take the opportunity to thank you and your team at DOE for your technical assistance and analysis on many pieces of our energy package that Senator Murkowski and I released this last week. A comprehensive energy bill has not been enacted since 2007, so I think that we can all agree that it is high time Congress updated the nation's energy policies. 2007 was the same year that the iPhone was first released, and what I find unbelievable is that in 13 years the iPhone has progressed through at least 10 different models in order to modernize and keep up in a world that is constantly evolving, yet we have not been able to do the same for many of the energy policies in our

country. That is why I am pleased that the Senate will vote today to proceed to another vehicle for the comprehensive energy innovation package that Chair Murkowski and I introduced last week, the American Energy Innovation Act. This legislation is a result of strong bipartisan work with my colleagues on this Committee to make a down payment on emissions-reducing technologies, reassert the United States leadership role in global markets and enhance our grid security and protect consumers. Importantly, this bill will connect energy-producing communities in states like West Virginia and Alaska with new markets and job opportunities while laying the groundwork for the Department of Energy to advance innovative energy technologies. We know how important it is that we are on the cutting edge of energy innovation which is why our bill sets a game plan for strong R&D at the DOE.

Unfortunately, based on the President's budget request this year, this Administration doesn't appear to be on the same page as we are as evidenced by the proposal to make drastic cuts to the Department's Offices of Science, Energy Efficiency and Renewable Energy and Nuclear Energy as well as eliminating critical programs like the Advanced Research Projects Agency-Energy, or ARPA-E. I was also disappointed to see that once again the budget eliminated the Weatherization Assistance Program and the State Energy Program which helps so many of us and our people in our states.

These programs are popular on both sides of the aisle, because they provide critical assistance to states to deploy energy projects and help low income homeowners weatherize their homes and save money on their energy bills. In my little state alone, we received over \$3 million per year from the Weatherization Assistance Program and over \$500,000 annually from the State Energy Program.

We are proud to host one of the crown jewels of the Department of Energy in West Virginia, which is NETL, the National Energy Technology Laboratory. I was disappointed again to learn the overall funding for NETL was cut by 40 percent and direct NETL funding within the Fossil Energy and R&D decreased by 7 percent. In the middle of an energy transition in the face of a changing climate, this is not the time to starve NETL, our national lab with the deepest knowledge of fossil energy. I will continue to fight to ensure NETL has the resources it needs to lead the charge in innovation to make fossil fuels more efficient, less carbon intensive and to be on the cutting edge of fossil energy research and continue its proud legacy in Morgantown for years to come and not only help the United States but to help all those in the world.

It was also disheartening to see that the request called for a 43 percent decrease in the Carbon Capture, Utilization and Storage (CCUS) budget. We need more resources, not less, to make sure that CCUS can be deployed at scale. The EFFECT Act, which I introduced with many of my colleagues, is a key piece of the American Energy Innovation Act and will provide the investments needed to advance CCUS. Fossil energy is going to be part of our national and global energy mix for years to come, so we need to make sure that we have the technologies to use it in the cleanest fashion possible. This will create jobs and lower our carbon footprint. It is a win/win across the board.

On the topic of nuclear energy, the Administration has recently shifted its nuclear waste repository strategy with the President calling for innovative approaches and lasting solutions to remedy the current policy deadline. I believe this shift raises the importance of Chairwoman Murkowski's Nuclear Waste Administration Act which would provide an innovative bottom/up approach to setting and constructing a nuclear waste repository. It is a bill that, I believe, with the changes that Senator Cortez Masto and I worked on together, provides an equitable policy path forward for site selection. If we are to support the advancement of new nuclear energy technologies, we have a responsibility to develop effective policy to dispose of our nuclear waste.

With that, Secretary Brouillette, thank you for joining us today and for all you do at DOE and for our country. I look forward to hearing from you.

The CHAIRMAN. Thank you, Senator.

At this time, Secretary Brouillette, you are, again, welcomed to the Committee. We appreciate the opportunity to have this discussion with regards to the President's request and would invite your comments.

**STATEMENT OF HON. DAN BROUILLETTE,
SECRETARY OF ENERGY**

Secretary BROUILLETTE. Thank you, Chairwoman Murkowski and Ranking Member Manchin and all of the members of the Committee who are here today. It's an honor to appear before you as the Secretary of Energy to discuss President Trump's Fiscal Year 2021 budget request for the U.S. Department of Energy.

The members of this Committee on both sides of the aisle have been strong partners to the Department over the past three years, and I want to thank you again for your support during my confirmation process to become the 15th Secretary of Energy. I'm grateful for the support that you gave me as the Deputy Secretary, and it's a privilege to appear before you today as the Secretary of Energy.

My interest in the national security work of the Department began as a tank commander, my service as a tank commander, United States Army, back during the days of the Cold War. I served in Fulda, Germany, which was then known as the Furthest Frontier of Freedom. Also, my time on the Hill working in a Member's personal office and later as Chief of Staff to the House Energy and Commerce Committee furthered my passion for the mission of DOE. Having also led the Department's Congressional Affairs Office and as Deputy Secretary, I am humbled and I look forward to continuing to work closely with each of you in my new role.

The President's FY21 budget request promotes energy independence. It advances scientific research, it strengthens U.S. energy security, and it enhances the protection of our nation's security. The budget request supports the development of reliable and affordable energy with strategic investments in research and development, critical infrastructure and crosscutting initiatives such as energy storage, including the next generation of batteries that integrate renewable energy better into the grid.

In 2020, for the first time in my lifetime, the United States will be a net energy exporter and the world's number one producer of oil and gas. Notably, the United States is also the world's second highest generator of wind and solar energy and the world leader in carbon emission reductions. I'm confident that the initiatives in this budget will advance and extend these gains for years to come.

The Trump Administration believes that it is imperative that America maintain dominance in science and technology, especially with global competitors like China racing to surpass us in critical scientific capabilities. That's the underpinning of this year's budget request of \$5.9 billion for scientific innovation all across the DOE complex. The request also supports substantial investment in areas the President has designated as industries of the future, including supercomputing, artificial intelligence, quantum and advanced manufacturing. The budget request again prioritizes the development of next generation advanced nuclear technology. As we strive to regain American leadership in nuclear energy, this Administration realizes the need for domestically-produced uranium and, in doing so, the budget request includes \$150 million for a new DOE program for a strategic stockpile of U.S. origin uranium to protect against market uncertainties. Recognizing the value of American nuclear energy and nuclear security interests, this is the first step of a soon to be released broader strategy endorsed by the President's Nuclear Fuel Working Group.

The budget requests nearly \$27 billion to support DOE's mission component for national security. Given the current geopolitical environment, the United States must have the nuclear capabilities to meet current and future nuclear security challenges, and key to this effort is sustaining the current stockpile of nuclear weapons, modernizing our nuclear forces, furthering non-proliferation and recapitalizing infrastructure. The request also funds continuation for cleanup of sites associated with nuclear weapons development and production and government-sponsored nuclear energy research. The Administration believes progress on managing the nation's spent nuclear fuel is critical and that the standstill has gone on for far too long. Notably, the FY21 budget does not request funding for Yucca Mountain licensing. Instead, we seek to prioritize research, development and the evaluation of alternative technologies and pathways for the storage, transportation and disposal of the nation's spent nuclear fuel.

The men and women that I have the privilege to lead are extremely dedicated to DOE's mission. Working with Congress and our industry partners, I'm very proud of the Department's accomplishments over the last three years to advance American energy, to promote scientific innovation and to protect America. The results are significant for the United States as a nation and for taxpayers.

I also commend the members of this Committee for your continued leadership on putting forward energy solutions that will benefit all Americans. We are very encouraged by the bipartisan and comprehensive legislation, the American Energy Innovation Act. The Department stands ready to work with you and the rest of the Senate as you consider the legislation this week and with Congress in the months to come.

Finally, I want to thank the Senate for the strong support of the FY20 appropriation and the full year appropriation for 2019. The certainty that that has provided the Department is appreciated, and we're seeking that same certainty again this year. I look forward to working with each of you and to that end, thank you and I look forward to answering your questions.

[The prepared statement of Secretary Brouillette follows:]

Testimony of Secretary Dan Brouillette
U.S. Department of Energy
Before the
U.S. Senate Committee on Energy and Natural Resources
March 3, 2020

Chairwoman Murkowski, Ranking Member Manchin, and Members of the Committee, it is an honor to appear before you today to discuss the President's Fiscal Year (FY) 2021 Budget Request for the Department of Energy (DOE).

It is a great privilege to serve as the Secretary of Energy. I am thankful for the opportunity to be here to testify on the President's Budget Request for DOE. The Department is grateful for the support of this Committee for DOE's mission and we look forward to a full-year appropriation.

Introduction

The President's FY 2021 Budget Request is \$35.4B for the Department of Energy to meet the challenges of today and tomorrow by promoting energy independence, progressing scientific research, and protecting the Nation.

The President's and the Department's focus is on delivering to the Nation the technology, innovation, and capabilities necessary for energy independence, scientific progress, and national security. The Department continues to increase stewardship, accountability, and commitment to excellence. This budget request demonstrates the effective and efficient management of tax payers dollars entrusted to us.

The FY 2021 Budget Request invests in DOE's mission to advance economic growth and support United States national security through transformative science and technology innovation that promotes affordable and reliable energy through market solutions, and meets nuclear security and environmental cleanup challenges.

America's position in the global energy system is as a leading producer, consumer, and innovator. Access to domestic sources of clean and reliable energy will underpin a prosperous, secure, and powerful America for decades to come. Abundant and reliable energy is central to a flourishing economy. The Nation must take advantage of domestic resources and energy efficiency to promote competitiveness across industries. Using the

Nation's energy resources of coal, natural gas, petroleum, renewables, and nuclear, stimulates the economy while building a foundation for future growth.

As other countries continue to advance, the U.S. must advance as well and DOE prioritizes emerging technologies critical to economic growth and security, such as advanced computing technologies and artificial intelligence (AI). The U.S. must lead in research, technology, and innovation to maintain competitive advantage. To do this, supporting research and development (R&D), including at the Department's 17 National Laboratories, is critical. The National Laboratories have served as leading institutions for scientific innovation in the U.S. for more than 75 years. American ingenuity at the Laboratories can drive tremendous technological breakthroughs leading to improvements across all aspects of American life.

To understand and address threats to national security, and given the geopolitical environment, it is crucial that the U.S. have capabilities to address the challenges presented. The return to great power competition coupled with an unprecedented range and mix of threats requires the U.S. to maintain a diverse set of nuclear deterrent and nonproliferation capabilities that can provide flexible and tailored options to enhance deterrence and to achieve objectives should deterrence fail.

Key to this effort is sustaining the current stockpile of U.S. nuclear weapons, modernizing nuclear forces and infrastructure, and maintaining deterrence in light of increasingly capable opponents. National security also depends on a resilient electric grid and successfully countering evolving and increasing cyber-attacks on networks, data, facilities, and infrastructure.

The budget request advances global leadership in scientific and technological innovation in part through the National Laboratories, including basic research to support the Administration's Industries of the Future initiative. DOE also remains committed to managing and cleaning up the Nation's spent nuclear fuel and materials, and aggressively modernizing the nuclear security enterprise for the safety and security of America.

Promoting Energy Independence, Progressing Scientific Research, and Protecting the Nation

Within the \$35.4B budget request there is \$3.6B for technologies that will make the Nation's energy supply more reliable and efficient for promoting energy independence and dominance.

Additionally, \$5.9B is dedicated to progressing cutting-edge scientific R&D, including quantum information science (QIS) and AI. The budget request will fund key technologies such as advanced manufacturing, biotechnology, and technology transfer. The request also supports state-of-the art scientific tools and facilities keeping U.S. researchers at the forefront of scientific innovation.

To support national security the budget requests \$26.9B. Of that, \$6.1B will continue cleanup of sites resulting from six decades of nuclear weapons development and production and Government-sponsored nuclear energy research. There is \$19.8B for sustainment and modernization of the U.S. nuclear stockpile and deteriorating infrastructure, reduction of global nuclear threats, and resources to propel the nuclear Navy fleet of aircraft carriers and submarines.

Focusing on results, the Department prioritizes intradepartmental collaboration to advance crosscutting initiatives such as energy storage, critical minerals, harsh environment materials, advanced manufacturing, exascale computing, QIS, AI, energy-sector cyber security, and microelectronics.

The budget request also continues investment in early-stage research and development at the National Laboratories to guarantee that the U.S. is at the forefront of technology and innovation through investments in the Administration's Industries of the Future initiative.

As part of that initiative the budget request provides over \$250M for Artificial Intelligence (AI) across the DOE enterprise. Researchers are applying AI to challenges in ways that will alter energy, science, and national security landscapes. AI is being applied to data collection in the Office of Science (SC), used by the Office of Fossil Energy (FE) for carbon storage through incorporation of autonomous monitoring and big data management. AI is also being used for materials discovery within the Hydrogen and Fuel Cells Technology research consortia efforts. AI is a tool used by the National Nuclear Security Administration (NNSA) nuclear proliferation analysts to sort through massive volumes of data from current and next-generation sensor systems, as well as integrating data from disparate sources to identify anomalies that need further investigation. Research using AI is critical for advanced computing associated with development of models for simulation of nuclear weapons and their components, enhancing weapons codes and a variety of other applications. The Office of Cyber Security, Energy Security, & Emergency Response (CESER) will apply AI for R&D and demonstration of innovative tools and technologies to prevent, detect, and mitigate cyber-attacks on energy delivery systems. To support all of these efforts DOE established the

Artificial Intelligence and Technology Office (AITO) to coordinate and oversee efforts across DOE and implement the vision for cross-cutting mission relevant AI projects.

In FY 2021, the budget request provides \$249M -- \$237M from SC and \$12M from NNSA -- in support of QIS research. Supporting the National Quantum Initiative and the Administration's Industries of the Future initiative, the budget request has funding for research activities including strategic partnerships in quantum computing and data intensive applications, development of quantum sensors based on atomic-nuclear interactions, development of quantum computing algorithms, and early-stage research associated with the initial steps to establish a dedicated Quantum Network.

The budget request also emphasizes coordinated crosscutting research and seeks innovation of technologies for energy storage. The request includes \$190M for the Advanced Energy Storage Initiative (AESI) to support the Energy Storage Grand Challenge (ESGC) -- a holistic approach to accelerate the development, commercialization, and use of next-generation energy storage technologies. In doing so the Department took existing dispersed storage efforts from the SC, Grid Modernization Initiative, AESI, Beyond Batteries, and others into ESGC for an integrated, comprehensive DOE-wide strategy. The vision for the ESGC is to create and sustain global leadership in energy storage usage and exports, with a secure domestic manufacturing supply chain that is independent of foreign sources of critical materials.

The budget request invests \$131M to establish a Critical Minerals Initiative (CMI) to coordinate research across the Department. Funds will be used from program offices including, the Office of Energy Efficiency and Renewable Energy (EERE) with \$53M, FE with \$32M, the Office of Nuclear Energy (NE) with \$1M, and SC with \$45M, to initiate a National Laboratory-led team approach modeled after the Grid Modernization Laboratory Consortium to elevate and coordinate research activities.

To promote efficiency and maximize impact, the budget request of \$58.5M maintains momentum on the Harsh Environment Materials Initiative (HEMI) launched in FY 2020. This funding includes \$6.5M from EERE, up to \$22M from FE, and \$30M from NE. The initiative aligns materials and component manufacturing process research for advanced thermoelectric power plants. Building on current applied energy programs, HEMI uses activities related to advanced reactor technologies and high efficiency low emission modular coal plants to support R&D of novel materials, integrated sensors, and manufacturing processes.

To maintain U.S. leadership in supercomputing, the budget requests nearly \$710M including \$475M from SC and \$235M from NNSA. In FY 2021, funding will support continued development of two SC exascale systems. The first of these two exascale systems will be deployed in calendar year 2021 at Argonne National Laboratory, with the second coming on line in the 2021 – 2022 timeline at Oak Ridge National Laboratory. In addition, the FY 2021 Budget Request supports the procurement of and site preparation for a third exascale system delivered to NNSA at Lawrence Livermore National Laboratory in FY 2023. The SC and NNSA partnership will bolster America's national security by strengthening the next generation of scientific breakthroughs and also support to the nuclear stockpile not possible with today's fastest computing systems.

Funding in the budget request invests \$176M in next-generation microelectronics research from SC (\$45M), NE (\$12M), and NNSA (\$119M).

To support fiscal responsibility and streamline DOE activities, the budget request eliminates the Advanced Research Projects Agency—Energy (ARPA-E) program, the Title XVII Innovative Technology Loan Guarantee Program, the Advanced Technology Vehicle Manufacturing Loan Program, and the Tribal Energy Loan Guarantee Program.

The phasing out of ARPA-E facilitates opportunities to integrate the positive aspects of ARPA-E into DOE's applied energy research programs, including through changes to the implementation of the Small Business Innovation Research and Small Business Technology Transfer program.

Loan programs are proposed for phase out as well because the private sector is better positioned to finance deployment of commercially viable projects.

To further achieve fiscal discipline and reduce taxpayer risk the request proposes to repeal the Western Area Power Administration's borrowing authority that finances the construction of electricity transmission projects. Investments in transmission assets are best carried out by the private sector with appropriate market and regulatory incentives.

Promoting Energy Independence

Recognizing that the U.S. is the leader in energy technology and has among the most abundant and diverse energy resources in the world, including oil, gas, coal, nuclear, and renewables, the FY 2021 Budget Request supports a variety of efforts that emphasize and

strengthen the country's unique advantage, including establishing a uranium reserve, to promote energy independence.

The budget requests \$3.6B for energy and related programs, funding early-stage applied R&D, and specifically targeted later-stage R&D to address unique challenges. DOE is committed to supporting energy initiatives that attract investments, safeguard the environment, and strengthen energy security.

The budget requests \$719.6M for Energy Efficiency and Renewable Energy (EERE). In FY 2021, EERE will prioritize core lab activities, particularly in renewables and energy efficiency. The budget also maintains funding at the National Renewable Energy Laboratory. EERE's efforts invest in early-stage research to spur private-sector research, development, and commercialization of critical energy technologies such as: sustainable transportation technologies to increase fuel diversity and improve efficiency across the transportation sector (\$161M); renewable power generation technologies to compete with other electricity sources without subsidies (\$160M); and energy efficiency to improve affordability, energy productivity, and resiliency of homes, buildings, and manufacturing sectors (\$164M). The budget request invests in the Plastics Innovation Challenge and continues to support Advanced Energy Storage Initiative in support of the energy Grand Storage Challenge, Harsh Environment Materials Initiative, Critical Minerals Initiative, and other cross-cutting activities.

The budget request divests from Weatherization and State Energy subprograms which are more appropriately funded at the state level.

Innovation investments in clean energy technologies are more competitive than ever before and examples include: utility-scale PV solar which achieved the DOE goal of 6 cents/kWh in 2017, three years ahead of schedule; onshore wind cost has declined by 55% since 2008; EV battery costs have declined by 80% since 2008; and, the cost of LED lightbulbs have declined by over 90% since 2008.

The request for the Office of Cyber Security, Energy Security, & Emergency Response (CESER) is \$184.6M. CESER will invest in an all hazards approach to energy-sector cybersecurity. The budget request supports development of capabilities to identify, prevent, protect against, mitigate, and respond to cybersecurity threats during an emergency event that pose risk to energy delivery system operations. To do so the budget

request funds R&D, public and private-sector partnerships, and emergency preparedness and response.

The budget requests \$195M for the Office of Electricity to support the mission of secure and resilient sources of electricity. The investment addresses the challenges of increased threats to energy infrastructure, changes in supply mix and location of the Nation's electricity generation portfolio, and increased variability and uncertainty of supply and demand. The budget request will support four priorities: to develop and implement an integrated North American Energy Resiliency Model; pursue a megawatt-scale storage; revolutionize sensing technology; and pursue transmission permitting and technical assistance.

The Office of Nuclear Energy (NE) budget request is \$1.2B to fund a diverse set of programs to advance nuclear energy technologies that are critical to the Nation's mix of energy sources. The budget request supports early-stage R&D and targeted later-stage R&D to address unique challenges. The request has funding for the Reactor Concepts R&D, Fuel Cycle R&D, and Nuclear Energy Enabling Technologies as well as critical laboratory infrastructure and safeguards needed to support nuclear energy R&D.

Of the \$1.2B for NE, \$295M is for the Versatile Test Reactor (VTR) project, one of the Department's highest priorities. The VTR is a first-of-a-kind fast reactor that will assist the private sector to develop and demonstrate new energy technologies. This effort reinforces the Administration's commitment to re-energize the U.S. nuclear sector with funds to support design and construction of the VTR.

For the Interim Storage and Nuclear Waste Fund Oversight program, the budget requests \$27.5M to fund the development and implementation of a robust interim storage program, DOE's fiduciary responsibility for maintaining a safe and secure Yucca Mountain facility, and oversight of the Nuclear Waste Fund. Coupled with DOE's funding for storage, transportation, and disposal R&D, the budget request supports the development of a durable, predictable yet flexible plan that addresses efficiently storing waste temporarily in the near term, followed by permanent disposal. In doing so the Administration will establish an interagency working group to develop this plan in consultation with States. The Department is committed to fulfilling the Federal Government's legal and moral obligations to properly manage and dispose of the nation's spent nuclear fuel and high-level waste.

To address the immediate challenges facing the domestic uranium mining and conversion industries, the budget invests \$150M to establish a Uranium Reserve. The Uranium Reserve reflects the Administration's priority for availability of uranium in the event of a market disruption and supports strategic U.S. fuel cycle capabilities.

For Fossil Energy R&D, the budget requests \$730.6M to conduct research that supports the clean, affordable, and efficient use of domestic fossil energy resources. The program funds early-stage R&D with academia, the National Laboratories, and the private sector to generate knowledge that industry can use to develop new products and processes. Funding will improve the reliability, availability, efficiency, and environmental performance of advanced fossil-based power systems.

The budget requests \$200M net amount for the Office of Petroleum Reserves, with \$187M for the Strategic Petroleum Reserve (SPR). The SPR is for strategic and economic security against potential interruptions in U.S. petroleum supplies, and this request supports operational readiness and drawdown capabilities. The budget request further proposes a sale of 15 million barrels of SPR crude oil to raise funds for other Departmental priorities, including \$242M needed to fund the completion of remediation work at the NPR-1 site. The Naval Petroleum and Oil Shale Reserves will be funded at \$13M.

Consistent with prior budget requests, the Administration is re-proposing the sale and closure of the Northeast Gasoline Supply Reserve (NGSR), which has not been used since establishment in 2014. Proceeds from the sale from the NGSR contribute to deficit reduction and will fund current law SPR sales. The Department is also proposing to close the Northeast Home Heating Oil Reserve which has also never been used for the intended purposes and is not a good use of taxpayer funds.

The Energy Information Administration (EIA) budget request of \$128.7M will continue supporting the collection, analysis, and dissemination of independent and impartial energy information and analysis to promote sound policymaking, efficient markets, and public awareness and understanding. EIA will also begin a multi-year effort to modernize energy modeling capabilities. Expected benefits include greater agility in EIA's modeling system to address key current and emerging trends. The budget request also bolsters EIA to continue planned cybersecurity initiatives for information security.

Office of Indian Energy Policy and Programs (IE) supports energy development and deployment on Indian lands, reduction of energy costs, assistance in economic development,

and electrification in tribal communities where unemployment and poverty rates far exceed national averages. The budget requests \$8M for these important IE efforts.

The budget requests \$78.6M for the four Power Marketing Administrations (PMA) to sell electricity primarily generated by federally owned hydropower projects to public entities and electric cooperatives. The budget again proposes to repeal Western Area Power Administration's (WAPA) borrowing authority that finances the construction of electricity transmission projects. Investments in transmission assets are best carried out by the private sector with appropriate market and regulatory incentives that support resiliency and reliability. The request again proposes to sell the transmission assets owned and operated by the PMAs, and authorize the PMA's to charge rates comparable to those charged by for-profit investor owned utilities.

Reducing the government's role in electricity transmission infrastructure ownership, and introducing market-based incentives for power sales from Federal dams will encourage an efficient allocation of economic resources and mitigate risk to taxpayers.

Progressing Scientific Research

The FY 2021 Budget Request includes \$5.9B to progress scientific research continuing U.S. dominance in research and science. The budget request funds the Department's science mission by focusing on early-stage research, operating the National Laboratories, and continuing high priority construction projects. The budget includes ongoing investments for Exascale and QIS for creating new ways of processing and analyzing information.

The request has \$475M for exascale computing to secure a global leadership role in exascale, \$237M for quantum information science (QIS), \$125M for Artificial Intelligence (AI) and machine learning, and \$45M to enhance materials and chemistry foundational research to support U.S.-based leadership in microelectronics. The Office of Science (SC) efforts in QIS include development of quantum computing and quantum sensor technology. QIS will benefit national security, economic competitiveness, and secure America's continued leadership in science. SC's work, particularly in the areas of QIS and AI, is fundamental for the Industries of the Future Initiative.

The SC request includes \$988M for Advanced Scientific Computing Research (ASCR) to strengthen and further U.S. leadership in strategic computing, the foundations of AI and QIS, and the infrastructure for data-driven science. To meet SC's high performance

computing mission for the exascale project, the budget request prioritizes basic research in Applied Mathematics and Computer Science with emphasis on the challenges of data intensive science, including AI and machine learning, and computing technologies. The budget request increases support for ASCR's Computational Partnerships focusing on developing partnerships in quantum computing and data intensive applications, and new partnerships in exascale and data infrastructure. The budget request also provides support for ASCR user facilities operations for the availability of high performance computing, data, and networking to the scientific community. Specifically, funds provide for exascale computing, QIS, and operation of user facilities.

The request for Basic Energy Sciences (BES) is \$1.9B. BES supports fundamental research to understand, predict, and ultimately control matter and energy at the electronic, atomic, and molecular levels providing foundations for new energy technologies, to address the environmental aspect of energy use. BES also supports DOE missions in energy, environment, and national security.

The budget requests \$516.9M for Biological and Environmental Research (BER) to support fundamental research to understand complex biological, biogeochemical, and physical principles of natural systems at scales extending from the genome of microbes and plants to the environmental and ecological processes at the scale of the planet Earth. This effort supports research in biological systems science, earth and environmental systems science, and new efforts in translating biodesign rules to functional properties of novel biological polymers. The budget request also supports and continues operation of three BER scientific user facilities: the Joint Genome Institute, the Atmospheric Radiation Measurement Research Facility, and the Environmental Molecular Sciences Laboratory.

Fusion energy is a carbon-free energy source with enormous potential, such as combatting climate change, serving as a vast energy source, providing economic benefits, and promoting national security. The Office of Fusion Energy Sciences request is \$425.1M for research to develop a fusion energy source and to understand matter at very high temperatures and densities. The budget continues to support research and facility operations, including research at international facilities with unique capabilities, research in QIS, and research in high-density laboratory plasma science. Funding for facilities operations includes DIII-D National Fusion Facility for magnetic fusion, the National Spherical Torus Experiment Upgrade facility repairs, and upgrades at the Matter in Extreme Conditions Petawatt facility project. The budget request also funds U.S. in-kind hardware contribution for the ITER international research project.

The budget requests \$818.1M for High Energy Physics (HEP) for research to understand at the fundamental level how the universe works by discovering the most elementary constituents of matter and energy, probing interactions between and exploring basic nature of space and time. HEP underpins and advances DOE mission and objectives through this research. This effort contributes to core research activities including QIS, AI, exascale computing, and next-generation microelectronics. The request further funds the Accelerator Traineeship Program to expand workforce development in advanced technology and HEP facilities.

The Nuclear Physics request is \$653.2M to support research to discover, explore, and understand all forms of nuclear matter. The budget request funds world class nuclear physics, QIS, the DOE Isotope program. The budget request also supports new initiatives in AI and Strategic Accelerator R&D in relationship nuclear physics.

The budget requests \$20.5M for Workforce Development for Teachers and Scientists which provides for a sustained pipeline of science, technology, engineering, and mathematics (STEM) professionals to meet current and future national goals and objectives. Maintaining U.S. leadership requires specialized computer scientists and applied mathematicians to develop supercomputing methods to solve real world problems today and develop technology of the future. The budget funds programs that place highly qualified applicants in authentic STEM learning and training opportunities at DOE laboratories, as well as supports the National Science Bowl® competition.

The request for Science Laboratories Infrastructure is \$174.1M. These funds will sustain mission-ready infrastructure and safe and environmentally responsible operations by providing the infrastructure necessary to support leading edge research at ten national science laboratories. The budget request funds the new and ongoing construction projects that will address inadequate core infrastructure and utility needs.

The budget invests \$5M for operations of the Artificial Intelligence and Technology Office (AITO). AI is a foundational technology that is a key effort for influencing and steering decades of innovation. AITO leads Department-wide efforts to evaluate the scope and effectiveness of DOE's AI programs and identify gaps not addressed by programs, functional offices, sites, or associated National Laboratories. The DOE AITO is uniquely situated to develop and lead collaborative solutions across the Department that are consistent with the Administration and Secretary's priorities and objectives. The

office will also be instrumental in supporting the Administration's Industries of the Future Initiative.

The budget requests \$12.6M for the Office of Technology Transitions to support ongoing activities, including the Technology Commercialization Fund, Lab Partnering Service, Energy I-Corps, and Innovation XLab summits. The budget request will fully implement the Empowering Novel American Businesses with Laboratory Embedding competition.

Protecting the Nation

Environmental Management

The Department must continue to manage nuclear waste in all forms including some of the most dangerous materials known. The FY 2021 Budget Request includes \$6.1B for Environmental Management (EM) to continue cleanup resulting from six decades of nuclear weapons development and production and Government-sponsored nuclear energy research. EM is responsible for cleanup at 16 remaining sites in 11 states. Funds requested will support cleanup of millions of gallons of liquid radioactive waste and thousands of tons of spent nuclear fuel and nuclear materials. Over time this effort will dispose of large volumes of transuranic and mixed/low-level waste, and huge quantities of contaminated soil and water. To date, EM has completed cleanup activities at 91 sites in 30 states and in the Commonwealth of Puerto Rico.

Within the EM request, \$1.7B will support the Liquid Waste Program at Savannah River Site (SRS) to achieve additional risk reduction through stabilization and immobilization of high activity radionuclides with vitrification into canisters at the Defense Waste Processing Facility and disposition of decontaminated salt waste. To do so, the request supports continuing construction of saltstone disposal units. Of note, the Salt Waste Processing Facility is poised to start in FY 2020 and in FY 2021 will begin 24-7 operations. The budget request for SRS also includes \$25M for the design and construction of the Advanced Manufacturing Collaborative Facility.

The budget request includes \$1.3B for the Office of River Protection to safely manage and treat approximately 56 million gallons of radioactive liquid and chemical waste currently stored in 177 underground storage tanks at Hanford. The budget supports construction, start up, and commissioning of facilities that are integral to begin treating Hanford low-activity tank waste by December 2023 as required by the 2016 Amended Consent Decree.

For the Richland site, the budget requests \$655M to support continued achievement of important progress required by the Tri-Party Agreement for cleanup activities separate from tank waste managed by the Office of River Protection. The request will maintain safe operations, provide Hanford site-wide services, and conduct critical site infrastructure projects, as well as startup preparation activities for the Integrated Disposal Facility to support Direct Feed Low Activity Waste commissioning and startup.

To continue cleanup at the Idaho site the request includes \$271M. These funds support Integrated Waste Treatment operations and additional treated sodium bearing waste storage capacity. The request also supports completing buried waste exhumation activities, and continued progress in characterizing, packing, and shipping stored contact-handled and remote handled transuranic waste, as well as spent nuclear fuel activities in order to meet the Idaho Settlement Agreement milestone for 2023.

For cleanup activities at the Oak Ridge site the budget requests \$432M. These funds support continued slab and soil remediation at the East Tennessee Technology Park, mercury characterization and remediation technologies, planning for construction of the mercury treatment facility at the Y-12 National Security Complex, as well as continued design for the On-Site Disposal Facility to support Y-12 National Security Complex and Oak Ridge National Laboratory.

For the Waste Isolation Pilot Plant, the Nation's only mined geologic repository for permanent disposal of defense-generated transuranic waste, the budget requests \$390M to safely continue waste emplacement. This effort includes \$50M for continued progress on the utility shaft project to increase underground airflow for simultaneous mining and waste emplacement operations, as well as \$10M to begin the Hoisting Capability Project.

The budget requests \$491M for the decontamination and decommissioning of the Portsmouth Gaseous Diffusion Plant facilities, including construction and design of on-site waste disposal facilities.

The budget requests \$282M for the Paducah site to continue environmental remediation and further stabilize the gaseous diffusion plant.

To continue focus on surface and groundwater management at Los Alamos National Lab \$120M is requested. The request also continues activities to control migration of a hexavalent chromium plume beneath Montana and Sandia Canyons.

Legacy Management

The budget request provides \$317M for Legacy Management (LM) to support long-term activities, administer an interagency agreement addressing abandoned defense related uranium mines, execute the Department's Uranium Leasing Program, develop applied studies and technology to reduce scope and costs, and close the Grand Junction, Colorado Disposal Site. Within this total, the budget request includes \$150M to support and expand the Reform Proposal to consolidate funding for the administration for Formerly Utilized Sites Remedial Action Program under LM.

National Nuclear Security Administration

NNSA is responsible for maintaining a safe, secure, and effective nuclear weapons stockpile that preserves a credible nuclear deterrent; for preventing, countering, and responding to evolving and emerging nuclear proliferation and terrorism threats; safe, reliable, and long-term nuclear propulsion to the Nation's Navy as it protects American and allied interests around the world; and for the highly skilled workforce.

To support these activities the budget request proposes \$19.8B for NNSA consistent with the nation's nuclear deterrence mission and the policy set forth in the 2018 Nuclear Posture Review (NPR).

Weapons Activities

The budget includes \$15.6B for Weapons Activities to maintain the safety, security, and effectiveness of the nuclear stockpile, continue the nuclear modernization program, and modernize and recapitalize nuclear security infrastructure.

Of the \$15.6B, \$4.3B is for Stockpile Management to include stockpile sustainment, dismantlement, and nuclear warhead modernization.

The Weapons Activities request also includes \$2.5B for Production Modernization to support strategic materials production capabilities for nuclear weapons, including primaries, canned subassemblies, radiation cases and non-nuclear components needed to sustain the nuclear stockpile near- to long-term. The budget request funds equipment, facilities, and personnel required to reestablish the Nation's ability to produce pits with the goal of producing 80 pits per year by 2030 at Los Alamos National Lab and Savannah River Site (SRS).

Further, the Weapons Activities funds include \$2.8B for Stockpile Research, Technology, and Engineering to provide the scientific foundation for science-based stockpile decisions and actions, including the capabilities, tools, and components enabling assessment of the active stockpile and certification of warhead modernization programs. The budget request for FY 2021 supports the continued implementation of the Enhanced Capabilities for Subcritical Experiments (ECSE). Funding includes \$235M for activities and research leading to deployment of exascale capability for national security applications, of which \$114M is for a multi-year non-recurring engineering collaboration focusing on advanced system engineering efforts and software technologies to make the 2023 exascale system a capable and productive computing resource for the Stockpile Stewardship Program.

The request is for \$4.4B to support Infrastructure and Operations to continue the long-term effort to modernize NNSA infrastructure, improve working conditions and capabilities of deteriorating facilities and equipment, and address safety and programmatic risks. The request specifically includes increased funding for the construction of the Uranium Processing Facility project and design of the Lithium Processing Facility at Y-12 and the Tritium Finishing Facility at SRS. The budget request also continues construction of the Chemistry and Metallurgical Research Replacement project to sustain plutonium science activities.

Defense Nuclear and Nonproliferation

For Defense Nuclear Nonproliferation at NNSA, the budget requests \$2B to address nuclear threats by preventing the unwanted acquisition of nuclear weapons or weapons-usable materials, countering efforts to acquire such weapons or materials, and responding to nuclear or radiological incidents. The budget request also supports design, long lead procurements, and site preparation for the Surplus Plutonium Disposition project at SRS, increases in funding for nuclear forensics, and continues support of non-Highly Enriched Uranium-based Molybdenum-99 production facilities in the U.S.

Naval Reactors

To continue funding for delivery of the reactor core for the Columbia-class submarine and refueling of the S8G prototype reactor the budget requests \$1.7B for Naval Reactors. The budget request also supports recapitalizing the capability to handle naval spent nuclear fuel and continued work to keep the U.S. Navy's Nuclear fleet as the most advanced, well-maintained, and capable nuclear fleet in the world.

Federal Salaries and Expenses

The budget request includes \$454M to invest in the recruitment, training and retention of the highly skilled workforce vital to DOE's national security mission within the NNSA.

Cybersecurity

Cyberattacks pose an increasing threat to the Nation's energy infrastructure. Recognizing the seriousness of the threat against critical infrastructure, the budget request supports increased funding for cyber and energy security initiatives. DOE will improve energy infrastructure security by addressing the emerging threats of tomorrow while protecting the reliable flow of energy to Americans today. The budget request includes \$158.8M in program office budgets to support improved energy-sector cybersecurity, in addition to \$375M for the information technology and cybersecurity of NNSA.

Other Defense Activities

The FY 2021 budget request provides \$1.1B to support defense activities conducted by the Department, including \$317M for Legacy Management. These include Environment, Health, Safety and Security, Enterprise Assessments, Specialized Security Activities, Hearings and Appeals, and Defense Related Administrative Support (DRAS). Funding from DRAS is used to offset administrative expenses for work supporting defense-oriented activities.

Administration and Oversight

The FY 2021 budget request includes \$215M for Administration and Oversight activities, including Departmental Administration (DA), International Affairs, the Inspector General, and offsets.

DA requests \$123.5M for management and mission support organizations that have enterprise-wide responsibility for administration, accounting, budgeting, contract and project management, human resources, congressional and intergovernmental liaison, energy policy, information management, life-cycle asset management, legal services, workforce diversity and equal employment opportunity, ombudsman services, small business advocacy, sustainability, and public affairs.

In January 2020, the Department began a restructuring of the Office of Policy to the Office of Strategic Planning and Policy (OSPP). OSPP will be a direct report to the

Office of the Secretary for a more efficient and effective approach to the analysis, formulation, development, and advancement of all policy across the Department.

The budget requests \$33M for International Affairs to coordinate the Department's international work and promote global market opportunities for U.S. energy companies and technology exports.

The Office of the Inspector General is funded at \$58M to review the integrity, economy, and efficiency of DOE programs and operations, including NNSA and the Federal Energy Regulatory Commission (FERC).

The Department will realize -\$722M in savings and receipts including from the sale of the Northeast Gasoline Supply Reserve (-\$75M), sale of oil from Strategic Petroleum Reserve (-\$589M), offsets based on the reduced Title 17 credit subsidy (-\$49M) and savings from FERC fees and recoveries in excess of annual appropriations (-\$9M).

Achieving goals established in the request requires an exceptional workforce. The Department will invest in attracting, training, and retaining the Nation's best talent.

Conclusion

The Department of Energy is focused on the bottom line – delivering real benefit for the resources provided by Congress on behalf of the American people. The FY 2021 President's Budget Request provides for America's future by promoting energy independence, progressing scientific research, and protecting the Nation. The budget demonstrates fiscal discipline and commitment to an efficient and effective Federal government. To that end, DOE will focus spending in areas with the highest return on investment of tax payer dollars. The President's Budget Request supports the critical role the Department of Energy has in energy independence and dominance, economic growth, and the safety and security of the Nation. Finally, I want to thank the committee for the support for DOE's mission in FY 2020, and your hard work to pass a full year appropriation for FY 2019. The certainty provided the Department is appreciated, and we are seeking that same certainty this year. I look forward to working with each of you and your staffs to support and achieve the important Department of Energy mission.

The CHAIRMAN. Thank you, Mr. Secretary, and we will certainly take you up on the offer to work with you as we work to advance the American Energy Innovation Act through the full Senate and the House and hopefully for signature soon by the President.

I want to join my colleague, Senator Manchin, in referencing a couple of the programs that are, once again, eliminated from the President's budget request. I mentioned ARPA-E. He reinforced that. He mentioned weatherization. That is, again, something that enjoys strong bipartisan support across this body—the State Energy Program. So as you listen to some of the comments around here, I hope a part of your takeaway will be that there are many of these programs that are very key, very critical to our states and we will work hard to ensure that they are appropriately funded.

I want to speak first on a couple of more local issues, although I don't ever consider the Arctic to be local. I am pleased that you have had an opportunity to visit the U.S. Arctic as you have traveled to Alaska a couple times now. You have seen some of the innovation that we are advancing there whether it is the good work of the Cold Climate Housing Research Center, the innovation, the geothermal innovation and really all the innovation that goes on at Chena Hot Springs.

We have talked several times, many times, about the Arctic Energy Office and during your confirmation hearing you indicated that DOE is prepared to reopen that office but the President's budget is silent on that. Can you give me some kind of a status?

Secretary BROUILLETTE. Sure, Madam Chairman, I will, and thank you again for the opportunity to visit Alaska. I'm happy to report that my grow tower is doing fine.

The CHAIRMAN. I harvested kale last night from mine.

[Laughter.]

Secretary BROUILLETTE. I hope that you will also pass my best regards to the good folks in Chena Hot Springs. It was a great opportunity for me to see some of the renewable technologies that are so innovative and, frankly, heartening to see all across Alaska but the rest of the country as well.

With regard to the Arctic Office, I did give you a commitment that we would expand that office. We are doing exactly that. While you may not see the numbers that you wish to see in the President's budget, I want to assure you that we are looking internally at the Department of Energy. We do have the authorities to organize the Department under the DOE Organizational Act in the manner in which the Secretary deems appropriate. In this case, I have deemed it appropriate that we will expand the office. We're going to have three to five people. We're working very closely with the University of Alaska at Fairbanks. We are looking for office space that, perhaps, they will be willing to share with us. We are about 90 days away from making these decisions and having these things operational.

The CHAIRMAN. Very good, I appreciate that update and I am encouraged by that. I know there is very strong interest up North and particularly there at the University.

Keeping on the issue of the North and the Arctic, I really appreciated the visit from the Assistant Secretary, Ted Garrish, when he attended the Arctic Circle Assembly in Reykjavik last year high-

lighting the Arctic energy initiatives. Having U.S. representation at that level was noted. It was appreciated, and it is something that I would hope that we are going to be able to encourage.

There is a great deal I think that we can contribute, the United States can contribute, in these international forums when we are talking about the Arctic, innovation that goes on and working with our global partners. Can you tell me how this budget request advances the United States' Arctic energy initiatives and our role in the region? This is a question that I ask every Secretary as they are presenting the President's budget, but I want to make sure that the Administration is fully keyed in on our role as an Arctic nation.

Secretary BROUILLETTE. Sure, Madam Chair, I appreciate the question.

I think, you know, the first step as we just discussed is to open up the Arctic Office at the U.S. Department of Energy. We're going to have that completed for you in approximately 90 days. The other things that we are considering, I mean, you just mentioned very important international events. I'm aware that there is a geothermal event that will occur later this year. I will assure you that if I am not there personally, we will have high level representation of the United States Government, either from the U.S. Department of Energy or the U.S. Department of State. Those are key events for us. They allow us to not only collaborate with our colleagues from around the world, they allow us to plan. And I intend to use those types of events and those types of collaborations to not only establish next year's budget, but to reorganize some of the research and development that's being done currently within the Department itself. So you have my assurance of that. You have my commitment for that. We look forward to working with you all throughout the year on these types of events.

The CHAIRMAN. Well, I appreciate that and I would like to follow up with you with more specifics as they are Arctic related. I know that the Cold Climate Housing Research Center is in discussions with our national lab. I know that there are, again, many issues associated with the impacts of climate change that we are seeing in Alaska that DOE can be engaged with us on.

Secretary BROUILLETTE. So—

The CHAIRMAN. There is a lot, a lot of room to work together.

Secretary BROUILLETTE. Sure, there certainly is. And if you'll allow me one quick minute, I will elaborate just a little further on some of the technologies.

I mentioned the Nuclear Fuel Working Group, for instance.

The CHAIRMAN. Right.

Secretary BROUILLETTE. What we're trying to do with that working group is to establish a more robust front end of the nuclear cycle. We have to put America back in a leadership position with regard to nuclear technologies. Last year we began a process and a program, a pilot program, at the Department of Energy to create high-assay LEU fuels, HALEU fuels. That is an important component to developing microreactors, and we're going to push forward through that in 2020 and into 2021. We're going to work closely with our colleagues at DoD who have expressed an interest in these types of reactors.

The perfect deployment for that type of technology is in a remote, rural location such as what you and I saw all throughout your beautiful state. Those are types of activities we think are important, not only for the Arctic but the rest of the world and the rest of the United States certainly, so we're going to continue that type of activity.

We're also going to continue our R&D work in solar, in wind and other renewable technologies which are key to some of these, again, rural and remote areas.

So I assure you, we're going to continue that work regardless of the numbers you see here in this budget.

The CHAIRMAN. Thank you.

Senator Manchin.

Senator MANCHIN. Thank you, Madam Chairman.

Mr. Secretary, last year I requested the GAO, the Government Accounting Office, to look into the Department's goals for technology readiness, commercialization and deployment. The GAO found that a few offices were not meeting the mark on getting funds out the door. I think we have sent you the report. I am going to submit the GAO's report for the record.

As examples, although nuclear energy obligated approximately 90 percent of appropriated funds each year, even though they have done that at a high rate, 90 percent, the President's request is cutting back nuclear which you just spoke about, 25.5 percent which would be unacceptable if we are going to go to decarbonized the way we want to.

Fossil energy obligated just over three-quarters of its funds in the past three years, and the Title 17 Loan Program obligated just eight percent, eight percent, in Fiscal Year 2018 and only 40 percent in Fiscal Year 2019. So, with consent, I want to go ahead and submit this.

The CHAIRMAN. That will——[off mic]

[GAO report follows.]

DOE Energy Spending by Program, Fiscal Years (FY) 2015 through 2019

Advanced Research Projects Agency-Energy	FY 15	FY 16	FY 17	FY 18	FY 19
Unobligated Funds Balance	245,100,000	235,900,000	262,600,000	449,300,000	410,400,000
Beginning Uncosted Funds Balance	412,540,189	417,147,315	476,935,630	481,519,905	391,564,680
Approved Funding Program	394,887,161	367,567,476	410,295,815	270,061,235	439,559,836
Obligations	244,341,655	299,250,233	273,844,881	159,923,203	404,954,501
Percent Obligated	62%	81%	67%	59%	92%
Costs	239,734,529	239,461,918	269,260,607	249,878,428	247,076,038
Percent Costed	61%	65%	66%	93%	56%

Cybersecurity, Energy Security and Emergency Response	FY 15	FY 16	FY 17	FY 18	FY 19
Unobligated Funds Balance	0	1,000	1,000	1,626,000	15,629,000
Beginning Uncosted Funds Balance	69,691,209	84,096,842	126,133,052	123,038,732	166,485,871
Approved Funding Program	51,080,167	77,478,332	71,683,020	106,451,227	115,412,151
Obligations	45,708,886	75,819,009	53,992,632	105,441,766	101,402,636
Percent Obligated	89%	98%	75%	99%	88%
Costs	31,303,254	33,782,799	57,086,952	61,994,627	83,321,527
Percent Costed	61%	44%	80%	58%	72%

Source: Department of Energy (DOE) data for unobligated funds balance, beginning uncosted funds balance, approved funding program, obligations, and costs. Percent obligated and percent costed is a calculation based on data from DOE.

DOE Definitions

Approved Funding Program: The funds available for obligation and expenditure.

Obligations: Definite commitments that create a legal liability of the government for the payment of goods and services ordered or received, or a legal duty on the part of the United States that could mature into a legal liability by virtue of actions on the part of the other party beyond the control of the United States.

Percent Obligated: The proportion of the approved funding program that has been obligated.

Costs: The expenditure of funds for goods and services.

Percent Costed: The proportion of the approved funding program that has been costed/expended.

Unobligated Funds Balance: The portion of budget authority (authorization to obligate Government funds) that has not yet been obligated.

Beginning Uncosted Funds Balance: Budget authority obligated in the prior year but not costed representing a portion of contract obligations for goods and services that have not yet been received.

Office of Energy Efficiency and Renewable Energy	FY 15	FY 16	FY 17	FY 18	FY 19
Unobligated Funds Balance	655,353,000	773,307,000	573,757,000	665,852,000	823,845,000
Beginning Uncosted Funds Balance	1,981,337,821	1,846,969,925	2,035,771,324	2,392,148,117	2,828,218,751
Approved Funding Program	1,917,711,779	2,127,927,680	2,262,617,116	2,274,287,795	2,284,810,860
Obligations	1,595,262,849	1,925,613,749	2,135,466,404	2,166,650,093	2,207,277,602
Percent Obligated	83%	90%	94%	95%	97%
Costs	1,729,630,745	1,736,812,350	1,779,089,612	1,730,579,458	1,946,951,576
Percent Costed	90%	82%	79%	76%	85%

Electricity	FY 15	FY 16	FY 17	FY 18	FY 19
Unobligated Funds Balance	16,405,000	20,793,000	7,457,000	22,925,000	16,814,000
Beginning Uncosted Funds Balance	93,439,636	76,930,108	96,280,097	152,423,462	175,818,437
Approved Funding Program	96,327,919	128,250,716	172,605,297	153,204,196	165,996,931
Obligations	88,433,090	126,354,180	168,410,840	148,352,138	158,883,463
Percent Obligated	92%	99%	98%	97%	96%
Costs	104,942,618	107,004,191	112,267,475	124,957,162	140,426,181
Percent Costed	109%	83%	65%	82%	85%

Source: Department of Energy (DOE) data for unobligated funds balance, beginning uncosted funds balance, approved funding program, obligations, and costs. Percent obligated and percent costed is a calculation based on data from DOE.

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Percent Costed: The proportion of the approved funding program that has been costed/expended.

Unobligated Funds Balance: The portion of budget authority (authorization to obligate Government funds) that has not yet been obligated.

Beginning Uncosted Funds Balance: Budget authority obligated in the prior year but not costed representing a portion of contract obligations for goods and services that have not yet been received.

Fossil Energy	FY 15	FY 16	FY 17	FY 18	FY 19
Unobligated Funds Balance	26,299,038	38,395,919	116,616,136	114,543,867	191,396,542
Beginning Uncosted Funds Balance	1,057,397,382	1,119,563,342	703,255,376	669,945,099	841,882,371
Approved Funding Program	597,583,966	735,954,178	696,714,481	836,535,906	863,227,408
Obligations	564,004,902	284,490,480	530,724,958	706,437,888	662,063,626
Percent Obligated	94%	39%	76%	84%	77%
Costs	501,838,942	700,798,446	564,035,236	534,500,616	622,361,879
Percent Costed	84%	95%	81%	64%	72%

Indian Energy	FY 15	FY 16	FY 17	FY 18	FY 19
Unobligated Funds Balance	10,329,903	5,955,226	1,801,375	34,106,622	7,479,868
Beginning Uncosted Funds Balance	1,815,486	3,899,893	17,716,452	24,887,373	19,145,895
Approved Funding Program	14,382,593	21,838,123	18,521,184	10,507,649	30,091,522
Obligations	6,234,982	20,373,903	18,061,602	3,786,401	28,571,712
Percent Obligated	43%	93%	98%	36%	95%
Costs	4,150,575	6,557,343	10,890,682	9,527,879	13,313,345
Percent Costed	29%	30%	59%	91%	44%

Source: Department of Energy (DOE) data for unobligated funds balance, beginning uncosted funds balance, approved funding program, obligations, and costs. Percent obligated and percent costed is a calculation based on data from DOE.

DOE Definitions

Approved Funding Program: The funds available for obligation and expenditure.

Obligations: Definite commitments that create a legal liability of the government for the payment of goods and services ordered or received, or a legal duty on the part of the United States that could mature into a legal liability by virtue of actions on the part of the other party beyond the control of the United States.

Percent Obligated: The proportion of the approved funding program that has been obligated.

Costs: The expenditure of funds for goods and services.

Percent Costed: The proportion of the approved funding program that has been costed/expended.

Unobligated Funds Balance: The portion of budget authority (authorization to obligate Government funds) that has not yet been obligated.

Beginning Uncosted Funds Balance: Budget authority obligated in the prior year but not costed representing a portion of contract obligations for goods and services that have not yet been received.

Loan Programs (Title 17 Innovative Energy Loan Guarantee Program and Tribal Loan Guarantee Program)	FY 15	FY 16	FY 17	FY 18	FY 19
Unobligated Funds Balance	18,958,000	23,453,000	507,000	10,016,000	20,255,000
Beginning Uncosted Funds Balance	1,741,927	5,763,228	9,621,919	2,616,583	1,454,517
Approved Funding Program	32,651,886	47,714,714	13,743,991	2,750,458	20,341,271
Obligations	25,222,259	32,389,038	12,641,765	214,245	8,054,267
Percent Obligated	77%	68%	92%	8%	40%
Costs	21,200,958	28,530,347	19,647,100	1,376,311	5,308,983
Percent Costed	65%	60%	143%	50%	26%

Loan Programs (Advanced Technology Vehicles Manufacturing Program)	FY 15	FY 16	FY 17	FY 18	FY 19
Unobligated Funds Balance	4,463,800,000	4,465,373,000	4,507,530,000	4,507,611,000	4,499,199,000
Beginning Uncosted Funds Balance	145,604,299	101,387,477	101,832,713	55,583,742	10,740,457
Approved Funding Program	25,166,254	7,118,494	7,692,468	7,734,654	42,668,582
Obligations	-8,299,154	4,425,121	-40,850,095	-40,008,134	39,195,567
Percent Obligated	-33%	62%	-531%	-517%	92%
Costs	35,917,666	3,979,885	5,398,874	4,835,149	37,324,769
Percent Costed	143%	56%	70%	63%	87%

Source: Department of Energy (DOE) data for unobligated funds balance, beginning uncosted funds balance, approved funding program, obligations, and costs. Percent obligated and percent costed is a calculation based on data from DOE.

DOE Definitions

Approved Funding Program: The funds available for obligation and expenditure.

Obligations: Definite commitments that create a legal liability of the government for the payment of goods and services ordered or received, or a legal duty on the part of the United States that could mature into a legal liability by virtue of actions on the part of the other party beyond the control of the United States.

Percent Obligated: The proportion of the approved funding program that has been obligated.

Costs: The expenditure of funds for goods and services.

Percent Costed: The proportion of the approved funding program that has been costed/expended.

Unobligated Funds Balance: The portion of budget authority (authorization to obligate Government funds) that has not yet been obligated.

Beginning Uncosted Funds Balance: Budget authority obligated in the prior year but not costed representing a portion of contract obligations for goods and services that have not yet been received.

Nuclear Energy	FY 15	FY 16	FY 17	FY 18	FY 19
Unobligated Funds Balance	28,090,000	35,859,000	48,204,000	78,455,000	114,440,000
Beginning Uncosted Funds Balance	428,919,984	433,778,712	469,638,804	556,569,302	752,392,619
Approved Funding Program	907,526,087	979,942,434	1,009,945,216	1,170,304,366	1,280,130,783
Obligations	895,750,890	961,680,963	997,164,990	1,145,401,042	1,263,742,171
Percent Obligated	99%	98%	99%	98%	99%
Costs	890,892,163	925,820,870	910,234,493	949,577,725	1,195,539,872
Percent Costed	98%	94%	90%	81%	93%

Source: Department of Energy (DOE) data for unobligated funds balance, beginning uncosted funds balance, approved funding program, obligations, and costs. Percent obligated and percent costed is a calculation based on data from DOE.

DOE Definitions

Approved Funding Program: The funds available for obligation and expenditure.

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Percent Obligated: The proportion of the approved funding program that has been obligated.

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Percent Costed: The proportion of the approved funding program that has been costed/expended.

Unobligated Funds Balance: The portion of budget authority (authorization to obligate Government funds) that has not yet been obligated.

Beginning Uncosted Funds Balance: Budget authority obligated in the prior year but not costed representing a portion of contract obligations for goods and services that have not yet been received.

Senator MANCHIN. I think your office has this. If you don't, we will make sure you get it.

So, if you want to continue, if you want to discuss the trends there. Let me go a little bit more in detail on that. The DOE's Title 17 Loan Program provides a significant opportunity for high-impact, energy-related ventures to receive the support and financial backing of the Federal Government. It helps commercialize advanced energy technologies that private lenders cannot or will not support and all the while has maintained a default rate that is lower than most conventional banks and has made over \$2 billion in interest payments to the Treasury. Most importantly, there are billions of dollars in unused loan authority that you have now at the DOE that could use the help to build the next generation of energy infrastructure.

I understand the Loan Program Office has enhanced the pre-application and consultation process to better prepare prospective applicants to submit successful applications and reduce their application cost. There has to be a reason why there is such a low amount going out the door. Either it is so cumbersome or, basically, they need some help and assistance. I think you are moving in that direction. I hope so. But the President, again, has recommended wiping out the Title 17 Program which has the greatest opportunity to help us for the 21st century energy needs. So if you can report on that, what you are doing, what you intend to do as we have to restructure this budget request the President put in.

Secretary BROUILLETTE. Senator, thank you. I will elaborate just a bit.

As you and I discussed privately yesterday, I'm very familiar with the loan program having been a young staffer on the Hill many, many years ago, which seems like five lifetimes ago, who saw some of the earliest drafts of this particular program and saw it become law in 2005. So I was happy to see that.

With regard to the structure of the program itself, one of the things I've noticed, 15 years later having spent a lot of time in the financial services industry with USAA, was it appears to me that we have some requirements in place that may slow down the process to your point. And what I mean, specifically by that, is that I've asked for a formal review, for instance, of the equity requirements of this program. I don't know that they're inappropriate, but I can't be assured that they're appropriate either. And what I've asked our Loan Program Office to do is to completely review those roles and requirements to simply ensure that we're not putting artificial blocks in the way of loans being made through the program.

I would be happy to come back and brief you more formally and in a more detailed fashion, but you have my assurance that we have begun the process to look at these rules and regulations within the program.

Senator MANCHIN. The only thing I would ask, but I would also recommend too, is that you use the GAO. We use the GAO to find out who is efficient, who is not efficient, if they are completing the task in legislation that we have passed, a task that we have asked every agency to take on. I would think coming in, in your new role right now, it might be good to have an outside entity looking in to see where your efficiencies are or deficiencies are and how you can

improve that. They are quite skilled at what they do. They give us a good look at what we can do and improve upon.

So I would recommend anything you can do using GAO reports basically. We have given you the one that we asked for last year. If you could get one to update that, if not, we will do it for you, but I think if you do it for yourself, it might be a little bit better.

Thank you.

Thank you, Madam Chairman.

Secretary BROUILLETTE. Yes, sir.

The CHAIRMAN. Senator Hoeven.

Senator HOEVEN. Thank you, Madam Chairman.

Mr. Secretary, thanks for being here today. We appreciate it very much.

Secretary BROUILLETTE. Thank you, sir.

Senator HOEVEN. I am very concerned that we have adequate baseload power on the grid so that we don't have blackouts or brownouts. So my question is, do you agree that early closure of critical baseload assets including our coal-fired electric plants will have an impact on reliability and do you share my concern about the early closure of critical baseload assets and resulting impacts on reliability, including the potential for blackouts and brownouts, if we don't have adequate baseload?

Secretary BROUILLETTE. I do, Senator. I do share your concern. It's one of the reasons why we've established at the Department what we refer to as the North American Energy Resiliency Model, or NAERM model. What that allows us to do is to see in near real time the impacts of the loss of baseload power and in certain cases, renewable power, all throughout the grid. As you and I have discussed in the past, we're not yet at the point where we can rely entirely upon renewable power. It is critical that we maintain our baseload facilities all throughout the country, and that includes not only coal but natural gas and nuclear as well.

So we share the concern. We think it's a real concern. We do not think in any way that it inhibits our goals toward increased battery storage. We've talked about that in the past as well. Our view on grid-scale battery storage, for instance, is that it's good, not only for the provision or eliminating, you know, in certain cases, the intermittency of renewable power. This type of battery storage is also important for the providers of baseload electricity as well. If a nuclear institution or a coal facility or a natural gas facility goes offline, perhaps due to, for instance, a cyberattack, battery storage, grid-scale battery storage can allow us to cover whatever gaps may occur as a result of that type of attack.

So I think the fundamental point is that yes, baseload is key. We must maintain it. And we cannot afford to lose some of these facilities at the rate at which we have been losing them over the course of the last four to five years.

Senator HOEVEN. Does that include making sure electric markets better value capacity provided by baseload power, particularly during instances where there may be a shortage or, as you say, an issue with intermittent power?

Secretary BROUILLETTE. I think it does. Each of these facilities brings certain values to the marketplace, and I think it's incum-

bent upon the regulators to regulate or to recognize the value that they do bring.

Senator HOEVEN. 45Q. We passed legislation in 2018 to provide a tax credit for capturing carbon and sequestering it. Now Treasury is working through the regulations. They have gotten through a lot of it, but we need to get that finished up. We have projects ready to go. For example, you are familiar with Basin Electric in our part of the country?

Secretary BROUILLETTE. I am.

Senator HOEVEN. There is a coal gasification plant. They already capture half their CO₂ to put it down a hole for EOR. They will capture the rest of it and put it down a hole for geologic storage but it is very important that the definition, as Treasury finishes these regulations, that A, they get it done, and B, they get it right.

So tell me, do you support and will you assist in terms of making that case to Treasury, that that definition of carbon capture equipment needs to be broad enough and done right so that we have plants in addition to power plants, like the coal gasification plants and ethanol plants? We have an ethanol plant that will do the same thing, Red Trail Ethanol. Of course, you have been out and we want you to come back and see them, but these projects will start right away if we get this reg right. Will you commit to help doing it?

Secretary BROUILLETTE. You have my commitment to do that. We do support it. We do want to see these rules finalized. I have had numerous conversations with my colleagues over at the Treasury Department. We were pleased to see just recently, the preliminary guidance coming out of the IRS. I will continue to urge Secretary Mnuchin, the IRS and others at the Treasury Department to complete the process. It's very, very important—

Senator HOEVEN. Yes, I mean—

Secretary BROUILLETTE. —that the industry have a clear, certain signal.

Senator HOEVEN. Excuse me, thank you, Secretary, I appreciate it.

Secretary BROUILLETTE. Sure.

Senator HOEVEN. Also, same thing with Project Tundra. Again, here is a power plant project that wants to do the same thing. You are familiar with it. Your commitment to help them?

Secretary BROUILLETTE. Sure.

Senator HOEVEN. This is a state/federal DOE private company partnership, latest, greatest technology. Your continued support?

Secretary BROUILLETTE. Yes, you have that.

Senator HOEVEN. Also, with the Energy & Environmental Research Center, the cooperative agreement, extremely important. Your commitment to continue that support? Again, part of doing this new technology, once we deploy it, there will be other adopters around this country and overseas that are going to not only make sure we get that dependable electricity, baseload electricity, but with carbon capture.

Secretary BROUILLETTE. Complete agreement, sir.

Senator HOEVEN. Let me switch gears for just a minute. You touched on it earlier, but commitment to support the national labs and DOE's effort to upgrade our nuclear force as part of making

sure that our triad continues to be the effective deterrent it is and that we are technologically the most advanced so that we can continue to hold that very important defense advantage over our adversaries for the safety of our country.

Secretary BROUILLETTE. Absolutely important point. You'll notice that the President's budget includes a significant increase in the weapons program at NNSA. We have put together a program that we think modernizes the nuclear triad—our component of that program, in particular. It's very important that we focus on the infrastructure in NNSA and upgrade some of the facilities that are now approaching 60 and 70 years old. It's time for us to renew this, redo this entire infrastructure.

Senator HOEVEN. Thank you, Mr. Secretary. I appreciate it.

The CHAIRMAN. Thank you, Senator Hoeven.

Senator Cortez Masto.

Senator CORTEZ MASTO. Thank you, Mr. Secretary, I appreciate you appearing today. And let me just say this, I appreciate your opening comments about the Administration not seeking funding for permanent storage at Yucca Mountain. In fact, if I—

Senator KING. You had her at that comment.

Senator CORTEZ MASTO. That is right.

[Laughter.]

I am going to lead with that comment. The President said that he will respect the voices of Nevadans and look for alternative nuclear waste storage solutions rather than continue to force the unsafe and unworkable Yucca Mountain project. However, last month when testifying before the House Energy Subcommittee, the Under Secretary of Energy, Mark Menezes?

Secretary BROUILLETTE. Menezes.

Senator CORTEZ MASTO. Menezes indicated that the interim storage program and the funding requested for that program in the Department's Fiscal Year 2021 budget is and I quote, "To put together a process that will give us a path to permanent storage at Yucca Mountain." So who are Nevadans to believe and can you clarify that statement? Are we to believe the President and the budget that he has put forward and he is willing to look for alternative solutions or are you still working toward a pathway to some sort of permanent storage at Yucca Mountain?

Secretary BROUILLETTE. On the last part of your question, we are not working toward a pathway as a final repository at Yucca Mountain. So let me take a step back and perhaps clarify the remarks made by the Under Secretary.

It's my understanding in his testimony that he was quoting the law which is the Nuclear Waste Policy Act, and under that law it states very clearly that Yucca Mountain will be the final repository. That being said, however, because of the work of the Appropriations Committee, it is also the law of the land that we cannot spend money that has not been appropriated and there have been zero funds appropriated for Yucca Mountain. That stalemate is largely the result of the voices here in Congress, the voices of the people of Nevada and we have reached the point where the President has decided that we will not pursue this over the objections of the people of Nevada.

So I want to state clearly for the record, the Administration will not pursue Yucca Mountain as a final repository.

Senator CORTEZ MASTO. So, as Congress is the appropriators and say, for instance, and I hope this doesn't happen, but there are funds appropriated to continue down this path and put into this budget line item, would the Administration still not pursue permanent storage?

Secretary BROUILLETTE. We will follow the law, obviously, but it's our intent to look for alternatives to Yucca Mountain. It's our intent to begin a process and that's why we've requested \$27.5 million in the budget to do a few things. One is to maintain our fiduciary obligation to the people of Nevada and maintain the site. It is still a federal site, so we have to have guns, gates and guards, if you will, to maintain the proper security around the facility. But we would also propose that we be allowed to use that \$27.5 million to look at research and development that might lead to alternatives to that final repository at Yucca Mountain. So that's our intent.

Senator CORTEZ MASTO. So if we were to work here in Congress and as Ranking Member Manchin said, and I have been talking both with he and the Chairwoman, to pursue consent-based siting language that treats Nevada equally and fairly along with all the other states, would you and/or the Administration oppose or support that?

Secretary BROUILLETTE. Well, we would have to see the, you know, the work that's being done, obviously, but I can give you a commitment that we will work toward that end. That is the intent of the President's comments that he's made publicly. It's the intent of the U.S. Department of Energy. We will certainly work with the Congress. We will also work with policymakers at both the state and local level to find an appropriate ultimate solution for the spent fuel.

Senator CORTEZ MASTO. I guess my question would be more specific. When you say you would work toward that solution, the consent-based siting looks toward treating Nevada equally like other states, and what we are looking to do is give the states a say and a voice in this process, including all the stakeholders. Is that something that you would oppose or support?

Secretary BROUILLETTE. Sure. We would certainly support that type of process, yes.

Senator CORTEZ MASTO. Okay, thank you.

And then, if we were to consider a repeal of the 1987 amendment that designated Yucca Mountain as the nation's sole nuclear waste repository, would you oppose or support that?

Secretary BROUILLETTE. Oh, I'd have to reserve judgment and see exactly what you're doing but, you know, I'll go back to what I said earlier, we are not going to pursue Yucca Mountain as a final repository.

Senator CORTEZ MASTO. And the alternative solutions, can I ask that Nevada be a part of that discussion and have an integral say—

Secretary BROUILLETTE. Absolutely.

Senator CORTEZ MASTO. —in how that plays out?

Secretary BROUILLETTE. Absolutely.

Senator CORTEZ MASTO. And a commitment from you on that?

Secretary BROUILLETTE. Yes, absolutely.

Senator CORTEZ MASTO. Thank you.

Then let me talk to you about the Nevada National Security Site (NNSS). As you know, DOE shipped a half metric ton of plutonium to Nevada, to that site, from the Savannah River Site in South Carolina. I worked with DOE and have gotten a commitment to begin removing the plutonium from the NNSS in 2021, a complete removal by end of 2026. Will the Department still be able to meet its commitment to remove that plutonium from the NNSS by 2026?

Secretary BROUILLETTE. Yes.

Senator CORTEZ MASTO. Thank you.

And then, can you talk a little bit about, I understand there is a budget request which includes more than a \$230 million increase for the National Nuclear Security Administration. What is that money for?

Secretary BROUILLETTE. That money is to complete work that was started some time ago, as you know, and thank you, I should thank you publicly for your visit there. The employees tremendously enjoyed your visit, and they enjoyed the opportunity to talk to you about the important work that's being done there.

That site conducts a number of different research projects, many of which are classified, so I must be careful about what I say in a public setting, but they are all related to national security. They are all related to the important national security mission, particularly at the NNSA, the National Nuclear Security Administration, which is part of the DOE. We want to see that work continue. We think as we begin this process of modernizing the nuclear triad, the research and development work that's going to be done at that site will determine our ability to safely maintain the stockpile for the next 30, perhaps 40, years.

Senator CORTEZ MASTO. Thank you, Mr. Secretary.

The CHAIRMAN. Thank you, Senator.

Senator BARRASSO.

Senator BARRASSO. Thank you, Madam Chairman.

Mr. Secretary, good to see you again.

Secretary BROUILLETTE. Good to see you, sir.

Senator BARRASSO. Good to be able to spend time with you at the International Security Conference—got back safely.

Secretary BROUILLETTE. In Munich.

Senator BARRASSO. Then I saw you with the President the week after that, I believe in India.

Secretary BROUILLETTE. So if I say anything really stupid, can I blame it on jet lag?

Senator BARRASSO. You may, that is right.

I can't imagine you doing that, however, saying anything stupid because you are very thoughtful on all of these topics.

I did want to talk to you about in late January the Federal Appeals Court severely restricted the eligibility of small refineries in the standpoint of hardship relief under the Renewable Fuel Standards. If allowed to stand and applied nationally, the ruling is going to put dozens of small refineries and tens of thousands of jobs at risk. In my home State of Wyoming we have five small refineries and employ thousands of men and women. New reports have indicated that the EPA may decide not to appeal this ruling and in-

stead just apply the whole thing nationally. I think it would be disastrous.

I think about a dozen of us, Senators, called upon President Trump to appeal the ruling. Have you explained to the White House what it would mean if all these small refineries are no longer eligible for this hardship relief?

Secretary BROUILLETTE. We've had a robust conversation within the White House on this particular policy. With regard to the Tenth Circuit decision, I can't really give you a precise answer. It's not a decision I get to make alone. I'll be working with my colleague, Andy Wheeler, over at EPA and obviously our friends at the Department of Justice on any final decision. But I'd be happy to follow up with you, personally, and give you whatever details I might learn from those conversations.

Senator BARRASSO. That would be helpful, thank you.

I want to talk about uranium now. Last July President Trump acknowledged that relying on foreign imports of uranium poses a security threat to our nation. He established the Nuclear Fuel Working Group and wanted to recommend actions to revitalize the nuclear fuel supply chain. The report was originally scheduled to be released October 12th of last year. Now here we are and it is in March. It has not yet been completed, at least we haven't seen it.

Mr. Secretary, America's uranium producers are facing dire financial situations, immediate relief is required, making funding available now is required to save the uranium mines. Uranium miners in my home State of Wyoming were encouraged by the President's budget request. It seeks \$150 million to create a uranium reserve, but that is going to take some time.

When will the Nuclear Fuel Working Group's report be finished and released, the one where the assignment was due last October?

Secretary BROUILLETTE. It is my sincere hope that later today you will see the final report. We have been working on this, as you pointed out, since last July. This began with a 232 filing at the U.S. Department of Commerce. At that point in time we went through an extensive review of the front end of the fuel cycle. Commerce, along with the U.S. Department of Energy, the President of the United States, all determined that the loss of leadership in the nuclear industry represented a national security concern for the United States. He has put together this working group. I will assure you that it would include not only the very front end of the fuel cycle, meaning the mining portion of this, we will find ways to revitalize that part of the industry. But it would also include other measures that we will take to enhance the mining capabilities, as you know, simply pulling the uranium out of the ground doesn't do much for purposes of creating nuclear fuel. We have to have enrichment, conversion. Other operations need to occur in order to make this product useable in the industry. The proposal that we will put forth, and I know that we've had some preliminary conversations with your staff, will be all encompassing and will address the entirety of the fuel cycle, the front end of that fuel cycle.

Senator BARRASSO. Are you prepared to provide immediate relief for the uranium producers in America.

Secretary BROUILLETTE. Yes.

Senator BARRASSO. So I would like to now focus, if we could, and turn your attention to carbon capture, utilization, sequestration. Wyoming sees a real opportunity not only to reduce carbon emissions but to put those emissions to good use whether it's to enhance oil recovery operations or develop coal-related carbon products. Can you explain how the Office of Fossil Energy is advancing these capture and utilization technologies?

Secretary BROUILLETTE. Sure, Senator, I will.

What we have put together within the Office of Fossil Energy is an organization or suborganization that's known, or it's developed a product known as Coal FIRST. It's a, I think, a very innovative program that focuses on coal but the technologies that can be used in this area of carbon capture and utilization don't apply exclusively to coal, they can also be utilized in natural gas as well. But the whole concept and the whole purpose of the work there is to develop smaller, more efficient and ultimately zero emissions coal facilities. So that's what we are working toward. Part of that is utilizing carbon capture and utilization, CCUS, but it's a little bit more robust and a little bit more comprehensive than just that one technology.

Senator BARRASSO. Thank you very much, Mr. Secretary.

Thank you, Madam Chairman.

The CHAIRMAN. Thank you, Senator Barrasso.

Senator King.

Senator KING. Thank you, Madam Chair.

Mr. Secretary, I like you. I voted for you, but I really don't like your budget.

[Laughter.]

And a wise person once said, budgets are policy. We can talk about policy, but budgets really are policy. I look down the list under energy efficiency and it is, kind of, a who's who of backward policy. I mean, let's see, we want more efficient vehicles, so let's cut vehicle technologies by 81 percent; or bioenergy technologies, let's cut that by 82 percent. Hydrogen and fuel cells, very promising, minus 72 percent. It goes on and on. Solar, minus 76 percent. Wind, minus 78 percent. Water power, that's only minus 69 percent. Geothermal, a tremendous potential, minus 76 percent. You just go down and down the list.

I don't get it. I mean this is, this is the future. This is where we're going to try to solve these very daunting energy problems, and you are cutting everything. I think the total is 74.7 percent. Three quarters. What possible justification is there for that?

Secretary BROUILLETTE. Well, I think what you're looking at, Senator, and I appreciate your comments. And thank you for your kind comments and thank you for your support, not only here in the Committee, but on the Senate Floor as well. I sincerely appreciate that and, you know, my family also enjoyed our conversations about our Acadian heritage. So thank you for those as well.

But with regard to your specific question, I think it's important for us to recognize, and sometimes take a step back and recognize, that the Department conducts research and development complex-wide. So the Office of Science, for instance, other laboratories, for instance, all do work—

Senator KING. We haven't even gotten to ARPA-E yet, so be careful.

Secretary BROUILLETTE. I understand. I understand.

But the complex conducts research enterprise-wide.

Senator KING. Are you telling me that research in vehicle technologies, wind energy, advanced manufacturing is being done on, is being offset by these numbers? If so, I would like to see it.

Secretary BROUILLETTE. In certain cases, it is. In certain cases, it is. So, for instance, with regard—

Senator KING. Well, if you could produce that for the record, I would like to see it.

Secretary BROUILLETTE. Sure, I'd be happy to do that.

I'll just give you one quick example. So, for instance, with regard to advanced manufacturing and vehicle manufacturing. Some of that work is being done at Oak Ridge National Laboratory in the area of advanced materials.

Senator KING. It is where I just visited. It is very impressive what they are doing.

Secretary BROUILLETTE. It's very impressive, you know, the 3D printing capabilities there are phenomenal. But it's that type of—

Senator KING. You said that on purpose because you know the largest 3D printer in the world is at the University of Maine.

Secretary BROUILLETTE. Is in Maine.

[Laughter.]

Exactly right.

Senator KING. Nice try.

Secretary BROUILLETTE. You can read my mind.

So when you look at the specific line items, you know, if you go through it as an accountant, you can very easily see the cuts, but I think what's important is to look at the results of the work that's being done at DOE and that's crosscutting.

Senator KING. Well.

Secretary BROUILLETTE. It goes all across the complex.

Senator KING. If you are suggesting that they are offsetting increases in other areas that will mitigate this disaster, I would like to see that.

But let me move to ARPA-E because I looked at ARPA-E, and you did something that I didn't think was possible. You cut something 173 percent. Now the reason that is possible is that you didn't spend a significant part of the funds that were allocated by the Congress last year. Now, you and other members of the Administration have sat here and said, we will do what the Congress told us to do. We will follow the law. In fact, you used that exact phrase. We will follow the law.

Well, not spending a substantial portion of the funds that Congress allocates and then trying to claw them back the next year, is not following the law. Congress appropriated that money in order to put it toward important scientific projects and the figure is in the range of a hundred and some odd million dollars. It is minus \$310 million that you are clawing back. And again, this fundamental research is one of our most basic bulwarks against the energy catastrophe that is heading for us. What is the thinking?

Secretary BROUILLETTE. It's a fair point. The, you know, there were some carryover funds from that particular program, but I would offer that, you know, it's a bit of a chicken and egg. You're absolutely correct that we have an obligation to follow the law. We have an obligation to get the money out of the door as quickly as possible in accordance with the appropriations that you generously provide us.

It also requires applicants on the other side, however, that we have an obligation to conduct due diligence on. So, it's not just a question of, you know, getting the money and moving it out the door, it's getting applicants on the other side that are fully qualified to receive the money. So it's a process.

Senator KING. Certainly, I understand that. And I'm not asking you to air drop money over Maine or Colorado or anyplace else but there is, I mean, the problem is for the past several years I've sat and been satisfied by the representation saying, we will follow the law, when a half or two-thirds of the money that's been allocated and it's invasion of the Congress' power of the purse. We have the ultimate authority on appropriations and the responsibility. I think the phrase is, "Take care that the laws be faithfully executed." And I don't think it's being faithfully executed when a substantial portion is held back and then is attempted to be clawed back in the following year's budget.

But I am sure you're going to help me out here and provide the data that we have discussed, and I look forward to working with you.

Secretary BROUILLETTE. Yes, sir, I will. I will make myself available to you or your staff and I will provide any detail that would support the comments I just made. And I will also, again, reiterate the point that, you know, this is a proposal that is the President's budget, but as you rightfully point out, you will, at the end of the day, determine the final budget as well as the final appropriations that are associated with these programs and you have my commitment—

Senator KING. And that's the right answer, but you have to commit to administering that budget according to the way it is passed here. You understand my concern.

Secretary BROUILLETTE. I understand your concern.

Senator KING. Thank you.

Thank you, Madam Chair.

The CHAIRMAN. Thank you, Senator King.

And Secretary, I think following Senator Manchin's comments and the observations that he had made about the GAO report, I think that that is something that the Committee would appreciate a more detailed review from the Department. So we will look forward to that.

Secretary BROUILLETTE. Yes, ma'am.

The CHAIRMAN. Thank you.

Senator Heinrich.

Senator HEINRICH. Secretary, how much input did you have in crafting this budget?

Secretary BROUILLETTE. Sorry, sir?

Senator HEINRICH. How much input did you have in crafting this budget?

Secretary BROUILLETTE. A fair amount, I mean, I'm not quite sure of the premise of your question. It is a robust process that occurs between the agencies and OMB.

Senator HEINRICH. Well, because I think what you have heard on this Committee is those of us who know you and know your level of professionalism and your commitment to R&D and other programs are trying to reconcile a budget that, frankly, sucks, with the way that you present yourself in front of this Committee. And it is very difficult to do. And you point to the results that the Department of Energy has produced and none of us will question those results. I would point out the fact that I think those results are directly the result of this Committee and Congress working to restore what have been proposed cuts, year after year, from this Administration.

I entirely agree with my colleagues on issues like ARPA-E and the incredible laundry list that Senator King went through, but it is a little closer to home, in particular, in Los Alamos for me, when, you know, Senator King said, "Budgets are policy." And that is very much true. But budgets are also about values and priorities. And this budget proposes nearly, almost, a 50 percent cut in environmental cleanup at Los Alamos. I can't understand why this Administration does not value cleanup and would risk breaking the legal commitments that the Department of Energy has made to the State of New Mexico with budget numbers like that. Why is the cleanup number so abysmal in this budget?

Secretary BROUILLETTE. So let me take a step back and address the process. We do have a very robust process, as I'm sure you're very aware. With regard to some of the programs that you mentioned, programs like ARPA-E and the loan office and what not, I engaged very early on and recommended alternative numbers, but as you know, this is a negotiated effort. So I won some and I lost some is the bottom line.

And the few that I lost, I think, you know, create some concern for this Committee. I can only suggest to you what I said earlier. If the Committee has a different view about ARPA-E, if the Committee, if the Congress has a different view about the Loan Program Office, I will ultimately follow the direction of the Congress because it is you that has the ultimate authority on these programs.

But I give you my assurance that I didn't take a back seat in the conversation, you know, with OMB and others, but as you do here in this Committee, as you do with your colleagues on the Senate Floor, you engage in debate. Some you win. Some you lose.

Senator HEINRICH. Secretary, do you think you could meet your commitments under the consent order to the State of New Mexico with the budget numbers that we see for cleanup at Los Alamos?

Secretary BROUILLETTE. I do. I do.

Senator HEINRICH. How?

Secretary BROUILLETTE. Because there, some of the cuts that you're referring to involve carryover funds or unexpended funds that were from years past. So those monies are not needed, you know, for us in 2021 at this point in time. Thanks to the work of the Congress, thanks to the U.S. Senate and the U.S. House, we have a full year appropriations all the way through the end of

2020. So, none of the milestones, to my knowledge, to the best of my knowledge, are going to be impacted.

Senator HEINRICH. I am not sure that inspires confidence in me, and I am not sure it inspires confidence in the Governor of the State of New Mexico, although I don't want to speak for her. But given the limited time here, I would like to shift real quickly to something that we took up with respect to the Defense Nuclear Facilities Safety Board (DNFSB). I think all of us can agree that nothing is more important at our national labs than assuring the safety of the people who work there and the public surrounding them. That is why you saw myself and others worked on legislation in the past year that reversed the effects of DOE's new Order 140.1 that limited the Board's access to people, information and facilities. Can you update us on the current status of that order? Has it been suspended and is it being rewritten?

Secretary BROUILLETTE. It's being revised. So I appreciate your interest in the matter. I would just take a few seconds to back up and to lay the predicate for what was the purpose of 140. It was simply to clearly define the roles of the DNFSB versus the Department of Energy, who is the regulator for these matters, these nuclear matters. The DNFSB, in our opinion, I think, in accordance with the statute, is an advisory board. We simply sought to clarify that relationship. At no point did we seek to deny DNFSB access to a DOE facility or access to the materials that they need to properly advise us.

That being said, however, I recognize the language in the NDAA. I recognize the concerns that were raised as a result of the order. We have begun the process of revising the order. I will be meeting with the DNFSB later this month, and we hope to have it completely resolved.

Senator HEINRICH. I am glad to hear that you will be meeting directly with them.

The CHAIRMAN. Thank you, Senator.

Senator Cantwell.

Senator CANTWELL. Thank you, Madam Chair, thanks for the hearing. It is great to see you, Secretary Brouillette. I obviously, would like to talk about a variety of things, but you know I need to get to Hanford.

But I will mention, you know, obviously, I am very concerned about cybersecurity and want to note that we have now seen, Madam Chair, the first successful attack on our power system that actually interrupted the electric system controlling 500 megawatts of power in generating sites in California, Utah and Wyoming for over 12 hours. We have had many attacks where people have infiltrated our power systems and well, let's just say, snooped around, but in this case, they actually interrupted power. And so, we take these attacks very seriously. You can respond for the record, but we have the energy bill that is on the Floor that has provisions to upgrade resources for DOE. I would like to know what, additionally, you think we need to do to increase the CESER Office, but we want to give you more resources on the Grid Storage Launch Pad, grid strategy for storage and integration, very happy for the support of PNNL on this point.

Like the Chair mentioned, the ARPA-E budget we are a little mystified about given the importance of all of that. But let me turn to Hanford. The President's budget request is over \$1.5 billion below what Department of Energy officials have said that they want and need. I have two letters here from managers from the Hanford site that basically are saying this is what we need to meet the Tri-Party Agreement.

[The two DOE letters referenced follow.]



Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

BUD:SPO/19-BUD-0108

SEP 19 2019

MEMORANDUM FOR WILLIAM I. WHITE
SENIOR ADVISOR FOR ENVIRONMENTAL MANAGEMENT
TO THE UNDER SECRETARY FOR SCIENCE
EM-1, HQ

FROM: BRIAN T. VANCE *BTV*
MANAGER

SUBJECT: FISCAL YEAR 2021 ENVIRONMENTAL MANAGEMENT
COMPLIANCE BUDGET SUBMITTAL FOR THE OFFICE OF
RIVER PROTECTION

Consistent with Environmental Management's Fiscal Year (FY) 2021 Budget Formulation Guidance (draft) and the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) paragraphs 148 and 149, the Office of River Protection (ORP) is requesting \$2.050B for FY 2021. This request is responsive to Executive Order 12088 and recognizes the Tri-Party Agreement objectives of the U.S. Department of Energy, the U.S. Environmental Protection Agency, and the Washington State Department of Ecology.

ORP's FY 2021 budget request represents planned efforts for continued achievement of important cleanup progress.

In summary, the FY 2021 budget is designed to:

- Maintain safe and regulatory compliant facilities and essential services in Tank Farms;
- continue progress towards startup and commissioning of DFLAW;
- continue double-shell tank and single-shell tank safe storage operations surveillance, monitoring and maintenance;
- continue retrieval activities of single-shell tanks in A farm;
- continue 222-S Laboratory operations and maintenance to support DFLAW;
- continue 242-A Evaporator facility repairs;
- continue Effluent Treatment Facility operations and maintenance;
- initiate operations of the Tank-Side Cesium Removal unit in AP Farm;
- support commissioning of the Analytical Laboratory;
- continue components and system testing startup activities for the DFLAW and complete Loss-of-Power testing;
- complete engineering, construction, and startup activities for the Effluent Management Facility;
- complete Low-Activity Waste Facility startup and initiate cold commissioning activities; and
- advance High-Level Waste Facility engineering design.

William I. White
19-BUD-0108

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SEP 19 2019

ORP and the Richland Operations Office held a public meeting to gather input during development of the FY 2021 budget and invited the Oregon Department of Energy, the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, and the Nez Perce Tribe to attend the public meeting. Attached is a summary of the public meeting results as well as comments and correspondence we received.

ORP in conjunction with its Contractors will continue to evaluate and advance cleanup strategies and initiatives that optimize taxpayers' dollars, while working collaboratively with the Federal and State regulators.

If you have any questions, please contact me, or your staff may contact Gregory A. Jones, Assistant Manager for Business and Financial Operations, on (509) 372-8977.

Attachments:

1. Budget Priority Discussion Summary
2. Budget Priorities Public Comments.
and Correspondence

cc w/attachs:

M. C. Bell, EM-5.1
E. A. Connell, EM-4
C. H. Crawford, EM-3
N. S. Doyle Jr., EM-5
D. R. Einan, EPA
J. C. Griffin, EM-3
K. Niles, ODOE
R. W. Seifert, EM-4.31
A. K. Smith, Ecology



Department of Energy
 Richland Operations Office
 P.O. Box 550
 Richland, Washington 99352

BUD:SPO/19-BUD-0097

SEP 19 2019

MEMORANDUM FOR WILLIAM I. WHITE
 SENIOR ADVISOR FOR ENVIRONMENTAL MANAGEMENT
 TO THE UNDER SECRETARY FOR SCIENCE
 EM-1, HQ

FROM: BRIAN T. VANCE *B.T.V.*
 MANAGER

SUBJECT: FISCAL YEAR 2021 ENVIRONMENTAL MANAGEMENT
 COMPLIANCE BUDGET SUBMITTAL FOR THE RICHLAND
 OPERATIONS OFFICE

Consistent with Environmental Management's Fiscal Year (FY) 2021 Budget Formulation Guidance (draft) and the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) paragraphs 148 and 149, the Richland Operations Office (RL) is requesting \$1.335B for FY 2021. This request is responsive to Executive Order 12088 and recognizes the Tri-Party Agreement objectives of the U.S. Department of Energy, the U.S. Environmental Protection Agency, and the Washington State Department of Ecology.

RL's FY 2021 budget request represents planned efforts for continued achievement of important cleanup progress.

In summary, the FY 2021 budget request is designed to:

- Maintain safe, secure, and compliant activities, facilities, and operations, including groundwater pump and treat operations;
- continue to upgrade site infrastructure and services to support Central Plateau cleanup, including Waste Treatment Plant operations;
- support startup and commissioning to Direct-Feed Low Activity Waste (DFLAW) operations;
- initiate characterization and removal of contaminated equipment and water from K West Basin;
- continue progress on 300-296 waste site beneath the 324 Building;
- continue remediation of waste sites in the 100K Area;
- continue preparation for moving cesium and strontium capsules into dry storage;
- support repackaging of transuranic waste currently in storage;
- support groundwater pump and treat operations; and
- continue River Corridor and Central Plateau remediation of waste sites, canyons, and facilities.

William I. White
19-BUD-0097

-2-

SEP 19 2019

RL and the Office of River Protection held a public meeting to gather input during development of the FY 2021 budget and invited the Oregon Department of Energy, the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, and the Nez Perce Tribe to attend the public meeting. Attached is a summary of the public meeting results as well as comments and correspondence we received.

RL in conjunction with its Contractors will continue to evaluate and advance cleanup strategies and initiatives that optimize taxpayers' dollars, while working collaboratively with the Federal and State regulators.

If you have any questions, please contact me, or your staff may contact Gregory A. Jones, Assistant Manager for Business and Financial Operations, on (509) 372-8977.

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J. C. Griffin, EM-3
K. Niles, ODOE
R. W. Seifert, EM-4.31
A. K. Smith, Ecology

Senator CANTWELL. We take those DOE letters seriously because they are the ones negotiating with the state to meet those agreements. So if the budget is just over half of what they say is needed for compliance, what is DOE saying about the need to comply with the Tri-Party Agreement to make sure the resources are there for Hanford cleanup and for Hanford workers?

Secretary BROUILLETTE. Well, Senator, if it would be possible to get a copy of those letters, I'd appreciate that. I'm not sure that I've seen those, but I would be happy to review them and come back to your office and explain anything that you may want to know more about then.

I will assure you that within the part of the EM budget that we have proposed to the Congress, Hanford receives the largest amount of funding from that EM budget. It is roughly one-third of the entire EM budget.

Senator CANTWELL. Yes.

Secretary BROUILLETTE. And as I mentioned to you throughout my confirmation process, it remains my highest priority. What you are seeing, I think in this case, is perhaps the elimination of some unobligated balances or uncostered balances that were in the program. So with regard to the program that we have for Hanford in 2020, we're going to continue the good progress that we've already made. For instance, we will complete the completion of DFLAW this year. The hot start for that in 2023 is unaffected by this budget request.

We have eliminated and deferred in certain cases lesser priority projects within the EM program in order to maintain the aggressive schedule that we set for Hanford. You know, the things that we have put aside, however, are somewhat low risk relative to the other risks at Hanford. So that's what you see in the budget. Yes, there are cuts, but the priorities that we have established in places like Hanford still remain.

Senator CANTWELL. Secretary Brouillette, you believe in upholding the Tri-Party Agreement and meeting those milestones, correct?

Secretary BROUILLETTE. I do.

Senator CANTWELL. Okay, so I think that is where the confusion is, and these are your local managers saying this is what they need. So, yes, please—

Secretary BROUILLETTE. Sure.

Senator CANTWELL. —review that. This has been one of Hanford's biggest problems all along is that people look at that number and they go, oh, my gosh, it is so big. What can I do to reduce it? When in reality we should be asking the question, what does it take to clean up the largest nuclear waste site on the entire globe? What does it take?

And as we can see, it takes a lot because it is very complex and the responsibility of the United States to get that done is the key responsibility represented in that Tri-Party Agreement. So we can't just look at it and go, oh my gosh, it is so big. That is what every energy secretary does. They come in. They look at that number, I am sure enticed by some OMB person, who says, oh, my gosh, here is where we can find half a billion dollars. Let's lop that off. We

do appreciate the progress that we are making but we don't want to let up now. Please review these, and I appreciate you being here.

Secretary BROUILLETTE. I will. I will, Senator. And neither do we. We don't want to let up and that's why, at the request of the Department of Ecology in Washington, we have begun a holistic review of the work at Hanford. We're going to look at everything from size and scope, and we'll want to have a honest conversation about what does it take to make meaningful progress there. I think, you know, without casting aspersions on previous, you know, administration officials, I don't know that we've had a complete and thorough assessment of the work that needs to be done there and that's one of my goals is to sit down and really put a pencil to this and really put the brightest minds to it so that we can begin the process of meaningful cleanup.

And it's not to suggest that cleanup hasn't already occurred. It certainly has. But we want to make sure that we can continue this work for the next 20 to 30 years.

Senator CANTWELL. Thank you, Mr. Secretary. I just don't want the budget to be the target. I want the cleanup to be the target.

Secretary BROUILLETTE. Fair point.

Senator CANTWELL. Thank you very much, Madam Chair.

Secretary BROUILLETTE. Fair point.

The CHAIRMAN. Thank you, Senator Cantwell.

Senator Daines.

Senator DAINES. Thanks, Chair Murkowski.

Secretary Brouillette, welcome. It is great to have you here today. I hope that we can have you out to Montana soon. Snow is starting to melt and then you can see firsthand our balanced energy portfolio we have in Montana and the issues we were discussing today like the Colstrip Power Plant. Montana is a great example, truly, of all-the-above energy portfolios. We are grateful for that in Big Sky Country.

Mr. Secretary, your budget seeks to reorganize how the Department does research for carbon capture, utilization and storage, better known as CCUS, and you fund it at approximately \$100 million less than the last fiscal year. As you know, CCUS research and development is critical if the U.S. plans on leading the commercialization and use of this technology which will lead to lower carbon emissions and maintain important baseload power from coal- and gas-powered plants. Fortunately, the Senate is taking major steps to prioritize CCUS research in the energy bill that is on the Floor this week which I thank the Chairman for her leadership there as well as the Ranking Member.

Fortunately, one of the bills included is this EFFECT Act which the Chairman, Ranking Member and myself introduced. This bill requires that DOE focus on getting CCUS technology out to the market, including through demonstration projects and a large-scale pilot plant. We think that Montana is a perfect place for this kind of project. Unfortunately, Montana communities have suffered through numerous coal plant closures, including the recent closure of Colstrip Units 1 and 2. Bringing a large-scale CCUS project to these communities would help keep and grow jobs and revitalize these rural towns.

Mr. Secretary, how could Montana partner with DOE to set up a large-scale CCUS project like the one that will be created in our EFFECT Act?

Secretary BROUILLETTE. Thank you, Senator, for your comments. I'm very aware of Colstrip and its importance, not only to Montana but to our national grid as well. As you and I talked about in the past, we've begun the process within DOE to look at defense critical infrastructure and I assure you that I will be reviewing Colstrip's role in your part of the woods, if you will, your part of the country and its importance to our national security and how it interacts with the rest of the grid.

With regard to CCUS, we had an earlier conversation with other Senators about some of the work that's being done by the IRS as well as the Department of Treasury. I have mentioned to my colleagues many times on the need to clarify those roles. We have to finalize them. We appreciate the guidance that came out just a few short weeks ago from the IRS. We think there are additional steps that need to be completed. We're going to continue to work with our Treasury colleagues and provide them the technical advice that they have asked for to finalize that important role. It's critical for us to send a clear signal to the industry, you know, that the rules are certain and final so that they can make the investments that they need to make to have this technology come forward.

With regard to the pilot project at Colstrip, I would welcome an opportunity to talk to them directly and to engage them in some of the studies that we're doing at the DOE, especially with regard to some of our pre-FEED studies. And I would like to invite them to come into the Department or meet with me and the team so that we might figure out as to whether or not Colstrip meets the conditions for a pilot project going forward.

Senator DAINES. Secretary Brouillette, I like that idea and we ought to work to get some of those folks here, face-to-face, and perhaps we will do something similar, and bring you out to Montana.

Secretary BROUILLETTE. Yeah.

Senator DAINES. The community would very much like to have you see, first of all, it is an amazing community, and to see how we believe looking at it purely on the criteria of where is the best place to locate something like that, why it would, I think, meet that criteria and seeing it firsthand, kicking the tires, touring the plant—

Secretary BROUILLETTE. I would love to do that.

Senator DAINES. —would be very helpful. We will work with you on that, and I appreciate your support for the consideration of that and hope we make that happen.

Secretary BROUILLETTE. Yeah, I would be happy to go, and I'd bring a team with me so that we can more closely evaluate the entirety of the site.

Senator DAINES. Thanks, Mr. Secretary.

The CHAIRMAN. Thank you, Senator.

Senator Wyden.

Senator WYDEN. Thank you, Madam Chair.

Mr. Secretary, I want to stay with the Hanford issue. In May of 2017 an underground tunnel used to store radioactive waste at Hanford unexpectedly collapsed and the Department of Energy had

to spend millions of dollars not to clean up the tunnel but to fill it with cement to stabilize the site. My colleague, Senator Cantwell, and I wrote the Government Accountability Office on this. They were very critical of the Department's failure to adequately assess and monitor the risk to workers and the public from these kinds of aging waste sites, some with very large amounts of plutonium and other radioactive materials.

Now let me put this in, kind of, a little bit of historical, you know, context because this is our lifeblood. The Columbia River is right next to the lifeblood of Oregon and Washington. The Department of Energy has left the cleaning up of Hanford, arguably the oldest and worst environmental problems in the Department's complex, for last—. I want you to tell us how you are going to make this a priority when you are cutting the budget 40 percent. When I think of priorities, I think about budgets that say, hey, we are going to move this up to the top of the list. You have a budget that takes it down and down and down some more and you are doing it right in the face of a Government Accountability Office report. So reconcile for me how this is a big priority for you when the budget has plummeted.

Secretary BROUILLETTE. Thank you, Senator, I appreciate that opportunity.

The health and safety of the workers at Hanford are our highest priority. I'm familiar with the GAO report. They've given us a series of recommendations, many of which we've already begun to implement. They focus on, what they gave us specifically, was a brand-new risk evaluation process which we used to evaluate some of the aging facilities like the PUREX Tunnels both 1 and 2. Our process internally is already—we were already engaged in that. We're using the process to identify those facilities that need newer technologies, for instance, to allow us to assess them more clearly. We've developed robotic technologies that allow us to go into the tunnels without the use of, or exposing workers, I should say, to the dangers that exist there.

With regard to the overall budget in EM, as I just mentioned to Senator Cantwell, Hanford remains our highest priority within the EM program. It is the largest program within EM and it constitutes roughly one-third of the entire EM budget. The work that we have done there, the successes that we have accomplished there in 2019 will continue. For instance—

Senator WYDEN. My time is short, Mr. Secretary, and I am going to give you the last word on the subject, but let me just be clear on this. We have some of the worst problems at Hanford and some of the oldest ones and you are producing a budget that is going to take it even longer to deal with them. And so, I would just like, as part of your response here, for you to tell us which of the problems you are going to kick down the road even further now that you have a budget that proposes cutting such a substantial amount of money.

I would like that, in fact, let's do it two ways. I want to hear your response and I would like, in writing, within let's say ten days, a written response on which problems at Hanford are going to be kicked down the road as a result of the fact that the budget is being reduced by such a substantial amount.

Secretary BROUILLETTE. Sure. I'd be happy to respond to the specific projects at Hanford, if you will, that we've deferred. We have picked some very low-risk projects there in order to prioritize the work around DFLAW. As I mentioned to Senator Cantwell, we are committed to completing the construction of DFLAW this year. We have already staged the waste product that will go into that facility. We will begin hot start in 2023.

So some of the lower risk, you know, projects we have deferred for perhaps one year, I will provide that list to you in writing so that you can understand what they are. We've also deferred some projects in places around the complex as well to, again, fund the highest priority at Hanford. And what we saw that, we saw some of this work completed in 2019, it was, you know, addressing the issues around the K-Basin, those areas closest to the Columbia River, ensuring that that sludge is removed and safely stored was one of our highest priorities. We did that in 2019. We'll continue that work in 2020.

Senator WYDEN. My time is up, Madam Chair, but I just want to say, Mr. Secretary, I wish I had a nickel for every time a Secretary has said we are dealing with the high priority, safety and public health questions and well, we are going to have to defer some of the less important ones. Yet we still have essentially no cleanup, year after year after year.

I will look forward to getting a written response on what you all are deferring, and I thank you, Madam Chair.

Secretary BROUILLETTE. Yes, sir.

The CHAIRMAN. Thank you, Senator Wyden.

Senator Gardner.

Senator GARDNER. Thank you, Madam Chair. Thank you, Mr. Secretary, for being here today.

You will recall when we talked in my office that we discussed the infrastructure challenges at the National Renewable Energy Laboratory, NREL, in Golden, Colorado. As you know, this lab is an incredibly high priority for me and my great state. During my time in the Senate, funding for the lab has grown by nearly 50 percent, and I am grateful for the support from my colleagues for this incredible, incredible lab. While it is exciting to see the growth of NREL's research and the work they are doing, with that challenge, of course, and the expansion of their work and the successful partnerships in the private sector they have created, comes a challenge of adequate lab and office spaces. And so I was grateful to see the appropriators this Congress provide additional support and funding to NREL's facilities account in the FY20 Energy and Water Development Appropriations bill. This will certainly help with badly needed lab space and support the transformation of the National Wind Technology Center from a single program site for wind to a multiple program campus called Flatirons that also includes solar and batteries and the accompanying research.

The FY21 budget fails to build on this success. I think you will agree with me on how important it is to invest in equipment and facilities that support innovation, helps attract and retain talent and enables partnerships that transition the national lab's research to commercial products. I can see that impact on the ground each and every day in Colorado. I hope you will work with me and Con-

gress as we look forward to support level funding for the next fiscal year.

Secretary BROUILLETTE. I will indeed, Senator. I'm very familiar and thank you for the time that you spent with me to articulate not only the history and the context behind some of the efforts that you've put forth at NREL, but talking about the future and what it looks like. And I think it's very, very important that we continue the expansion.

I've met with Martin Keller, the Lab Director there, numerous times and he's explained to me the constraints that are being placed on the lab through the, you know, the limited office space, the limited laboratory space that he has available to him. I am committed to that. I'm committed to working with some of the private sector partners as well who have expressed interest in helping us develop some of the resources outside of the lab complex in certain cases. National companies like Wells Fargo and others have expressed interest in joining the lab in that effort. So I look forward to working with them. I give you my assurance we'll continue this project and continue this process.

Senator GARDNER. Thank you very much, Mr. Secretary.

Secretary BROUILLETTE. Thank you.

Senator GARDNER. This Committee has passed several bills relating to grid modernization and grid security that are part of the American Energy Innovation Act we are considering on the floor this week. Underpinning all of this, of course, is cybersecurity. I note that the new Office of Cybersecurity, Energy Security, and Emergency Response, or CESER, is addressing the challenge of securing today's energy infrastructure from cyberattacks and thank you for that work. But I am interested in whether or not there is a requirement in DOE's Applied Energy programs to ensure adequate resources and attention are given to incorporating cybersecurity early in the design of emerging energy technologies rather than bolting security on after the deployment onto the grid. Is there a process enabling CESER to assist these programs and within the other applied energy programs as research matures to the point of commercialization, how is the importance of grid security communicated to industry and are they the questions that really are inward facing to DOE or outward facing to industry? How do we address those issues?

Secretary BROUILLETTE. We do have a very robust program within CESER to share the technologies and share some of the applied research within DOE with the industry itself. We do that in a number of different ways. One is just direct interaction with the Office of CESER, with utility executives, with other industry executives. The other way we do this is through a very formal process with the Electric Sector Coordinating Council. That's where we sit down and we talk about events that are happening, in real time, on the grid and address what responses we're going to use to attack them.

We have the CRISP program which is, you know, an acronym that I can't remember right at the moment because we have an acronym for everything in government service, but these are programs where we interact directly with the industry and share both experiences and new technologies coming online. And it's a two-way conversation.

The other thing that we have worked closely on are some of the newer technologies coming to market. And I'll just share real quickly something that we are very excited about that relates to cybersecurity, if not directly then tangentially, and that is the creation of a quantum entangled internet which we have now put about 52 miles of service in the Chicago area. University of Chicago, Argonne, Fermilab are utilizing this technology now. It's a closed circuit, quantum internet which, in many respects, obviates the need for cybersecurity, encryption, things like that. So it's a new technology that we hope at one point, if we can get support from Congress, to apply to all of our national laboratories and eventually move out into the public domain with our utilities as well.

Senator GARDNER. Thank you, Mr. Secretary.

Thank you, Chairman.

The CHAIRMAN. Thank you, Senator Gardner.

Senator Hirono.

Senator HIRONO. Thank you, Madam Chair.

I would like to start by expressing my support for the Department of Energy's efforts to accelerate the development of energy storage. However, improving energy storage technologies is only one component to shifting to 100 percent renewable power like Hawaii is doing and this is why I introduced the Next Generation Electric Systems Act. The demonstration grants in the Act would bring together the DOE and private expertise to spur innovation in the ability of the grid to provide families and businesses with affordable power from clean sources while benefiting from energy storage, local microgrids and electric vehicles. I want to thank the Chair, the Ranking Member and Senator Cantwell for including the Grid Technology Demonstration grants in the American Energy Innovation Act that we are considering on the Floor even as we speak.

Last week you testified to the House Appropriations Subcommittee on Energy and Water Development that, "We need to get to grid-scale battery storage. That allows people to move even further, perhaps even to one day where we achieve the goal of 100 percent renewables."

You have acknowledged the vision of Hawaii and nine other states, District of Columbia, Puerto Rico, all of which have set 100 percent renewable and clean energy targets for their jurisdictions. How do you square the vision you shared last week with which I agree, and the scale of the challenge of confronting climate change with a budget that cuts renewable energy funding by 74 percent, cuts basic science funding by 17 percent and increases electricity funding by only two percent?

Secretary BROUILLETTE. Senator, thank you for the question. You know, what we have done in the budget is focus our investments into some very important areas and one of them you mentioned, the grid-scale storage initiative that we have at our Western lab, the Pacific Northwest National Laboratory, PNNL, in Washington State. We announced there the effort to build a new laboratory, or a new facility I should say, to develop grid-scale battery storage. And why is that important? It's important, not only for the purposes of integrating renewable energy onto the grid, which is something I know that you care deeply about and Hawaii has been a

leader on. It's also important for grid resiliency itself. If we have grid-scale battery storage, for instance, for a nuclear facility or coal facility——

Senator HIRONO. Excuse me. Of course, I am with you on the need for battery storage research, but it is just one part of getting to a renewable energy future. So, you know, this may be more a statement or a comment, but as some of my colleagues have already said, your budget, the budget reflects values and I do not believe that this budget reflects the value of supporting alternative and renewable energy.

Let me move on.

Each year the Trump Administration has proposed canceling the Advanced Research Projects Agency-Energy, ARPA-E. And so far, Congress has wisely rejected the idea each year. Congress established ARPA-E to take a chance on highly innovative energy technologies that could benefit the public in the long-term. For example, ARPA-E is supporting research in Hawaii on harvesting seaweed as a potential local renewable energy source.

The ARPA-E model of high risk, high reward projects may not translate as easily to small businesses that are taking more proven technologies from the national labs and scaling them up. So the Small Business Innovation Research, SBIR, and Small Business Technology Transfer, STTR, programs are more focused on transferring good ideas to the market than on proving the ideas to begin with. So your budget proposes cutting ARPA-E but your budget proposes applying ARPA-E practices to the SBIR and STTR programs. How do you plan to avoid applying the wrong tools to small businesses seeking to scale up technologies?

Secretary BROUILLETTE. That's a good question. The conversation around ARPA-E that we had earlier, I think, is applicable here as well. You know, we have proposed, the President's budget has proposed scaling back and reducing and eliminating in the case of ARPA-E. Some of these projects that we feel, perhaps, are better administered, if you will, by the private sector. I recognize your point about the fact that there are small businesses who simply don't have the funding to go past the Valley of Death and that's a very important, you know, role that, you know, programs like ARPA-E can eventually cover for them.

But at least in the case of this budget, we feel very strongly that ARPA-E has perhaps outlived its purpose at the Department of Energy. That being said, you know, as I mentioned to the Chairwoman and other members of the Committee, this is a proposal from the President. It is a beginning of a conversation with the Congress on what the ultimate budget numbers should be. And if the Congress or if this Committee decides that it should be something different, you have my assurance that we will execute the program to your direction in the U.S. law.

Senator HIRONO. Yes, I don't understand how a program, ARPA-E, that really promotes highly innovative energy technologies, how that can have outlived its usefulness.

Thank you, Madam Chair.

The CHAIRMAN. Thank you, Senator Hirono.

I promised you that you would hear from just about every member——

Secretary BROUILLETTE. I did.

The CHAIRMAN. On the significance and the value that we ascribe to ARPA-E. I would share the final comment from Senator Hirono there when we are talking about technologies. We are never done. We are never done. And those men and woman that are helping to facilitate some of these great exciting ideas and how we move through this so-called Valley of Death to real, on-the-ground application, is forever the challenge.

I have two more quick questions here for you this afternoon because we are getting into the afternoon already.

This year's funding for the Office of Nuclear Energy included \$230 million to begin an Advanced Nuclear Demonstration Program similar to what we had authorized in my NELEA Act, the Nuclear Energy Leadership Act. The appropriations bill directed DOE to request a, to issue a request for proposals within 30 days of enactment but a full RFP isn't expected to be released any time soon. Can you just give me a sense as to what we can expect when it comes to the funding opportunity to utilize the Advanced Reactor Demonstration funds for this Fiscal Year and, kind of, what the strategy is here when we are talking about advanced reactor demonstrations?

Secretary BROUILLETTE. Well, Senator, thank you for the question. We are committed to advanced reactors, as I mentioned earlier, one of the earlier answers to the questions. You're familiar with the HALEU project—

The CHAIRMAN. Right.

Secretary BROUILLETTE. —that we currently have ongoing. In addition to that, we are working closely with companies like NuScale which are slightly larger reactors in the 50-megawatt range. We're working closely with them and, importantly, our Idaho National Laboratory. We have a demonstration project there that we are going to begin. We're excited about their progress in the regulatory process, if you will. They've now completed phase four of that regulatory process. We are encouraging them to continue. We're working with companies like Oklo as well at the Idaho National Laboratory.

We think it's important for us at DOE to continue to catalyze this industry through the development of advanced fuels, and that's been our focus for the last few years and will continue to be our focus all throughout 2020 and 2021 as well.

The CHAIRMAN. Yes, we certainly recognize the value and the imperative there.

I mentioned in my opening statement the critical minerals initiative that you are working through the Department. You really didn't flesh out many of the details in your statement, so I would like to give you the opportunity to tell us a little bit more about what this initiative is and, effectively, what you hope to accomplish this year and then, I guess, to make sure that you feel that you have the tools needed to fulfill the President's Executive Order on mineral security.

Secretary BROUILLETTE. So I'm looking at the, I'm looking at a few things we're doing here. And I want to first start off by just saying we appreciate the language that you've put in your bill.

The CHAIRMAN. Thank you.

Secretary BROUILLETTE. And we look forward to working with you on that and to the extent that we can be of any further assistance, we want to do this.

Critical minerals, as we have talked about in the past as well, is important, you know, not only for the production of new battery technologies, it's important from a national security standpoint as well. For too long, at least in our view, for too long we've depended upon countries that are, quite frankly, adversaries. They do not have our interest at heart. I'm speaking primarily to China. Through their One Belt One Road efforts they've dominated the market, if you will, in critical minerals and critical elements, rare earth elements, I should say.

Our goal with this program is to develop new sources of critical minerals. So we're looking at things, as I mentioned to Senator Manchin, we're looking at things like coal, coal ash, the acid runoff that comes from a coal mine. We seek to develop technologies that will allow us to extract many of the minerals we need for battery production from the residue that's left over from the coal mining process or, in certain cases, from the coal itself. So we think, in that case, it is a future use of coal. We want to continue to see that technology advance.

We will be working with you on not only the language in your bill but other appropriations, perhaps at some point, to continue that type of R&D work. This is one of our focal points within not only the Office of Fossil Energy but within our Office of Science as well.

The CHAIRMAN. When we think about security issues, energy security issues, you cannot separate yourself from the growing vulnerability that we face when it comes to our reliance on others for these minerals that are so essential to just about everything that we do. So this is an effort that we are going to continue to stay focused on. I appreciate your willingness to work with us on that.

I think we have had some good discussion here this morning before the Committee members expressing their priorities which this is what we do. You come and you represent the President's request and we affirm to you where we think those priorities may be lacking, and I think you have heard us clearly this morning. We think the focus on R&D and the technologies that can come from ARPA-E, the Office of Renewable Energy, I think these are, these must be priorities moving forward.

I think you have heard that the effort to help many of the most vulnerable when it comes to things like weatherization programs, again, have to be priorities moving forward. Our responsibility, environmentally, on the cleanup issues, I recognize Senator Cantwell's relentless push on this as it relates to Hanford and Senator Wyden as well. These are matters that we all, it is not in my state, but it is a problem for all of us throughout the country. How we address these in a meaningful way through policies, but through budgets, must be an ongoing priority.

Developments in CCUS, in storage, what we must do with cyber. You heard all of this. You heard my push, again, on the Arctic and what we can be doing in the space of nuclear, my focus on advanced nuclear, the waste issue that is raised by the Senator from

Nevada. These are all, all priorities for the Committee. Many more that you will hear as you get additional questions.

The CHAIRMAN. Know that we need to be working with you at the Department. We are at a point, I believe, in our nation's energy policies where we are looking at some of the things that could go forward that are perhaps not moving forward or not moving forward quickly enough because our policies have not been refreshed and that is what this American Energy Innovation Act is designed to do. But as I mentioned in my comments, your role at the Department in helping to implement so much of this is going to be key going forward.

So hopefully we will have your support as we move forward. These are initiatives that are good for everybody. They are bipartisan in every sense of the word. If you don't want your energy to be affordable, accessible, clean, diverse and secure, if we can't agree on that, it is going to be a pretty tough day around here.

I appreciate your leadership as we work through many of these issues. Know that the Congress, I know that this Senate will speak very clearly as to where we believe those energy priorities should be.

Thank you for what you do. Thank you to your team, because we know they allow you to look pretty good up there, but I know I will extend yet another opportunity to visit not only my State of Alaska but others have invited you as well. We look forward to seeing you out and about as you are becoming even more personally familiar with these matters that we all represent.

With that, we thank you, Mr. Secretary, and we appreciate your time and your leadership.

Secretary BROUILLETTE. Thank you, Senator. Take care.

The CHAIRMAN. The Committee stands adjourned.

[Whereupon, at 11:24 a.m. the hearing was adjourned.]

APPENDIX MATERIAL SUBMITTED

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QUESTIONS FROM RANKING MEMBER JOE MANCHIN III

- Q1. With only two power plants with carbon capture installed operating in the entire world, can you explain to me why the Department has recommended such substantial cuts for Carbon Capture, Utilization and Storage (CCUS)?
- A1. While DOE recognizes and understands the importance of scaling up and developing technologies, the FY 2021 budget request for CCUS prioritizes early-stage research and development (R&D), which is lower cost, higher risk, and where private industry is least likely to invest. Private industry is best positioned to invest in later stage R&D.
- Q2. How much more quickly could we get CCUS technologies commercialized and deployed with a budget, \$1 billion per year for CCUS versus the proposed 43 percent budget cut and do you believe industry will step in to advance CCUS if federal funding is reduced?
- A2. Government funding in R&D is critical to the advancement of science and accelerating the development and commercialization of advanced technologies. The funding levels proposed in the President's Budget can help catalyze industry to make investments and accelerate R&D in advanced technologies and concepts by reducing the risk of research decisions being made by industry and the broader research community. The amount of federal funding, however, is not the only factor that will determine commercialization and deployment of CCUS technologies. Other factors, such as market conditions, financing, and regulatory frameworks, will also play a role in whether industry decides to invest.
- Q3. What has been the result of the Loan Program Office consultation outreach and business development efforts to prepare prospective applicants to submit applications and reduce their costs? Has the Loan Program Office consultation efforts increased the number of qualified applications being considered?
- A3. FY 2019 was the first full year for implementing the outreach and business pre-application consultation conversations. Overall LPO reported 294 consultation conversations. LPO is monitoring the effectiveness of the newly implemented pre-application process to increase qualified applicants, but there is currently insufficient data to analyze the impact.

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- Q4. Why has the Department been unable to obligate funds across the Department and explain how you will improve the Department's effectiveness to obligate appropriated funds?
- A4. Department-wide DOE Programs obligate virtually all of the funding available. In fact, 95% of DOE funds are obligated within 12 months of enactment. However, and primarily in the applied energy programs, a percentage of funding is placed into reserve to fund Funding Opportunity Announcements (FOA) developed during the current year and issued late in the fiscal year. Time and care is taken in the formulation of these FOA requests, and in funding the most promising research and development (R&D) proposals received in responses from industry. While the amounts in reserve appear large, percentage-wise they are consistent with the outlay rates experienced in recent years, particularly given the funding increases that the programs have experienced.
- Q5. How has the Cyber Security, Energy Security, & Emergency Response Office been supporting efforts to bolster industrial control system security and if any support is being provided to pipelines and oil and gas facilities to strengthen their cybersecurity?
- A5. The Department of Energy's (DOE) Office of Cybersecurity, Energy Security, and Emergency Response (CESER) leads DOE's efforts in close collaboration with the government and the private sector, to enhance the security and resilience of the Nation's critical energy infrastructure. This includes identifying and mitigating cybersecurity vulnerabilities in key industrial control systems and operational technologies (OT) through programs like CESER's Cyber Testing for Resilience of the Industrial Control Systems (CyTRICS™). Under the CyTRICS program, DOE's National Laboratories will test key industrial control systems to identify cybersecurity and reliability vulnerabilities, and will further inform efforts to identify systemic and supply chain risks and vulnerabilities to the sector by linking threat information with supply chain information and enriching it with other data sources and methods. As part of CyTRICS, DOE works with government, National Laboratory, and industry partners to identify key energy sector industrial control system components and apply a targeted, prioritized, and collaborative approach to these efforts.

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Another example of DOE's work to advance the security of industrial control systems is CESER's Cyber Analytics Tools and Techniques (CATT TM 2.0) program, which will create a secure platform for government and the energy sector to timely share emerging threat data and vulnerability information pertaining to energy sector information technology (IT) and OT systems. The CATT 2.0 platform will ingest and process the voluntarily provided energy sector IT and OT data through automated analysis, enriched with classified threat information utilizing unique and sophisticated U.S. Government tools.

As part of DOE's work with the energy sector, CESER provides support to the oil and natural gas subsector, and pipeline operators specifically, in a variety of ways. As the Sector-Specific Agency for the energy sector, DOE's CESER, as well as the Department of Homeland Security's (DHS) Cybersecurity and Infrastructure Security Agency (CISA) co-chair the Energy Government Coordinating Council (EGCC), which convenes industry and other key stakeholders such as the Federal Bureau of Investigation, and the Office of the Director of National Intelligence, to foster information sharing between government and the private sector and support a shared national homeland security strategy as it relates to energy infrastructure.

DOE CESER and DHS CISA are also the government co-chairs of the Oil and Natural Gas Sector Coordinating Council (ONG SCC), the primary vehicle for coordination with all operational segments of the oil and natural gas industry—drilling, exploration and production, marketing, processing, refining, service and supply, transmission, and distribution—on a variety of security and resilience issues, including cybersecurity. The ONG SCC meets three times a year with senior cybersecurity and physical security representatives from industry, further enabling the public and private sectors to coordinate oil and natural gas security strategies, activities, and communication to support the Nation's homeland security mission.

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DOE also works closely with the trade associations of the ONG SCC to provide classified threat briefings for cleared sector representatives. Through its ties with the intelligence community, DOE regularly delivers briefings related on emerging cyber and physical threats to energy infrastructure.

In addition to regular coordination through the ONG SCC, CESER regularly engages the energy sector Information Sharing and Analysis Centers (ISACs), including the Oil and Natural Gas (ONG) ISAC and the Downstream Natural Gas (DNG) ISAC. Recognizing the need for continuous improvement of information sharing both between industry and government and across the energy sector, DOE convenes monthly meetings with the ONG ISAC, DNG ISAC, and the Electricity ISAC to share and discuss evolving and emerging cyber threat trends in a classified setting.

With regard to specific pipeline initiatives, DOE has established a productive public-private partnership with government partners and the pipeline industry to secure the transport of oil and natural gas. Through CESER, DOE works with DHS's CISA, Transportation Security Administration (TSA), and U.S. Coast Guard, and the Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA), and the Federal Energy Regulatory Commission (FERC) to streamline pipeline security and safety initiatives as they relate to resilience and reliability.

Moreover, in October 2018, DOE and DHS launched the joint Pipeline Cybersecurity Initiative to specifically address pipeline security. This collaboration leverages DHS CISA's cybersecurity resources, DOE's energy sector expertise, and TSA's regular and ongoing assessments of pipeline security, ensuring all stakeholders gain a comprehensive understanding of the risks the sector faces. This initiative is leveraging the unique expertise of DOE, DHS CISA, TSA, and other federal agencies to support the efforts of the ONG SCC to address the evolving threats to our nation's pipelines.

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Q6. The Weatherization Assistance Program helps lower-income Americans weatherize their homes. That leads to reduction in energy waste and money saved for West Virginians – many of whom suffer the disproportionate impacts of high energy costs due to their modest incomes. West Virginia receives over \$3 million per year from the Weatherization Assistance Program but that's not nearly enough to weatherize all of the homes that are eligible for assistance in my state. Nationally, the program weatherizes approximately 35,000 homes per year—resulting in an average annual savings of \$283 dollars per household per year. The Department has indicated the desire for states to fund weatherization work. Have you received input from states like West Virginia that indicates they have the ability to replace this federal support?

A6. To reduce federal intervention in state-level energy policy and implementation activities, the President's Budget request includes no funding for the Weatherization Assistance Program (WAP). The Administration's focus for the Office of Energy Efficiency and Renewable Energy (EERE) is on early-stage applied research and development. DOE is focused on higher risk activities that are more appropriately performed by the federal government, versus those that are more appropriately left to the private sector, states, and local governments. DOE also understands congressional interest in these programs, and continues to manage WAP activities consistent with the statute and execute appropriated funds in an expeditious manner. The WAP program continues to work with states like West Virginia, and takes their feedback into consideration.

West Virginia (WV) has been allocated \$3,947,952 for WAP in FY 2020 funds, set to be awarded by the July 1st start date of the WAP program year. As for the State Energy Program (SEP), WV was allocated \$606,000 in FY 2020 funds, set to be awarded by the October 1st start date of their SEP program year.

Q7. As markets and other forces continue to transition our economy to reduced utilization of fossil fuels, the U.S. cannot quit on rural economies that have produced our energy for decades and policymakers must find ways to integrate these communities into the new clean energy economy, what role do you think Department can play in developing our energy workforce? What exactly is Department's existing authority with respect to workforce development? Is the Department is equipped to handle workforce training programs and distributing grant funding for workforce training focused on a clean energy economy? If not what more needs to be done?

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- A7. To address the demand for a talented pool of workers, DOE is expanding outreach programming that integrates rural economies and the energy industry through the expansion of existing programs and investments in learning. The Department focuses on training at all skill levels, including industry-based training, certifications, and apprenticeships, to support the development of a skilled energy workforce.

DOE derives its authority to lead and participate in workforce development initiatives from federal mandates and Departmental directives for several industries in the energy sector. These industries include manufacturing, engineering, construction, and other technical jobs that can show direct correlation to the energy industry. The Department continues to review and prioritize workforce development by ensuring our programs are designed with legislation such as this in mind. Additionally, pursuant to the Natural Energy Conservation Policy Act of 1978, Public Law 95-619, the Office of Economic Impact and Diversity (ED) is authorized to implement programs which impact minority communities to include workforce development initiatives. 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 to expand the participation of underserved communities such as minorities, women, veterans, and formerly incarcerated persons in the energy workforce to ensure America's energy independence. In FY19 and FY20, ED has also organized separate Equity in Energy discussions around the country for Asian American and Pacific Islander, African American, Native American and Alaska Native, and Hispanic stakeholders.

DOE has also been fully engaged in charting a path in workforce development for the clean energy economy. The Office of Energy Efficiency & Renewable Energy (EERE) leads several workforce development initiatives with the most recent being an announced grant program called the Minority Education and Workforce Training (MEWT) program for college and universities to participate in developing an energy workforce development program for their respective institutions. Additionally, the Office of Science (SC) supports the training of scientists and engineers careers in academia, the

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DOE national laboratories, and the private sector which supports the DOE mission areas in science, energy, and national security. SC accomplishes this through supporting students and postdoctoral researchers on research awards as well as supporting targeted research and technical training opportunities at the DOE national laboratories – including those from community colleges, undergraduates from 4-year institutions, and faculty from academic institutions historically underrepresented in the DOE R&D portfolio. These activities not only support the DOE mission, but will train the next generation of skilled workers who will engage in the Industries of the Future – fields like artificial intelligence, quantum information science, 5G, and advanced manufacturing.

It is our commitment to continue to work with Congress and our federal, state, local, and industry partners to continue to advance DOE's workforce development initiatives. As with any and all workforce development programs, we will continue to defer to the Department of Labor which is the lead Federal agency over workforce development and job training programs under the Workforce Innovation and Opportunity Act (WIOA).

- Q8. Does the Department provide any guidance to the Department of Labor in order to ensure we are providing individuals with the right skills needed to build our clean energy workforce?
- A8. EERE does not provide formal guidance to DOL.
- Q9. Can you explain to me why the Department has recommended such drastic cuts to the Office of Energy Efficiency and Renewable Energy? Do you believe the Office of Energy Efficiency and Renewable Energy will be able to function at full capacity with the proposed level of funding?
- A9. The FY 2020 budget request focuses resources on early-stage R&D, where the Federal role is strongest, and reflects an increased reliance on the private sector to fund later-stage research, development, and commercialization of energy technologies. Through investments in DOE labs, industry, and academia, EERE's technology offices will continue to lead the world in developing domestic, clean, reliable energy choices in power generation and energy efficiency, which strengthen the U.S. economy while increasing energy security. EERE will continue to conduct cutting-edge R&D to improve

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the affordability of clean energy technologies. At the same time, EERE is focusing resources on the emerging challenges of grid integration and energy storage. For example, the FY 2021 request includes funding for the Energy Storage Grand Challenge, an integrated R&D effort across the applied energy offices to develop storage technologies that enhance flexibility of generation and consumption to support grid reliability.

- Q10. How have the Chinese and Russians used civil nuclear as a geopolitical tool and why is it important that the U.S. offset these efforts? Should the U.S. increase its foreign financing capabilities to support civil nuclear programs?
- A10. The People's Republic of China (PRC) and the Russia Federation (Russia) seek to dominate the global nuclear energy market for strategic and economic advantage. Like other energy projects, nuclear projects build 50-100 year relationships. The PRC and Russia understand the strategic significance, and at the highest levels, are signing Memorandums of Understanding for cooperation with other countries around the world. They see the long-term relationships developed out of civil nuclear cooperation as an opportunity to deepen political relationships with partner countries through economic interdependence, gain leverage for economic coercion to affect political ends, and undermine alliance (e.g. North Atlantic Treaty Organization) networks through closer relationships. North American and European market share of nuclear power has dropped precipitously, and Japan and Korea are retreating due to domestic political situations. Of the 107 reactors planned by 2030, two thirds will be built by China and Russia, and most of those will be exported outside their countries (*Restoring America's Competitive Nuclear Energy Advantage*, U.S. Nuclear Fuel Working Group, 2020). This poses a risk to the high standards of nuclear safety security and nonproliferation that the United States (U.S.) and like-minded countries have championed for decades. We are also carefully evaluating and are alarmed at how the Russian and Chinese civil nuclear cooperation agenda is designed to undercut security frameworks such as NATO and U.S. bilateral security assistance. For these reasons, DOE is also actively engaged with the NSC and the interagency to discuss how energy security, and the civil nuclear component, must be

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an integrated component of U.S. participation with NATO and our bilateral assistance to many of these effected nations.

The PRC and Russia also use state-backed funding to undercut competitors. Financing international civil nuclear projects should be a priority for the U.S. Government.

Currently, many countries interested in developing a civil nuclear industry find it difficult to finance civil nuclear projects, particularly from vendors that are not state-owned enterprises.

- Q11. What was the rationale behind the administration's decision to cut funding for battery recycling research? Additionally, what assurance can you provide me that the Department is committed to finding a solution to improve lithium-ion battery recycling in this country?
- A11. The Department of Energy's FY 2021 Budget Request aligns with Administration priorities such as securing America's energy independence and funds innovation for affordable, reliable, and efficiency energy sources. The request for Energy Efficiency and Renewable Energy Office's Vehicle Technologies Office (VTO) supports core early-stage research to accelerate the development of a variety of sustainable transportation technologies. For example, Battery R&D will focus on exploring new battery materials and technologies to significantly reduce cost and enhance performance, while reducing or eliminating the need for critical materials.

Recognizing the importance of lithium-ion battery recycling, the Department established the Lithium Battery Recycling R&D Center (ReCell) and the Lithium-Ion Battery Recycling Prize in FY19 and continue support for both activities in FY20 and in the FY21 Request. Additional lithium battery recycling R&D will be carried out in FY21 with industry through DOE funded, cost-shared projects with the United States Advanced Battery Consortium (USABC).

ReCell has made significant headway in its first year. Multiple processing approaches have shown promise for effective separation of cathode, anode and electrolyte materials

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and profitable direct recycling. In FY21, ReCell will demonstrate the more promising approaches and complete development of the lithium ion battery recycling analysis tool (LIBRA), which maps the lithium ion material and manufacturing supply chain globally. This tool can help advance U.S. leadership and various battery material supply chain.

The USABC projects are focused on developing novel recycling processes that recover and produce cathode material that performs the same as the virgin material. These projects take both spent batteries as well as manufacturing scrap material and resynthesize cathode powders. These processes allow for compositional changes in cathode chemistry so older generation cathodes can be upcycled into next generation high capacity low-cobalt materials. These projects also focus on scale up and cost reduction.

The Lithium-Ion Battery Recycling Prize, co-funded between VTO and the Advanced Manufacturing Office (AMO), encourages American entrepreneurs to find innovative solutions to collecting, storing, and transporting discarded lithium-ion batteries for eventual recycling. The prize aims to accelerate the development of solutions from concept to prototype to demonstration. Phase I of the competition is complete, with 15 winners receiving \$67,000 each, for a total of \$1 million awarded. These 15 competitors have advanced to Phase II, where they will translate the Phase I concepts into end-to-end solutions that demonstrate a viable business model that can be scaled. The prize is fully funded and is expected to run through FY21.

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QUESTIONS FROM SENATOR RON WYDEN

- Q1. During the hearing on DOE's FY2021 Budget request, we discussed the disappointing budget amount requested for ongoing cleanup activities at Hanford and other DOE legacy sites. In the case of funding to address legacy waste facilities at Hanford, this cut was nearly 40%. I was interested in knowing which specific Hanford site projects the Department was going to delay and kick down the road even further as a result of this funding cut. I am especially concerned about this reduction in light of the recent GAO report on the Hanford PUREX tunnel collapse in 2017 and DOE's management of similar risks.

Please identify the specific Richland monitoring, stabilization, and remediation activities (facilities, sites, or sub-projects of record) that will be negatively impacted by a lower budget for Richland EM activities? Please provide details on the impacts on scope, schedule, and health/environmental risks.

- A1. At Hanford, the focus is on completing and commissioning the facilities and infrastructure needed for Direct Feed Low-Activity Waste (DFLAW). The Department remains on track to meet the commitment to begin tank waste treatment by the December 31, 2023 Amended Consent Decree milestone.

The Department will continue preparatory work this year in Building 324 to stabilize the structure of the facility in preparation for removing contaminated soil under the building. Work was temporarily paused to address worker safety issues after several incidences where workers experienced minor but recurring skin or clothing contamination. The request will safely maintain Building 324. By taking a risk-informed approach, there will be a suspension of the operation of the groundwater treatment system on the Central Plateau. The request maintains operation of the groundwater treatment along the Columbia River. Design work to move cesium and strontium capsules to dry storage will continue. The Department will continue maintenance, monitoring, and assessment activities at the Waste Encapsulation Storage Facility where the capsules are currently stored.

The Department has begun implementation of the GAO-20-161 recommendations by establishing a risk evaluation process for the aging facilities and structures after the partial collapse of PUREX Tunnel 1. As a result, the Department is proceeding to

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stabilize the 216-Z-2 crib, 216-Z-9 crib and 241-Z-361 settling tank in coordination with the U.S. Environmental Protection Agency and Washington State Department of Ecology.

- Q2. During the hearing, some of my colleagues asked about uranium and in particular the nuclear fuel working group. The Department is requesting \$150M to establish a "Uranium Reserve" under the DOE Office of Nuclear Energy. This would appear to be a decision affecting the commercial uranium market, and one for which the Department does not have authorization. I am interested to know more specifics about this proposal.

Can you provide more information on the nature of this proposed reserve, including what form of uranium would be stored, amounts, assay level or level(s), and origin (domestic/foreign)?

- A2. The Uranium Reserve, for which \$150 million is requested in the Department's 2021 budget request for Nuclear Energy, would support strategic U.S. fuel cycle capabilities and provide assurance of availability of uranium in the event of a market disruption. Creation of the Uranium Reserve would address near-term challenges to the production and conversion of domestic uranium, where the risks of closure are most immediate.

If funded, initial actions in Fiscal Year 2021 would include development of the acquisition strategy for the Uranium Reserve. The Department plans to implement a competitive procurement process that will result in the acquisition of domestically-produced uranium and services to best meet program goals while ensuring the best use of taxpayer dollars. The Department plans to engage industry and other stakeholders through a Request for Information (RFI). The comments received from the RFI will be considered in the formulation of that strategy. While precise quantities of domestic uranium and conversion services to be purchased are not known at this time, it is expected that purchases for the reserve will support the operation of two or more uranium mines and help support the U.S. uranium conversion capability.

The Uranium Reserve would serve as a backstop mechanism to be available if a market disruption prevents utilities from acquiring fuel in the markets. The uranium would be stored as natural uranium hexafluoride (UF₆). The Uranium Reserve is not designed to

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replace or disrupt market mechanisms. All of these activities are subject to appropriations. The Department has authority under the Atomic Energy Act of 1954, as amended, and the Department of Energy Organization Act to acquire, store and sell or transfer uranium. Any sale or transfer of uranium, however, must be undertaken in a manner consistent with any applicable conditions set forth in Section 3112 of the Atomic Energy Act.

- Q3. The Department is requesting \$40M to complete a High-Assay Low-Enriched Uranium Demonstration Program. I understand that this is a pilot-scale enrichment capability. This request would appear very similar to the defense-related budget request being made to support an enrichment capability for the National Nuclear Security Administration. At first blush, it would seem like the left hand is not talking to the right hand at DOE.

Can you provide information on how these requests are distinct, including technical details of how they differ, and what capabilities would be built out if this request is funded at the amount proposed?

- A3. The three-year, \$115 million High Assay Low Enriched Uranium (HALEU) Demonstration Program being funded through the Office of Nuclear Energy (NE) has a focus to demonstrate the capability to enrich uranium to a nominal 19.75% U-235 using a commercial technology known as the AC-100M centrifuge. This level of enrichment would be sufficient for HALEU fuels. Once the HALEU Demonstration Program is complete (by June 1, 2022), the commercial sector would be expected to support any ongoing HALEU enrichment capability. Commercial HALEU enrichment vendors would size the enrichment capacity to meet the expected near-term market demand.

Separate from the NE Demonstration Program, the National Nuclear Security Administration (NNSA) is executing a strategy to re-establish a domestic uranium enrichment capability for national security needs. NNSA's nearest-term need for a domestic uranium enrichment capability is low-enriched uranium to fuel the production of tritium for nuclear weapons beginning in the early 2040s. Since 2016, NNSA has funded the development of a small centrifuge technology at Oak Ridge National Laboratory (ORNL) as a potential alternative technology to the AC-100M centrifuge. NNSA is currently executing a thorough Analysis of Alternatives to evaluate the best

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solution to meet its needs, which includes a broad range of options including the ORNL small centrifuge, the AC-100M centrifuge, other enrichment technologies, as well as non-construction alternatives.

NE and NNSA are working, and will continue to work together for the collective uranium enrichment objectives of the Department.

- Q4. The Department is requesting 64% less funding than in FY 2020 for its efforts to install energy infrastructure in Indian Country. Given the relatively small scale (\$22M in FY 2020) and large impact of these projects by saving tribes money over the life of equipment installed, I'm interested to know the effects of such a low figure on program delivery. A paltry \$8M as indicated in the request is a let-down to tribal governments that depend on these programs to keep the lights on and costs low in their communities.

Can you explain the rationale behind such a low request for such a high-impact program, and explain what programs, if any will serve the electrical and power needs of underrepresented tribal communities?

- A4. The President's FY 2021 budget request of \$8 million is consistent with the FY2020 budget request. A reduction of \$14 million will result in a slight decrease to program direction and will have minimal impact on the Office's efforts to install energy infrastructure in Indian Country. The Office of Indian Energy will, to the maximum extent practical, utilize the amount of appropriated funding to assist Indian tribes and tribal entities for the deployment of energy infrastructure.

Funds for related activities are provided through the Department of Interior (DOI) Indian Loan Guarantee Program, which provides planning and technical assistance, as well as the U.S. Department of Agriculture, which provides grants, loans, and loan guarantees. Additionally, the U.S. Department of Commerce's Comprehensive Economic Development Strategy (CEDS) provides funding and can assist with energy related economic development activities.

- Q5. The Department is requesting \$55M more this year (\$546M) for Coal Energy Systems and carbon capture. Despite market forces overwhelmingly pushing electricity generation away from coal and more toward comparatively cleaner and more cost-

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efficient gas-fired generation, it is concerning that we might spend even more scarce research money on a commodity that is being phased out nationwide.

Can you specify the types of systems (both mitigation and capture) that the Department intends to pursue with this program? And can you provide information specifically on how and whether such technologies can be back-fit into existing coal-fired generating facilities?

- A5. Coal FIRST is the DOE flagship program that will develop a coal-fired power plant, with zero/near-zero emissions that meets the demands of the 21st century U.S. electricity grid. The International Energy Agency (IEA) projects that coal will be one of the largest sources of electricity production in the world by 2040. Worldwide coal production is projected to increase from 8 billion tons a year currently, to an estimated 9 billion tons by the year 2050. The IEA has also concluded that any solution for CO₂ emissions must include carbon capture, one of the key traits for a Coal FIRST power plant.

The United States is the only country developing the next-generation of coal plants, and there is an opportunity for the United States to reclaim global leadership from China and sell these technologies to developing economies that will continue to use coal for decades to come.

Coal FIRST plants will meet the growing need for dispatchable generation, critical ancillary services, and grid reliability on an evolving grid with increasing amounts of intermittent renewables.

Extreme weather is precisely the time when renewables (wind & solar) are most vulnerable, a situation seen in the Midwest, Northeast, Puerto Rico, and Texas. In addition, these Coal FIRST technologies will provide power producers with a fuel-resilient alternative to natural gas as the aging coal and nuclear fleet continues to retire.

In 2018, the Office of Fossil Energy released a Request for Information (RFI) seeking input on the coal-fired power plant of the future. Over 30 responses were received, indicating a great interest in working with DOE to develop such a plant. A 21st century coal plant that would employ advanced manufacturing (versus stick built construction)

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and advanced monitoring and control systems that provide the ability to co-fire multiple fuels. The responses came from a variety of stakeholders, including power producers, a coal company, technology developers, equipment suppliers and coal-producing states. In addition, DOE executives had consultations with coal State Governors and industry leaders to gain insight into the structuring and need for the Coal FIRST program.

Coal FIRST attributes: **Flexible**: quick to adjust to the changing needs of the grid; **Innovative**: cleaner, more agile, and more efficient through cutting-edge technology; **Resilient**: able to recover rapidly from severe weather and other events; **Small**: compact relative to today's conventional utility-scale coal plants; **Transformative**: fundamentally re-designed to meet emerging and future grid needs. The research and development (R&D) activities pursued under this program will improve the efficiency of new and existing coal-fired power plants, which reduces (i.e., mitigates) emissions, and also captures and stores carbon dioxide (CO₂) emissions.

Coal with Carbon Capture and Storage has also been shown to be an excellent and economical feedstock for hydrogen; combining coal with biomass or petroleum product waste (e.g., plastics) as the feedstock with carbon capture and storage can produce "green" hydrogen that in turn can be used for green energy storage, transportation, or power generation.

Also, many of the technologies that are being developed by the program will also have the ability to be retrofitted onto existing coal-fired generation facilities. For example, the program awarded nine front-end engineering design (FEED) studies in September 2019—five on coal-fired generation and four on natural gas generation. The five on coal-fired generation are all retrofits and include first-generation and second-generation carbon capture technologies that were developed by the program.

Additionally, technologies developed for coal-fired generation have applicability for other sources of carbon dioxide (CO₂), such as natural gas-fired generation, industrial

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facilities, and even removing CO₂ from the atmosphere (i.e., direct air capture (DAC)).
The funding request for carbon capture also includes these other applications.

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QUESTIONS FROM SENATOR JAMES E. RISCH

Q1. Secretary Brouillette, the intelligence agencies have made it clear that Chinese and Russian's pose a serious cyber threat to U.S. critical infrastructure. The Idaho National Lab, which in addition to being our nation's nuclear research laboratory, is also a leader in critical infrastructure protection, including the grid. How are the Department of Energy and national labs working to respond to this challenge? In your opinion, what else can the Department of Energy and national labs be doing?

A1. The Department of Energy is home to some of the most cutting-edge computing and information technologies in use in the world. DOE's National Laboratories are the "crown jewels" of the Federal government's national research infrastructure. The National Labs regularly collaborate with Federal agencies, providing them with the scientific and technical support they need to fulfill their missions.

One such mission is enhancing the security and resilience of the Nation's critical energy infrastructure, which is led by DOE's Office of Cybersecurity, Energy Security, and Emergency Response (CESER) and conducted in close collaboration with government and private sector partners. It is a complicated and significant mission.

The former Director of National Intelligence, along with several heads of the Administration's Intelligence Community agencies, has stated that "China has the ability to launch cyberattacks that cause localized, temporary disruptive effects on critical infrastructure—such as disruption of a natural gas pipeline for days to weeks."¹ Russia has similar abilities with the capability to disrupt "an electrical distribution network for at least a few hours—similar to those demonstrated in Ukraine in 2015 and 2016."²

To address the role of the Idaho National Laboratory (INL) specifically, INL cybersecurity researchers leverage the methods and ideologies that cyber adversaries possess in order to inform and instruct users on how to better ensure efficient, reliable,

¹ <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf>

² <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf>

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and secure control systems and network operations through a variety of programs and initiatives.

As a general matter, DOE's collaborative approach with the energy sector is proactive with regard to coordination, information sharing, education, and training exercises. That collaborative approach extends to its work with the National Laboratories and informs its investments for research and development (R&D), designed to achieve energy sector situational awareness and address the challenges facing the operational technology (OT) systems that drive much of the sector's energy generation and transmission.

Through focused, early-stage R&D, CESER's Cybersecurity for Energy Delivery Systems (CEDS) program is designed to assist energy sector asset owners by supporting the development of cybersecurity solutions for energy delivery systems. CESER co-funds industry-led, National Laboratory-led, and university-led projects with State, local, tribal, territorial, and industry partners to advance cybersecurity capabilities for energy delivery systems. These research partnerships are essential for helping to detect, prevent, and mitigate the consequences of cyber incidents in current and future energy delivery systems.

CESER's Infrastructure Security and Energy Restoration (ISER) division works with the energy sector and National Laboratories to fund R&D focused on analyzing critical infrastructure vulnerabilities and recommends or develops preventative measures. ISER's R&D work, though related to the CEDS portfolio, is focused on leveraging DOE's technical expertise, ensuring the security, resiliency and survivability of key energy assets and critical energy infrastructure at home and abroad.

One example that spans the CEDS and ISER portfolios is OT systems. The cybersecurity challenges presented by the OT systems used in energy infrastructure differ from those presented by typical Information Technology (IT) systems. OT power systems must operate continuously with high integrity and availability. Many assets are in publicly-accessible areas, where they can be subject to physical tampering. Real-time operations

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are imperative, and latency is unacceptable. The complex R&D conducted at DOE's National Laboratories is instrumental to advancing the work to protect our nation's energy assets, particularly for OT systems.

Examples of projects that have been competitively awarded and are currently underway that are expected to yield significant positive benefits as we work to secure our Nation's critical energy infrastructure include:

- The Automated System Research and Development initiative, which is a response to the increasing speed of cyberattacks. The initiative will prioritize energy sector defenses against high-consequence cyber events, isolate automated systems, and remove vulnerabilities. The concept behind the initiative is called consequence-driven, cyber-informed engineering. This project is supported by Pacific Northwest National Laboratory.
- The Cyber Analytic Tools and Techniques (CATT™ 2.0) project, which is developing capabilities to improve sector-wide cyber threat awareness through rapid, early discovery and mitigation of advanced cyber threats to critical energy infrastructure. A key component of this project is the analysis of voluntarily provided IT and OT data, which is enriched with classified threat information and analytics by the U.S. Government. This project is supported by Idaho National Laboratory.
- The Cybersecurity for Operational Technology Environments (CyOTE™) program, which is developing analytic tools and procedures to receive, store, and analyze partner utility data to identify anomalous behavior on OT networks that indicate potential threats and system vulnerabilities. This project is supported by Idaho National Laboratory.
- The Cyber Testing for Resilience of Industrial Control Systems (CyTRICS™) initiative, which is developing a testing program to support the identification and mitigation of supply chain vulnerabilities in industrial control systems by leveraging the engineering and security expertise resident in government,

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National Laboratories, and industry. This project is supported by Idaho National Laboratory, Pacific Northwest National Laboratory, Sandia National Laboratories, National Energy Technology Laboratory, and Lawrence Livermore National Laboratory.

- The Cybersecurity via Inverter-Grid Automatic Reconfiguration (CIGAR) project, which is developing technology to identify compromised grid sensors—such as inverter controllers for solar panels or energy storage systems—and adjust the settings of the sensors so that they remain trustworthy, while simultaneously ignoring data from compromised sensors, so the power grid sustains critical functions while cyber-incident response actions proceed. This project is supported by Lawrence Berkeley National Laboratory.

CESER is also working closely with other applied program offices within DOE through the Grid Modernization Initiative (GMI). For example, currently CESER is developing several projects with these applied offices and the National Laboratories to use machine learning to predict evolutions in malware and detect unexpected changes in device firmware. With regard to the selection of cybersecurity R&D projects, DOE is constantly examining the threat landscape and coordinating with partners, such as DHS, to identify the areas where its work can provide the most impact to the energy sector while minimizing overlap with existing projects.

- Q2. Senator King and I recently had our *Securing Energy Infrastructure Act* signed into law. Can you provide us an update on the status of implementing those provisions at DOE, and do you believe that the department is properly resourced to carry it out?
- A2. DOE's efforts to carry out the intent of Securing Energy Infrastructure Act (SEIA) are well underway. Currently, DOE, through its Office of Cybersecurity, Energy Security, and Emergency Response (CESER), is pursuing several lines of effort, which are in line with SEIA's, including, the Cyber Testing for Resilient Industrial Control Systems (CyTRICS™) program, under which DOE's National Laboratories will test industrial control systems to identify cybersecurity and reliability vulnerabilities, providing valuable information to identify systemic and supply chain risks and vulnerabilities to the

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sector by linking timely threat information with supply chain information and enriching it with other data sources and methods. SEIA strengthens CESER's efforts for the CyTRICS program in coordination with the energy sector Section 9 entities and expands the means in which DOE will work more closely with Section 9 entities.

Furthermore, CESER is currently examining how to best leverage or modify its existing agreements with the National Laboratories and partners to execute the pilot program created by SEIA and is determining whether additional agreements will be necessary to expand the scope of the program in order to meet the requirements set forth in SEIA and apply the liability protections set forth in the legislation—which we expect will encourage even greater participation by manufacturers and vendors.

DOE's Office of Electricity (OE) is also working with CESER to review ongoing research activities in its portfolio that may be helpful to identify, test, and pilot long-term solutions before they are widely deployed in the electric subsector or at the Power Marketing Administrations.

Some of DOE's initiatives with the National Laboratories that will support its implementation of SEIA include:

1. CESER's cyber R&D program, which currently has 24 active research and development, projects—including the CyTRICS program—that aim to adapt energy delivery systems to survive sophisticated cyberattacks.
2. OE Permissive Communications for Protective Relaying and Fault Detection program, a pilot program led by Idaho National Laboratory (INL) for two technologies that would limit or eliminate the use of digital control technologies.
3. OE DarkNet, which leverages work by Oak Ridge National Laboratory to use non-public optical fiber for communications. The lab's scientists are focused on a new architecture for transferring the grid's data using "dark," or underutilized, optical fiber to build a private, secure communications network. Combining a secure, fast, fiber optic-based communications network with sensors and other

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protective elements is the backbone of the DarkNet project.

4. DOE's FY 2019 Grid Modernization Laboratory Consortium research program awards include machine learning/artificial intelligence research, ensuring the bulk power system, including protective relays and associated substation and control center systems, can perform intrusion tolerant operations. These novel architecture and software advancements will also detect compromised systems.

Finally, with the goal of obtaining a more thorough situational awareness, DOE is examining the expansion of its existing Section 9 supply chain working group—which includes Section 9 entities, interagency partners such as DHS, the Department of Justice (DOJ) through the Federal Bureau of Investigations (FBI), and the Department of Defense (DoD), along with representatives from the Electricity Subsector Coordinating Council (ESCC) and the North American Electric Reliability Corporation (NERC)'s Electricity Information Sharing and Analysis Center (E-ISAC)—to include representation from: the Nuclear Regulatory Commission; the Office of the Director of National Intelligence; State or regional energy agencies; and national research bodies or academic institutions, as set forth in SEIA.

- Q3. Secretary Brouillette, I believe DOE's ongoing support for developing SMRs is key to helping the United States regain its leadership role in nuclear energy. As you know, NuScale power is working with UAMPS to site the first SMR at the Idaho National Lab by 2026. Before that is possible, much more research and development is needed, and DOE's cost-shared funding is helping to accelerate that process. Would you explain why you think SMR research and development funding is important? What are the overall benefits to the country and our national security for the US to regain its leadership position on advanced commercial nuclear technologies like SMR's?
- A3. The Department believes that emerging domestic small modular reactor (SMR) designs have the potential to contribute significantly to the revitalization of the domestic nuclear industry due to the improved resilience, flexibility, affordability, safety, and siting options that they offer. The development and deployment of advanced reactor designs is key to the U.S. maintaining a technological leadership role in the global nuclear industry, as well as improving our domestic economy, environment, and national energy security

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posture. As advanced SMR designs mature a great deal of technical and regulatory uncertainty remains, which requires continued investment on the part of the designer. If deployed, SMRs have the potential to provide a resilient, emission-free power source that can support mission-critical power needs and develop a robust domestic manufacturing enterprise with stable, high-paying jobs. If US-technology advanced reactors are deployed in overseas markets, there will be additional benefits to the U.S. economy as well as to our strategic interests by developing long-term relationships with nations through civil nuclear cooperation. In addition, the presence of U.S. designs in other countries will assure these countries are meeting high standards of safety, security and nonproliferation.

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QUESTIONS FROM SENATOR MARIA CANTWELL

- Q1. Over 80% of the land area of Richland School District, located in Benton County, Washington, is owned by the Department of Energy. Over 10,000 employees under contract to the Department of Energy work at these federal facilities that do not pay school property taxes. Children of those employees attend school in Richland School District, where untaxed federal property leads to higher private property school tax rates but with lower school tax revenue. Can you explain the timeline on which the Department of Energy makes the Payment in Lieu of Taxes payments to Benton County?
- A1. Benton County's PILT requests specify that in any given year the payment be made in two equal payments. The first half of the PILT payment is due by April 30th, and the second half due by October 31st. The Department strives to make the payments on the requested schedule when funds are available to do so and once all required information to support the request has been received.
- Q2. The Benton County Assessor invoices all tax payers in the county twice a year as they do the Department of Energy (treating the Department as they do any local taxpayer). It doesn't appear, based on information my office received from Richland school officials, that the Richland School District is receiving their payments from the Department in a timely and reliable manner. Can you explain the delay and is the Department looking into the matter of ensuring that two PILT payments will be made in the future, both in October and April?
- A2. The Department makes PILT payments to Benton County. The Department does not make payments to the local school districts; that is done by the county. For Fiscal Year 2020, the Hanford Department of Energy has funds to pay PILT per the requested due dates.
- Q3. I understand that your Department has a long history of providing radioisotopes, specifically Plutonium-238, to NASA for missions in which solar power alone is infeasible. Given the scarcity of Pu-238 and the need for resilient power for funded missions such as the Artemis Program, is DOE currently working to make other isotopes available for use in radioisotope power systems?
- A3. The Department of Energy DOE and the National Aeronautics Space Administration (NASA) efforts are focused on ensuring a robust, domestic supply of plutonium-238 (Pu-238) fuel (known as heat-source plutonium oxide) to support the Nation's space

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exploration needs. In Fiscal Year 2018, DOE and NASA established a Constant Rate Production Program focused on increasing Pu-238 fuel production to support NASA mission demands. To date, DOE has produced over half a kilogram of new Pu-238 fuel and made significant investments to modernize supply chain infrastructure within the DOE complex on a full cost recovery basis. Additionally, DOE and NASA used a small portion of this new fuel supply to power the Mars Perseverance Rover, which launched in July 2020, to demonstrate the viability of the Nation's Pu-238 domestic supply chain. Based on this progress, NASA lifted the ban on missions proposing radioisotope power system missions for the Discovery 2026 program.

DOE and NASA will continue to increase Pu-238 fuel production to 1.5 kilograms/year on average by 2026 to meet future space exploration needs. At this time, DOE and NASA do not foresee a shortage of Pu-238 that would necessitate evaluation of other isotopes for use in radioisotope power systems.

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QUESTIONS FROM SENATOR STEVE DAINES

- Q1. As was discussed during the hearing, an important component of commercializing and getting to market carbon capture, utilization, and storage (CCUS) technology is the 45Q tax credit. Unfortunately, many industry stakeholders are waiting for the Internal Revenue Service (IRS) to issue regulations to allow for more uses of carbon storage, including through Enhanced Oil Recovery and Secure Geological Storage. This will not only help reduce the cost of CCUS, but it will also help increase the responsible development of oil and gas resources. Senator Hoeven and I introduced the CO2 Regulatory Certainty Act, which would accomplish this.

Mr. Secretary, will you commit to raising this issue with IRS and urge them to address it in a way that, consistent with congressional intent, encourages broad adoption and provides the necessary certainty for carbon capture projects to commence?

- A1. I share your concern regarding the need for clear regulations regarding secure geologic storage for enhanced oil recovery operations and geologic storage. During his tenure, Secretary Perry sent two memos to Secretary Mnuchin, urging action on this issue ([December 2018](#) and [November 2019](#)). DOE staff have made themselves available to IRS staff for technical assistance. In March 2020, IRS issued guidance that establishes a safe harbor for partnerships ([Rev. Proc. 2020-12](#)) and a notice that clarified the definition for beginning of construction ([Notice 2020-12](#)). In May 2020 IRS released the [Notice of Proposed Rulemaking](#) addressing secure geologic storage and other issues. This NPRM, combined with the already-issued guidance on partnerships and beginning of construction should provide the necessary certainty for carbon capture projects to commence.
- Q2. In recent years, the Western Area Power Administration, the Southwestern Power Administration, and the Southeastern Power Administration have retained unobligated balances to manage Purchased Power and Wheeling activities. What is the Department's position on that and how their unobligated balances must be used?
- A2. The Power Marketing Administration (PMA)'s purchase, power, and wheeling (PPW) program provides the funding for the PMAs to purchase additional power to meet contractual requirements for power delivery when not enough Federal hydropower is generated. Consistent with legislative authorities, unobligated balances as a contingency reserve are intended to provide greater funding certainty for the highly variable PPW program requirements. That certainty strengthens the PMAs' ability to meet their

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fundamental mission: the delivery of the Federal hydropower resource relied on by tens of millions of Americans, including many critical DOE, Defense, and other Federal agency facilities.

The PMA PPW program is affected by energy market conditions, generation and transmission system constraints, reservoir storage levels, and drought conditions. In addition, power generation can be constrained by downstream flow restrictions resulting from many different events including icing, flooding, environmental activities, health and safety, recreation, irrigation, and navigation requirements. The PPW reserves provide the flexibility needed to deliver on contractual power commitments to customers during these unanticipated adverse conditions, such as the long-term drought in the Pick-Sloan Missouri Basin experienced from 2001 through 2008, and the sudden severe droughts that can occur in the central Great Plains and southern regions of the United States, as experienced from 2005 through 2006 and again from 2011 through 2013.


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QUESTION FROM SENATOR DEBBIE STABENOW

- Q1. The Facility for Rare Isotope Beams (FRIB), located in my home state of Michigan, represents a game-changer for science and for the Michigan economy. Once built, this facility – which is on time and on budget – will be the world's most powerful radioactive beam facility providing more than 1,000 new rare isotopes for research and approximately \$187 million in new tax revenues and \$4 billion in statewide transactions. I am pleased to see the Department of Energy's FY21 budget request includes money for the final year of construction and for a FRIB isotope harvesting project that will provide new isotopes for cancer treatment approaches. However, I am disappointed the DOE budget request for operations and maintenance is less than half the amount defined by the DOE-MSU cooperative agreement. I understand this would delay the start of FRIB's cutting-edge research by as much as a year. Would you please provide me with an overview of the Office of Science's plans for research and operations at FRIB to ensure it continues on its trajectory of being on time and on budget?
- A1. The Facility for Rare Isotope Beams (FRIB), which will provide world-leading capabilities for nuclear structure and nuclear astrophysics, continues to be a Department priority. Construction is over 93 percent complete, and the FY 2021 President's Request provides the final year of project funding according to the baselined profile. The Department is committed to providing funding to retain the most critical operations and research staff in advance of the first year of operations in FY 2022. The Office of Science prizes the incredible scientific potential of FRIB and continues to develop plans on how to best reap the rewards of this exciting new facility.

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QUESTIONS FROM SENATOR MARTIN HEINRICH

- Q1. I continue to hear from New Mexicans with concerns that DOE's new Order 140.1 has impeded DNFSB's ability to oversee worker and public health and safety at defense nuclear facilities, including Los Alamos and Sandia National Laboratories and WIPP. To ensure DNFSB continues to have full access to the information and the nuclear facilities it needs to do its job, we made legislative changes to DNFSB's statute in sec. 3202 of the FY20 NDAA. How is your department responding to the FY20 NDAA changes and ensuring that DNFSB again has the access it needs?
- A1. In accordance with the new FY2020 NDAA requirements, on February 26, 2020, DOE submitted our Report to Congress entitled, *DOE's Response to Information Requested by the Defense Nuclear Facilities Safety Board, Report Period: July 1 – December 31, 2019*. The Department has also completed a draft revision to Order 140.1 to reflect the requirements in the FY2020 NDAA.
- Q1a. If a revised version of Order 140.1 is prepared, will you share a draft of it with the members of DNFSB before it is finalized?
- A1a. Yes. On February 26, 2020, DOE provided a draft revised Order 140.1 to the DNFSB and solicited their input. On February 28, 2020, the DNFSB issued a letter (see attachment below) to the Secretary stating that DOE's draft revision of Order 140.1 satisfactorily addresses the statutory concerns previously expressed by the DNFSB.
- 
- DNFSB Letter Feb
28 2020
- Q1b. Because of the direct impact on public health and safety, will you release a draft of a revised order for public comment before it is finalized?
- A1b. No. The revised Order 140.1 is an internal DOE management directive that only applies to DOE and its contractors. Furthermore, revised Order 140.1 does not impact long-standing departmental requirements governing public and worker health and safety programs, which are implemented and monitored in accordance with established laws, regulations/rules, policies, directives, and technical standards. DOE's public and worker

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health and safety regulations (i.e., 10 C.F.R. Part 835, *Occupational Radiation Protection Program*, 10 C.F.R. Part 830, *Nuclear Safety Management*, and 10 C.F.R. Part 851, *Worker Safety and Health Program*) are subjected to public review and comment in accordance with the Administrative Procedure Act (Public Law 79-404).

DOE's directive's process is similarly aligned with the DNFSB's policy statement review process, whereby, the DNFSB does not solicit public comment on its internal directives.

Q1c. Is DOE planning any additional changes to Order 140.1 that could limit DNFSB's ability to access information or defense nuclear facilities, such as restricting the type of information it provides to DNFSB or who at DNFSB will be granted access to information or facilities?

A1c. No.

Q1d. With regard to the FY20 NDAA and the changes it made to the DNFSB's statute, are there any areas where the Department was uncertain or would benefit from further clarification of Congressional intent?

A1d. DOE would benefit from further clarification on:

- The new requirements for "prompt and unfettered access."
- The inclusion of "employees and contractors" at defense nuclear facilities. It would appear the intent of the language is to expand its coverage to the health and safety of workers at such facilities for conduct that is subject to the provisions of 10 Code of Federal Regulations Part 830, the area in which the DNFSB has expertise, not to cover worker health and safety, similar to that covered by the Occupational Safety and Health Administration and regulated by 10 CFR 851, *Worker Health and Safety*, in which the DNFSB has limited expertise.

Q1e. Is DOE working with DNFSB to develop a bilateral MOU/MOA to address other operational or staff interface issues that are not addressed by a revised Order 140.1?

A1e. The Department remains open to engaging the DNFSB in mutually addressing continuous improvement opportunities regarding agency-to-agency transparency and operational/interface communications. The DNFSB described a bilateral MOA in their

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February 28, 2020, letter. The DOE will provide the DNFSB with any comments we may have once it is provided for review and coordination.

- Q2. Your FY21 budget request for environmental cleanup work at Los Alamos implies the pace of cleanup work will not be reduced below the current year, even though the request is nearly half the FY20 level. Please provide a table that compares the current expected spending rates for fiscal years 2020 and 2021 and the available carryover (if any), that shows that the pace of cleanup work will be unchanged.
- A2. At the beginning of FY 2020, Environmental Management (EM)-Los Alamos had \$140 million in uncostered prior year funds. The Fiscal Year 2020 enacted budget of \$220 million plus the proposed FY21 request of \$120 million provides \$480 million for this year and next. We are currently reviewing the costs for the first part of FY20, and the remaining work plans for the year to ensure that this year's milestones for the 2016 Consent Order will be achieved.

EM Los Alamos Budget/Spending Chart			
Millions of dollars			
Year	FY19	FY20	FY21
Appropriated	220	220	120 ³
Obligated ¹	364	360	250
Spend rate	224	230 ²	220 ⁴
Carryover	140	130	30

¹ Includes prior year funds

² Planned spend rate for FY20

³ Assumes FY21 at the Request Level

⁴ Assumed spend rate for FY21

- Q3. There are two pending applications with the NRC to site a consolidated temporary storage facility for commercial spent nuclear fuel. One of the proposed sites is in New Mexico. I continue to be concerned that without an approved site for permanent geologic disposal, any proposed "temporary" storage facility could easily turn out to be de facto "permanent" storage.

Does DOE currently have or plan to request statutory authority to fund or contract with a private company for storage of spent nuclear fuel?

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Do you support the recommendation of the Blue Ribbon Commission to require state approval of any temporary consolidated storage facility for spent nuclear fuel and high-level waste?

- A3. The Administration believes progress on managing the nation's spent nuclear fuel and high-level waste is critical and the standstill has gone on too long and is committed to fulfilling the Federal Government's legal and moral obligations to properly manage and dispose of the nation's spent nuclear fuel and high-level waste. The Administration supports developing a durable, predictable yet flexible plan that addresses more efficiently storing waste temporarily in the near term, followed by permanent disposal and supports establishing an interagency working group to develop this plan in consultation with States. The FY 2021 Budget Request prioritizes research, development, and evaluation of alternative technologies and pathways for the storage, transportation, and disposal of the nation's nuclear waste, with a focus on solutions deployable where there is a willingness to host. Fulfilling the legal and moral nuclear waste management obligations will continue to be an Administration priority, including development and deployment of a robust interim storage program and permanent disposal pathway.

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QUESTION FROM SENATOR MAZIE K. HIRONO

- Q1. Congress has repeatedly rejected the administration's proposals to cut funding for the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE), but the administration has again proposed a 74 percent cut to EERE. The proposed cuts would have a wide-ranging effect on the ability of EERE to fulfil its mission of helping the country transition to a clean energy economy, and the Department of Energy's ability to assist states like Hawaii in meeting their clean energy targets.

I understand from the Department of Energy's Senate budget briefing on February 12, 2020 that EERE currently has about 550 full time employees, and that the department is planning to increase EERE staff up to 675-700 full time employees. What internal deadlines is the Department setting to meet those staffing goals so that DOE can carry out Congress' vision for EERE?

- A1. On March 20, 2020, EERE and the Department's Office of Human Capital (DOE-HC) jointly briefed the SEWD/HEWD committee staff on EERE's plan and joint strategy with DOE-HC to reach an FTE level of 675.

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QUESTION FROM SENATOR ANGUS S. KING, JR.

- Q1. As you are aware, the President's FY 2021 budget for the Department of Energy proposes massive cuts to R&D activities, specifically in renewable energy and energy efficient technologies. This includes an 81 percent cut from vehicle technologies, 76 percent from solar, almost 79 percent from wind, 76 percent from geothermal, another 76 percent from advanced manufacturing, and we could go on. The total budget for the Office of Energy Efficiency and Renewable Energy would be cut by 74.1 percent under this proposal. These programs represent our energy future, and I find these cuts unacceptable.

In your response to my question regarding these deep cuts at EERE and many other areas of the Department's FY 2021 budget proposal, you stated that a number of these cuts were not necessarily as they seem, but are actually offset by increases in other areas like at the Office of Science or the National Laboratories. Please supply the detailed figures showing the cuts and the offsetting increases to which you referred in the hearing.

- A1. The FY 2021 Budget Request prioritizes early-stage research across basic and applied research programs where the federal role is the strongest. Through this approach, the Budget Request emphasizes funding for a number of coordinated department-wide priority areas, including research of technologies that cut across Program Offices for:
- Energy Storage (\$213.6M),
 - Critical Minerals (\$130.6M),
 - Harsh Environment Materials (\$58.5M),
 - Artificial Intelligence and Machine Learning (\$258.0M)
 - Advanced Manufacturing (\$228.5M),
 - Advanced Microelectronics (\$175.8M),
 - Exascale Computing (\$710.1M), and
 - Quantum Information Sciences (\$248.8M).

These priority areas support the Administration's emphasis on the Industries of the Future and other scientific priorities and represent new and increased emphasis areas to meet today and tomorrow's challenges by promoting energy independence, progressing scientific research, and protecting the Nation. EERE accounts for only a portion of the

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programs above, but, improves its potential impact when combined with other offices' focused research.

The Request also prioritizes sustaining mission-ready infrastructure and safe and environmentally responsible operations at the National Laboratories by providing funding for the infrastructure necessary to support leading edge research. This includes infrastructure projects that will address inadequate core infrastructure and utility needs, as well as funding for three new construction projects, and continuation of 15 ongoing construction projects across the 10 National Laboratories that the Office of Science stewards on behalf of the Department.

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QUESTIONS FROM SENATOR CATHERINE CORTEZ MASTO

Q1. The FY 2021 Congressional Budget Justification requests \$20,000,000 to establish a new program for Interim Storage.

Q1a. How was the \$20,000,000 amount determined?

A1a. Of the \$27.5 million requested for this effort, approximately \$20 million will be allocated to the initiation of interim storage activities. This amount is sufficient to initiate interim storage activities.

Q1b. How many of the 26 new full time employees (FTEs) requested are for the Interim Storage program?

A1b. No new FTE's are being added at this time, these are existing employees that currently reside within the Office of Spent Fuel and Waste Disposition within the Office of Nuclear Energy (NE-8), the Office of the General Counsel (GC), the Energy Information Administration (EIA), and are all currently funded within NE R&D Program Direction.

Q1c. Please provide a breakdown for the Interim Storage program new dollars requested and the new FTEs requested for the three locations identified in the Laboratory and State Tables documents: DOE Washington Headquarters, DOE Idaho Operations Office, and DOE Nevada Field Office.

A1c. These figures represent the whole of the Interim Storage and Nuclear Waste Fund Oversight Programs combined.

Location	Funding Amount	FTEs
Washington D.C.	\$7,500,000	26
Nevada Field Office	2,500,000	0
Idaho Operations Office	\$10,000,000	0

Q2. The FY 2021 Congressional Budget Justification requests \$7,500,000 to establish a new program for Nuclear Waste Fund Oversight.

Q2a. How was the \$7,500,000 amount determined?

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- A2a. The \$7.5 million requested supports DOE's requirements to secure and manage the environmental obligations for the Yucca Mountain site and support DOE's ongoing program to oversee management and execution of the Nuclear Waste Fund, and other fiduciary responsibilities.
- Q2b. How many of the 26 new FTEs requested are for the Nuclear Waste Fund Oversight program?
- A2b. No new FTE's are being added at this time, these are existing employees that currently reside within the Office of Nuclear Energy (NE-8), the Office of the General Counsel (GC), the Energy Information Administration (EIA), and the Office of Spent Fuel and Waste Disposition, and are all currently funded out of NE Program Direction.
- Q2c. Please provide a breakdown for the Nuclear Waste Fund Oversight program new dollars requested and the new FTEs requested for the three locations identified in the Laboratory and State Tables documents: DOE Washington Headquarters, DOE Idaho Operations Office, and DOE Nevada Field Office.
- A2c. These figures represent the whole of the Interim Storage and Nuclear Waste Fund Oversight Programs combined.
- | Location | Funding Amount | FTEs |
|-------------------------|----------------|------|
| Washington D.C. | 7,500,000 | 26 |
| Nevada Field Office | \$0 | 0 |
| Idaho Operations Office | \$0 | 0 |
- Q3. The FY 2021 Congressional Budget Justification State Table includes a new request for \$2,500,000 for Interim Storage and Nuclear Waste Fund Oversight at the Nevada Field Office.
- Q3a. How was this amount determined?
- A3a. This estimate is based upon prior year expenditures. \$2 million of these funds are to support hosting historic electronic records in an up-to-date cloud environment, which is an annual requirement starting in FY 2021.
- Q3b. Is this amount for activities not previously conducted in Nevada?

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A3b. No.

Q3c. If these activities were previously conducted in Nevada, what were the expenditures in FY 2017, FY 2018, and FY 2019?

A3c. The table below contains actual costs for site security at the Yucca Mountain site. They may not be inclusive of all site and security costs as some of those services are not tracked separately by activity.

FY 2017	FY 2018	FY 2019
\$374,869	\$356,840	\$329,965

Q4. The FY 2021 Congressional Budget Justification Overview states, "The Department recognizes that legislative changes are needed to implement elements of the proposed approach, and looks forward to working with Congress to implement a solution." A number of bills addressing spent nuclear fuel storage and high-level nuclear waste disposal have already been introduced in the 116th Congress, including H.R. 1544, H.R. 2699, H.R. 2995, H.R. 3136, S. 649, S. 721, S. 1234, and S. 2917.

Q4a. Please identify the bills that the Department has evaluated relative to the Interim Storage and Nuclear Waste Fund Oversight activities proposed in the CBJ.

A4a. DOE is familiar with the above proposed legislation.

Q4b. Does the Department intend to support any of these bills?

A4b. DOE looks forward to working with Congress on any of the above proposed legislation.

Q4c. Does the Department intend to work with Congress on new legislation?

A4c. Absolutely, DOE is committed to working with Congress to make it possible to provide for both the interim storage of spent nuclear fuel as well as the permanent disposal of both spent nuclear fuel and high-level radioactive waste.

Q5. The FY 2020 Appropriations Act, enacted December 20, 2019, directed DOE "to provide to the Committees on Appropriations of both House of Congress not later than 90 days after enactment of this Act a report on innovative options for disposition of high-level waste and spent nuclear fuel management. Priority should be given to technological

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options that are cost effective, are able to be implemented in the short term, and consider siting stakeholder engagement.”

Q5a. What is the status of this report?

A5a. The report is in draft form and is undergoing internal DOE review.

Q5b. Will this report address consent-based siting of nuclear waste storage and disposal facilities?

A5b. The report is in draft form and is undergoing internal DOE review.

Q5c. Will this report address geologic repository programs in countries other than the United States?

A5c. The report is in draft form and is undergoing internal DOE review.

Q5d. Will this report address alternative geologic disposal technologies, such as deep borehole disposal of nuclear waste?

A5d. The report is in draft form and is undergoing internal DOE review.

Q6. The FY 2020 Appropriations Act, enacted December 20, 2019, directed DOE “to contract with the National Academy of Sciences (NAS) not later than 60 days after enactment of this Act to conduct a comprehensive, independent study on the waste aspects of advanced reactors.”

Q6a. What is the status of contracting for the NAS report on waste aspects of advanced reactors?

A6a. The contract is being prepared by the National Academy of Sciences (NAS) and the Department of Energy (DOE).

Q7. At the end of FY 2019 (September 30, 2019), what were the unobligated balances in the Department's Defense Nuclear Waste Disposal and Nuclear Waste Disposal accounts? What were the Department's ending FY 2019 obligated but unspent funds in those accounts?

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- A7. The unobligated balances in the Department's Defense Nuclear Waste Disposal and Nuclear Waste Disposal accounts were \$6,436,657 at the end of FY 2019. The Department's ending FY 2019 obligated but unspent funds in those accounts were \$7,997,302.
- Q8. During FY 2019, did the Department spend any funds from the Department's Defense Nuclear Waste Disposal and Nuclear Waste Disposal accounts for Yucca Mountain licensing activities?
- A8. The Yucca Mountain licensing proceeding was suspended in 2011 and the Department is not engaged in licensing activities for the Yucca Mountain site.
- Q9. During FY 2019, did the Department spend any funds from the Department's Defense Nuclear Waste Disposal and Nuclear Waste Disposal accounts for security, maintenance, and environmental requirements at the Yucca Mountain site?
- A9. Yes. Approximately \$200K-\$350K is spent annually for Yucca Mountain safety and security provided by Nevada National Security Site contractors. Some maintenance and environmental requirements costs may not be captured in these amounts as some of those services are not tracked separately by activity.
- Q10. Please provide a breakdown of FY 2019 expenditures for pension fund obligations for retired Yucca Mountain workers and closeout of legacy accounts; administration of the Nuclear Waste Fund, financial audits, investment guidance, and other analyses; and maintenance of Yucca Mountain Project records and technical and scientific information, including preservation and security of the geologic samples.
- A10.

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Activity	Costs
	FY 2019
Pension fund obligations and closeout of legacy accounts	\$136,296
Administration of the NWF, Financial Audits, etc.	\$1,951,476
Maintenance of Yucca Mtn. Project records and technical and Scientific Info. (including preservation and security of geologic samples)	\$952,322

- Q11. The President has said that he will respect the voices of Nevadans and look for alternative nuclear waste storage solutions, rather than continue to force the unsafe and unworkable Yucca Mountain project.
- Q11a. If the Administration does not intend to pursue the Yucca Mountain repository, will you explain why the Department is requesting \$7.5 million for Nuclear Waste Fund oversight, including funding for the “security, maintenance, and environmental requirements” for the Yucca Mountain site?
- A11a. The Nuclear Waste Fund is for all activities authorized by the Nuclear Waste Policy Act of 1982, and DOE has a legal responsibility to oversee the use of the fund. Because there is still DOE property at the site, DOE supports several activities to ensure that the Yucca Mountain site is maintained in a safe and secure manner. For example, because the Yucca Mountain site is partially located on the Nevada National Security Site (NNSS), DOE funds a portion of the security costs of the NNSS. Additionally, DOE supports environmental activities to ensure that relevant portions of the NNSS land, air, and water resources are monitored and protected. DOE also funds activities related to accommodating, and ensuring safety during, official visits to the Yucca Mountain site, such as the one that Senator Cortez Masto participated in last year.
- Q11b. Will the Department work with Congress to map out a consent-based, long-term nuclear waste storage solution that treats Nevada fairly and breaks free from the flawed process that led to the Yucca Mountain repository designation, decades of inaction, and billions of wasted taxpayer dollars?

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- A11b. The Department is committed to working with Congress to develop a flexible but durable solution for the storage, transportation, and disposal of the Nation's spent nuclear fuel and high-level radioactive waste.
- Q12. Would the Department support a repeal of the 1987 amendment that designated Yucca Mountain as the nation's sole nuclear waste repository?
- A12. The Department will work with Congress on possible legislative changes necessary to implement the program outlined in the FY21 Budget.
- Q13. The President's Budget Request reads, "...the Budget supports the implementation of a robust interim storage program and R&D on alternative technologies for the storage, transportation, and disposal of the Nation's nuclear waste, with a focus on systems deployable where there is a willingness to host." Additionally, in Volume 3, Part 2 of the Budget Request, the Department lists that it will work with State, Tribal, and local governments as well as other affected federal agencies.
- Q13a. Will the Department support a process consistent with the recommendations of the Blue Ribbon Commission on America's Nuclear Future to require that an agreement be reached between the Department and the governor, local governments, and affected tribes before pursuing an interim or long-term nuclear waste storage facility?
- A13a. The Department has made it clear that any proposed solution must include working with states and local communities that may be interested in hosting an interim storage facility or a permanent repository.
- Q14. Has the idea of using Yucca Mountain for an interim storage site ever been discussed within the Department?
- A14. Under the terms of the Nuclear Waste Policy Act of 1982, as long as Yucca Mountain is named as the repository, designating Yucca Mountain as an interim storage site is not permitted.
- Q15. The DOE shipped a half metric ton of plutonium to the Nevada National Security Site (NNSS) from the Savannah River Site in South Carolina in 2018. I secured an agreement with DOE, which you have agreed to honor, to begin removing the plutonium from NNSS in 2021 and complete removal by the end of 2026. The Budget Request includes a

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more than 18 percent increase for the National Nuclear Securities Administration (NNSA).

Q15a. Will the Department still be able to meet its commitment to remove the plutonium from NNSS by 2026?

A15a. The Department of Energy remains committed to commencing removal of this material from Nevada beginning in calendar year 2021 and completing removal by the end of 2026.

Q16. The Budget Request includes a more than \$230 million increase for the Nevada National Security Site.

Q16a. How much of the increase is related to the Savannah River Site (SRS) plutonium currently being stored at NNSS?

A16a. The requested funding increase in Fiscal Year 2021 supports strategic investments in facilities, infrastructure, and scientific capabilities at the Nevada National Security Site and is not tied to the plutonium from the Savannah River Site that is temporarily staged in Nevada.

Q16b. Is the increase in funding requested for stockpile stewardship activities at NNSS because DOE intends to make additional shipments of SRS plutonium to NNSS?

A16b. The Department of Energy does not plan to ship any additional plutonium from the Savannah River Site to the Nevada National Security Site.

Q17. The Budget Request includes \$97 million for the Department's new Energy Storage Grand Challenge (ESGC). In the Budget in Brief, the ESGC vision "is to create and sustain global leadership in energy storage utilization and exports, with a secure domestic manufacturing supply chain that is independent of foreign sources of critical materials, by 2030."

Q17a. I understand that this program will be looking beyond existing lithium-ion technologies, but what role do you expect lithium to continue to play in ESGC research and development in battery and domestic critical mineral production?

A17a. Launched in January 2020, the Energy Storage Grand Challenge (ESGC) is a comprehensive program to accelerate the development, commercialization, and

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utilization of next-generation energy storage technologies and sustain American global leadership in energy storage.

Through the Grand Challenge, DOE is prioritizing an integrated, comprehensive strategy focused on energy storage that brings together the relevant DOE offices and leverages all the tools at DOE's disposal. Lithium ion technologies are expected to be key part of the overall solution, along with other energy storage technologies such as flow batteries, chemical storage, hydro-storage, plus others coupled with flexible generation and loads.

The Department's FY21 Budget Request for lithium battery R&D will focus on exploring new battery materials and technologies to significantly reduce cost and enhancing performance of lithium batteries, with a focus on reducing or eliminating the need for critical materials. Establishing domestic supplies of critical battery materials such as lithium and nickel will also be an important effort. There are opportunities for producing raw materials, such as lithium and nickel here in the U.S. In addition, lithium battery recycling will play an important role for material supply in the future, including the recovery of cobalt from spent lithium batteries.

- Q17b. Will there be opportunities for the Department to engage with Nevada, a domestic lithium producing state, in helping to increase our critical mineral security and make advancements in lithium-based battery technologies?
- A17b. Securing raw materials for lithium ion batteries is a critical pathway to establishing the U.S. as a leader in this emerging market. Some materials, such as cobalt, do not have significant domestic reserves and are reliant on a robust recycling infrastructure or foreign sources of raw materials. The U.S. had a net import reliance of 78% for cobalt in 2019. There are opportunities for producing raw materials, such as lithium and nickel here in the U.S. In addition, lithium battery recycling will play an important role for material supply in the future, including the recovery of cobalt from spent lithium batteries.

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The U.S. also lacks domestic materials processing capabilities in the lithium ion battery supply chain. Increasing raw materials production without increasing corresponding processing and manufacturing capabilities simply moves the source of economic and national security risk down the supply chain and creates dependence on foreign sources for these capabilities.

The Departments' Energy Efficiency and Renewable Energy Office supports an ongoing cross-office effort between the Geothermal, Advanced Manufacturing, and Vehicle Technologies Offices (GTO, AMO and VTO respectively) to understand how the U.S. can better establish a domestic lithium supply chain for materials as well as explore the potential for resource diversification. EERE is planning a workshop this summer with industry stakeholders including raw material suppliers, material processors, and battery manufacturers to identify R&D pathways to address domestic production and processing gaps.

Recognizing the importance of lithium-ion battery recycling, the Department established the Lithium Battery Recycling R&D Center (ReCell) and the Lithium-Ion Battery Recycling Prize in FY19 and will continue support for both activities in FY20 and in the FY21 Request, along with continued support for lithium battery recycling R&D with industry through cost-shared projects with the United States Advanced Battery Consortium (USABC).

- Q18. The budget request, like previous requests, has proposed to eliminate the Weatherization Assistance Program and the State Energy Program. For decades, the weatherization program has helped Nevadans make their homes more energy efficient and reduced their energy costs. While the State Energy Program has supported the State of Nevada as it deploys electric vehicle infrastructure and works to expand renewable energy. Eliminating these programs hurts Nevadans and undercuts the progress being made across the country by innovative state energy offices.
- Q18a. Can you explain why the Administration continues to propose the elimination these important programs?

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A18a. To reduce federal intervention in state-level energy policy and implementation activities, the President's Budget request includes no funding for the Weatherization Assistance Program (WAP) and the State Energy Program (SEP). The Administration's focus for the Office of Energy Efficiency and Renewable Energy (EERE) is on early-stage applied research and development. DOE is focused on higher risk activities that are more appropriately performed by the federal government, versus those activities that are more appropriately left to the private sector, states, and local governments. DOE also understands congressional interest in these programs, and continues to manage them consistent with the statute and execute appropriated funds in an expeditious manner.

EERE invests in research and development (R&D) as part of the DOE broad portfolio approach to addressing our Nation's energy and environmental challenges. The President's Budget request focuses DOE resources toward these early-stage R&D activities and reflects an increased reliance on the private sector to fund later-stage research, development, and commercialization of energy technologies. It emphasizes energy technologies best positioned to support American energy independence and resilience in the near- to mid-term.

Q19. The Budget requests only \$8 million, a 63.6 percent reduction in funding, for the Office of Indian Energy, which provides essential financial and technical assistance to tribal communities to promote energy development and increase efficiency. Additionally, the Budget also eliminates the Tribal Energy Loan Guarantee Program, despite tribal lands having significant potential for energy development, especially renewable energy development, which can help boost local economies and reduce emissions.

Q19a. Why is the Department slashing programs that have helped bring power to the most remote parts of Indian Country and improved tribes' access to reliable energy and resilient infrastructure?

A19a. The President's FY 2021 budget request of \$8 million is consistent with the FY2020 budget request. A reduction of \$14 million will result in a slight decrease to program direction and will have minimal impact on the Office's efforts to install energy infrastructure in Indian Country. The Office of Indian Energy will, to the maximum

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extent practical, utilize the amount of appropriated funding to assist Indian tribes and tribal entities for the deployment of energy infrastructure.

Authority to administer the Tribal Energy Loan Guarantee Program (TELGP) was delegated to the Department's Loan Programs Office (LPO) in February 2018. LPO issued a draft solicitation in March 2018 and then a final solicitation in July 2018. Since the draft solicitation was issued, LPO has been actively reaching out to tribal nations and affiliated organizations to make them aware of TELGP as a financing option as they begin to plan for these projects that typically have multi-year development timelines.

The President's Fiscal Year (FY) 2021 budget request proposes to eliminate the TELGP.

- Q20. Will you commit that the Department of Energy will not pursue the proposal to auction off Power Marketing Administration transmission infrastructure, including those operated by Western Area Power Administration?
- A20. Under current law, DOE is responsible for the supervision of the PMAs. DOE has no authority to sell or otherwise divest PMA transmission assets. Any such action would require congressional authorization.

