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THE PRESIDENT'S BUDGET REQUEST FOR THE DEPARTMENT OF ENERGY FOR FISCAL YEAR 2023

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED SEVENTEENTH CONGRESS

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THE PRESIDENT'S BUDGET REQUEST FOR THE DEPARTMENT OF ENERGY FOR FISCAL YEAR 2023

THURSDAY, MAY 5, 2022

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

The Committee met, pursuant to notice, at 10:04 a.m. in Room SD–366, Dirksen Senate Office Building, Hon. Joe Manchin III, Chairman of the Committee, presiding.

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

The CHAIRMAN. The Committee will come to order.

I am pleased to welcome my dear friend, Secretary Jennifer Granholm. We go back a ways with her and her family, and I appreciate that relationship very much. And we have you back to the Committee to discuss President Biden's Fiscal Year 2023 budget request for the Department of Energy. So I want to thank you, Madam Secretary, for being here today.

The ongoing crisis in Ukraine is severe. Putin has used energy as a weapon to leverage power over European democracies and intends to do the same globally, using Russia's abundant energy resources. So far, the U.S. has taken significant steps to counter Putin's aggression, including banning the import of Russian oil, petroleum products, LNG, and coal, while also authorizing additional LNG export capacity. These are critical moves to stop funding Putin's brutal war on the Ukrainian people, but there is more that we can and must do. In a time when maintaining and strengthening our energy security is top-of-mind, I look forward to hearing more about how the Administration's budget request will help us achieve that goal.

At the same time, the Department's efforts to advance critical clean energy technologies from solar to nuclear energy and storage continue to transform the U.S. economy and reduce our greenhouse gas emissions, and you have some pretty historic new authorities and funding levels with which to do that. This Committee's work product, the Energy Act of 2020, established new pathways for research and development across the energy landscape. The Bipartisan Infrastructure Law we passed late last year was a critical step to enable us to be a leader in innovative energy technology and supplying our partners with our abundant resources. The infrastructure law provides an all-of-the-above investment in innova-

tion, not elimination, including funding for carbon capture utilization and storage, hydrogen, critical minerals, transmission, energy efficiencies, clean energy manufacturing, and so much more. The Department of Energy is overseeing the implementation of $62 billion of this funding.

Secretary Granholm, as you saw when you visited West Virginia in March, there is so much excitement around programs like the hydrogen hubs and the many other programs in the infrastructure law that will have an enormous impact not only on my State of West Virginia, but also on a lot of states throughout the country. We wanted to ensure you have all the tools and personnel you need to get that money out the door efficiently and effectively, and I look forward to hearing about the progress the Department has made in implementing this historic legislation. I was glad to see several West Virginia priorities included in the Department's budget request. The request includes $502 million for the Weatherization Assistance Program, which helps low-income families make lasting energy efficiency improvements to their homes, and I can tell you, everyone on this Committee will benefit by that—freeing up finite resources for other essentials like food and medicine. I am pleased to see an increase in funding for the Weatherization Readiness Fund, which was funded for the first time last year, and will help low-income families make the repairs to their homes that are necessary to qualify for weatherization dollars. The request also supports the National Energy Technology Laboratory, headquartered in Morgantown, West Virginia, although, I think this is an area of underinvestment, as you could well imagine.

We are so proud of the work that Brian Anderson—Dr. Anderson—and his team do to keep us on the cutting edge of energy innovation, especially technologies that will help us reduce carbon emissions without sacrificing reliability and energy security. We also cannot sacrifice the rural economies that have produced our energy for decades. That means leaving nobody behind. That is why I have been encouraged to see the Administration acknowledge the contribution of these hardworking men and women by convening an interagency working group on coal and power plant communities. This working group needs dedicated funding and a long-term mission to truly make an impact on these communities that have given so much to our country. This transition will be playing out for decades. Creating new opportunities in coal communities means that we need to use all of the tools that we have, and government investment—if done right—can be one of the most powerful.

Now, it is no secret that I have serious concerns about our nation's debt, and as such, I take my role as both an authorizer and appropriator very seriously. I fully believe that we can get our fiscal house in order while supporting West Virginia and American priorities. I look forward to hearing from the Secretary this morning about how we can do just that.

And with that, I am going to turn it over to Ranking Member Barrasso.

OPENING STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM WYOMING

Senator BARRASSO. Well, thanks so much, Mr. Chairman. Thank you for holding today's hearing. And thank you, Madam Secretary, for testifying today.

There are few issues to me as important right now as energy. And that is the same with the American people. During your confirmation hearing last year, I said "The incoming Administration should not devastate our economy by implementing policies that undermine energy production." And I meant that as a warning, but it turned out to be a prediction. The shale revolution made America the world's leading oil producer and natural gas producer. It also lowered our country's carbon emissions, and many saw that as a huge success. But instead of embracing America's energy revolution, President Biden is fighting it. He has been leading an energy counterrevolution. He wants to return us to the days of going hat-in-hand to the OPEC cartel. American families are now bearing the consequences, and our adversaries are in the driver's seat.

Madam Secretary, in an interview on Bloomberg last year, you were asked what your plan was to increase oil production. You responded, "That is hilarious." You may find high energy prices a laughing matter. Maybe the President does as well. He seemed to laugh about it Saturday night at the White House Correspondence Dinner. I can assure you, American families are struggling, are suffering, and they do not view these high gas prices as a laughing matter. The price of gas at the pump is up seventy percent since the week Joe Biden was inaugurated. Two-thirds of that increase came before Russia invaded Ukraine. Residential natural gas prices are up 24 percent from January 2021 to January 2022. Inflation is at a forty-year high. Too many families, this past winter, faced the choice of whether to heat their homes or put food on the table. The White House should be encouraging American energy production.

The business section today, New York Times, front page, big picture—"increasing costs, next, electricity." But instead of focusing on that, this Administration is waging a war on America's energy producers. The Administration has done all it can to block new oil and gas production on federal lands, including banning new oil and gas lease sales. The court ruling lifted the moratorium. The President's response was to slash the acreage available by 80 percent and make it even more expensive to produce American energy on that land. The Federal Energy Regulatory Commission even tried to impose rules that would make it nearly impossible to site new natural gas pipelines. Last month, the White House repealed rules to ensure environmental reviews are completed in a timely manner. U.S. oil production is 1.3 million barrels a day below the pre-pandemic peak. We are even further below the increase in production projected a couple of years ago. In addition to helping the American people, this lost production would have undermined Russia—could have done both, helped the American people, undermine Russia. But killing the Keystone Pipeline on day number one of the President—and that was before your nomination, before the hearings here for you Madam Secretary—the President killed the Keystone Pipeline, banning new federal leases, undermining Alaskan oil pro-

duction, and blocking energy infrastructure. All of these things have empowered our adversaries.

Well, the President reluctantly ended domestic purchases of Russian oil. Remember, he begged Russia to produce more oil when he was in Glasgow, Scotland for the climate meeting. The President still hasn't stopped the purchase of Russian uranium. America has enough uranium to replace these imports. The Administration is doing nothing to boost production here at home. Desperate gimmicks like releasing oil from the Strategic Petroleum Reserve or a gasoline tax holiday will not solve our supply shortage. The solution is more American energy. Yet, that is something the Administration will not allow. We must make our country energy-dominant again. Increasing U.S. oil and natural gas production would make our people more prosperous. It would make our nation and our allies safer.

Now, the President has claimed that he is not doing anything to limit domestic energy production. Simply not true. Look at President Biden's policies. Look at production numbers. Look at the international marketplace. Look at the statements of his own appointees. According to Gina McCarthy, the White House National Climate Advisor—now this is after the President gave a speech, talked about energy. She went and apparently had to clean up after the President because she said "President Biden remains absolutely committed to not moving forward with additional drilling on public lands," after a statement by the President. So, apparently, we see a lot of cleanup going on at the White House.

Madam Secretary, it is long past time for the Biden Administration to have an energy strategy that includes American energy.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator.

And now, I would like to turn to our witness this morning, Secretary Jennifer Granholm, to deliver her opening remarks. Thank you, Secretary, for being here.

OPENING STATEMENT OF HON. JENNIFER GRANHOLM, SECRETARY OF ENERGY

Secretary GRANHOLM. Chairman Manchin and Ranking Member Barrasso and members of the Committee, it is an honor to appear before you today to discuss President Biden's 2023 budget request for the Department of Energy. I am extremely proud to lead the Department as the 16th Secretary of Energy, and I am very grateful for the support that you have given DOE, including through the 2022 Omnibus legislation and the Bipartisan Infrastructure Law.

Under the Biden Administration, DOE is committed to increasing energy security and affordability and resilience. We are committed to securing the clean energy supply chains that are needed to reduce our reliance on unabated fossil fuels and increase our energy independence, like the $3 billion from the Bipartisan Infrastructure Law for battery manufacturing that we announced on Monday. We are also committed to strengthening America's competitiveness by accelerating scientific discovery and innovation. These commitments are reflected in our budget, and a look around the world shows that this is the right focus with the right priorities for this moment in history.

Right now, we face a trio of crises—climate change, which cost the United States $148 billion last year alone in cleaning up after extreme weather damages, then, COVID–19, and now Russia's invasion of Ukraine, which is costing American families right now, as they see prices rising from gas stations to grocery stores. Let me be clear, the Department of Energy is using every tool available to increase oil supply. In late March, President Biden did authorize the release of one million barrels per day from our Strategic Petroleum Reserve over the next six months—180 million barrels total—coordinating with our international allies and partners who committed to release another 60 million barrels to increase global supply. I appreciate your leadership and support of the President's ban on Russian energy imports. We are also working to offer relief to American families for home fuel costs, including through $3.5 billion for the Weatherization Assistance Program, provided in the Bipartisan Infrastructure Law.

But ultimately, these crises tell us that energy security and independence and affordability all depend on a shift, yes, toward American-made clean energy. It is why we are working with our international allies to advance alternative energy sources and boost clean energy manufacturing. It is why we are grateful that Congress, through the 2020 Energy Act and the Bipartisan Infrastructure Law, has invested in building clean energy technologies here at home with American parts and American labor. I am grateful to the members of the Committee for the faith that they have placed in our Department to oversee many of these investments, and in the new offices and clean energy goals that come with them. The $62 billion from the Bipartisan Infrastructure Law is a historic investment in projects that will serve our nation for decades, but it is not, on its own, sufficient to address the nation's energy challenge. And that is why our request includes base-year funding for efforts to complement the Bipartisan Infrastructure Law and maximize its impact to lower costs and provide reliable, secure American power.

The request also supports our Office of Energy Efficiency and Renewable Energy, our Office of Science, our 17 national labs, which sharpen our nation's innovative capacity and competitive edge, and our budget, of course, includes funding for DOE missions that keep our country safe—from environmental management to nuclear security. I am proud of DOE's work with our extraordinary employees to confront our nation's most pressing challenges. I reaffirm DOE's commitment to implement Congressional actions from the Bipartisan Infrastructure Law, the Energy Act, to those still to come, including the bipartisan Innovation Act, and the President's full agenda for building a better America. So thank you for the opportunity to be here, and I am happy to answer any questions.

[The prepared statement of Secretary Granholm follows:]

Testimony of Secretary Jennifer M. Granholm

U.S. Department of Energy

Before the

U.S. Senate Committee on Energy and Natural Resources

May 5, 2022

Chairman Manchin, Ranking Member Barrasso, and Members of the Committee, it is an honor to appear before you today to discuss the President's FY 2023 Budget request for the Department of Energy ("the Department" or "DOE").

It is a privilege to serve as the 16th Secretary of Energy and have the responsibility of leading the Department in delivering technological advancements and scientific discoveries, advancing the energy, economic, and national security of the United States, and combatting the climate crisis. DOE is committed to securing and advancing environmental justice and equity and spurring economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and experience underinvestment in essential services. DOE supports these missions through transformative science and technology solutions, partnerships with states, Tribes, municipalities, communities, and other nations, and the Nation's best scientists and scientific facilities at the National Laboratories.

Budget Topline and the Passage of the BIL

DOE's FY 2023 Budget Request is $48.2 billion, an increase of $8.6 billion or +21.7 percent over the FY 2021 Enacted Level, and an increase of $3.3 billion (+7.4%) over the FY 2022 enacted level. The request helps to build a better, stronger, more secure, and more inclusive America by creating jobs through investments in clean energy and infrastructure. The Investments proposed in the FY 2023 Budget Request are necessary for the long-term transition

of most of the economy from fossil fuels to domestically produced renewable energy. This will end our dependence on volatile fossil fuels to drive our cars, transport our goods, heat and cool our homes, and much more. It will also help us slow the destructive impacts of climate change.

I would like to highlight that resources provided through the FY 2023 Budget will complement, not duplicate, the $62 billion Congress provided the Department in the Bipartisan Infrastructure Law, or BIL. This $62 billion is a down payment that will supercharge DOE's work on clean energy demonstrations, advanced manufacturing, grid infrastructure, and low-income home weatherization. The FY 2023 Budget complements the BIL to bolster the Department's resources to cut energy costs for households and businesses, advance clean energy innovation, and generate good-paying, union jobs.

Ukraine and the Need to Continue the Clean Energy Transition

I am appearing before you at a troubling, shocking time in world history. The bravery of the Ukrainian people should inspire all of us to do our part. In addition to the tragic impact on the people of Ukraine, I am focused on the enormous consequences of Russia's invasion on the future of energy. I appreciate the strong message Congress has sent, stating clearly along with President Biden to ban Russian oil imports. Vladimir Putin's actions have sent the oil market reeling, raising oil prices and the price of gas at the pump, and affecting our daily lives, which underscores the need for clean energy deployment to increase national security through further energy independence. Stated bluntly, the situation in Ukraine and the impact on gas prices has highlighted the national security importance of our energy investments. We must rapidly deploy homegrown clean energy technologies like renewable energy and energy efficient electric appliances to stop relying on the volatile oil market and create price stability for American households and businesses. The FY 2023 request includes new and expanded investments to increase our energy security and deploy domestically manufactured clean energy.

Moving Beyond the COVID-19 Pandemic

Additionally, DOE's FY 2023 request will not only move DOE, its workforce, and the Nation toward a clean energy future, but also serve as a brick in the path to help the Nation move beyond the COVID-19 pandemic and build a better, stronger, more secure, and more inclusive America. DOE's 17 National Laboratories have and will continue to play a foundational role in U.S. leadership in science and technology and in tackling the pandemic and the most pressing challenges of our time as they emerge. They are our solutions factories where scientific collaboration takes place, where world-leading experimental tools provide crucial insights into nature, and where solutions to our most urgent challenges are being developed. It was at DOE's scientific user facilities where researchers from the National Laboratories, universities, and industry collaborated to reveal the structure of the spike protein on SARS CoV-2, the virus that causes COVID-19, using X-ray and neutron sources, and where vaccine binding was modeled using DOE's high-performance computers.

Seeking to return to yesterday's normal is not realistic, nor is it enough. It is time to use the science and solutions from DOE's laboratories and help the Nation address our challenges while reimagining our energy economy. And, as America goes back to work, we are going to help rebuild and refocus by creating millions of good-paying energy jobs in communities all over the country. The FY 2023 Budget Request will continue to advance our core science and security missions and create jobs supporting our clean energy infrastructure.

Cutting Energy Costs for Households and Businesses

The FY 2023 budget request bolsters DOE's efforts to cut energy costs for households and businesses while making the Nation more resilient to geopolitical disruptions that hurt Americans at the pump and in the pocketbook. Funding for the Weatherization Assistance Program (WAP) including for a new pilot initiative to drastically reduce costs for households in need, will save low-income households money on their home energy bills.

The budget request includes $100 million for this new pilot program, known as the Low-Income Home Energy Assistance Program (LIHEAP) Advantage Pilot, to invest in home energy

efficiency and energy cost-saving retrofits, including distributed energy solutions. The LIHEAP Advantage Pilot program will use innovative ways to design and expand the combined impact of WAP, the Department of Health and Human Service's LIHEAP program, and related low-income energy assistance programs. More than 33 million households are eligible for energy assistance through LIHEAP to help them cover often-burdensome energy bills. These households could save significant money on their bills if they had access to energy-saving retrofits. The LIHEAP Advantage Pilot will save low-income households money on their bills through energy efficiency and clean energy, thereby reducing the demand for LIHEAP bill assistance and enabling taxpayer dollars to support even more people in need. The upgrades will also make the homes more comfortable and reduce harmful indoor air pollution.

Additionally, programs like the State Energy Program and Energy Future Grants will help communities, states, municipalities, and Tribes improve energy planning and meet energy needs with low-cost clean energy. Robust funding for the Office of Energy Efficiency and Renewable Energy will help cut energy bills by expanding access to rooftop solar and cost-saving energy efficiency upgrades. Moreover, the request expands DOE's efforts to support resilient supply chains and domestic manufacturing for critical clean energy materials and technologies. A new Solar Manufacturing Accelerator will help DOE shore up supply chains for solar energy and make us more resilient to geopolitical disruptions. The new Global Clean Energy Manufacturing initiative will enable DOE to partner with friendly and allied nations to develop secure supply chains for critical materials.

FY 2023 President's Budget Request

President Biden's proposed FY 2023 Budget request for the Department of Energy invests $48.2 billion in discretionary funding to advance key priorities including creating jobs through clean energy projects, bringing America to the forefront of clean energy innovation, tackling the climate crisis with the urgency that science demands, investing in communities that have been left behind, cleaning up the environmental legacy of the Manhattan Project and Cold War, and ensuring the safety and security of the nuclear stockpile.

In addition to the $2.1 billion for the new Under Secretary for Infrastructure, the request includes $14.7 billion for the Under Secretary for Science and Innovation focused on fundamental science, clean energy innovation and our core research, development, and demonstration (RD&D) missions across existing programs and our National Labs. Of the $14.7 billion, $7.8 billion is for the Office of Science (SC) for increased investments in Administration priorities including basic research on climate change and clean energy, artificial intelligence (AI) and machine learning (ML), and bio preparedness.

The request includes $21.4 billion for the Under Secretary for Nuclear Security and Administrator, National Nuclear Security Administration to pursue three major national security missions: maintain a safe, secure, reliable, and effective nuclear weapons stockpile; reduce global nuclear threats and keep materials out of the hands of terrorists; provide safe and effective integrated nuclear propulsion systems for the U.S. Navy. These missions all require strong science, technology and engineering capabilities and a modern, revitalized infrastructure.

The Budget request also invests $7.6 billion through the Office of the Environmental Management to continue cleanup of sites resulting from six decades of nuclear weapons development and production and Government-sponsored nuclear energy research. This sustains our investment in the EM mission to clean up World War II and Cold War nuclear sites.

Modernizing Energy Infrastructure through a New Under Secretary

To implement the BIL, the FY 2023 Budget Request reflects DOE's February 2022 realignment to better execute DOE's mission and ensure that the Department has the structure needed to effectively implement the clean energy investments prescribed in the BIL and the Energy Act of 2020. The new organizational structure establishes two Under Secretaries: one focused on fundamental science and clean energy innovation and the other focused on deploying clean infrastructure. This new structure will maximize the effectiveness of BIL programs and support DOE's ongoing work to reduce energy costs through low-cost clean resources and achieve carbon-free electricity in the U.S. by 2035 and a net zero economy by 2050. These structural changes set DOE up for success in carrying out all our missions – and to carry them forward for

the coming years and decades. Our strategic realignment optimizes the world-class expertise of our talented staff and will maximize our ability to accelerate the technologies needed to grow clean energy jobs and fight the climate crisis.

The FY 2023 Budget Request includes $2.1 billion for the new Office of the Under Secretary for Infrastructure focused on clean energy infrastructure — large-scale demonstration and deployment. The new office centralizes existing program offices focused on major demonstration and deployment with newly created offices. The existing offices that moved to the new Under Secretary include DOE's Loan Programs Office, Office of Indian Energy, Office of Clean Energy Demonstration, Office of Cybersecurity, Energy Security, and Emergency Response (CESER), and the Federal Energy Management Program.

Funding for the Under Secretary for Infrastructure's programs is critical to reducing energy costs for households and businesses, rounding out DOE's portfolio of innovation investments, and ensuring a clean, safe, resilient, and secure energy system. The FY 2023 budget request includes:

- $90 million for the Grid Deployment Office to catalyze the development of new and upgraded high-capacity electricity transmission and distribution systems nationwide, working with electricity system partners and stakeholders to ensure a reliable, resilient, and equitable grid that connects consumers to lower-cost and cleaner electricity options. The FY 2023 request supports two new programs, the Wholesale Electricity Market Technical Assistance and Grants, to improve electricity markets, and the Interregional and Offshore Transmission Planning programs, which will address barriers to offshore wind deployment.

- $727 million for the State and Community Energy Program to work more closely with states, localities, and communities to reduce energy costs for households and businesses, deploy low-cost clean energy solutions, weatherize at least 50,000 homes through the Weatherization Assistance Program, and improve energy system planning;

- $27 million for Manufacturing and Energy Supply Chains to support U.S. competitiveness in manufacturing next-generation energy technologies, ensure a strong energy industrial base, build resilient domestic supply chains, and help small- and medium-sized manufacturers improve productivity and competitiveness, reduce waste, and save energy;

- $214 million for the Office of Clean Energy Demonstrations (OCED) to initiate a new program to support full-scale and commercial-scale demonstrations that address integration issues of renewable energy into the U.S. transmission and distribution grids. OCED will also house the Advanced Reactor Demonstration Program, which focuses on the construction of demonstration reactors in the near- and mid-term that are safe and affordable to build and operate;

- $170 million for the newly established Federal Energy Management Program (FEMP) to help federal agencies meet their building infrastructure and fleet modernization needs, by accelerating the implementation of energy and water conservation measures and improving energy resilience, including by funding the Assisting Federal Facilities with Energy Conservation Technologies (AFFECT) program and launching the Net-Zero Labs Initiative to support the National Laboratories in decarbonization projects.

- $150 million for the Office of Indian Energy Policy and Programs for financial and technical assistance to promote energy development, efficiency, and use, reducing or stabilize energy costs, strengthening energy and economic infrastructure, transitioning the national Tribal Colleges and Universities to renewable energy, and bringing electrical power and service to Indian land, homes, and Alaskan Native communities;

- $162 million, net of offsetting collection, for the Loan Programs Office, which includes $150M for the Title 17 Innovative Technology Loan Guarantee Program credit subsidy costs, associated with an additional $5 billion of loan guarantee authority open to a range

of eligible projects that will help drive innovation, increase U.S. competitiveness, and support domestic manufacturing and supply chains; and

- $202 million for the Office of Cybersecurity, Energy Security, and Emergency Response (CESER), which leads the Department's efforts to secure U.S. energy infrastructure against all hazards, reduce the risks of and impacts from cyber events and other disruptive events, and assist with restoration activities.

Office of Clean Energy Demonstrations

DOE's FY 2023 Budget Request supports the BIL-established Office of Clean Energy Demonstrations (OCED), which will accelerate clean energy innovation through major demonstrations of the clean energy technologies that have been invented and improved by the National labs and DOE's R&D programs. OCED will support scale-up of technologies including clean hydrogen, carbon capture, grid-scale energy storage, advanced nuclear reactors, and more. The FY 2023 Budget Request provides $214 million for OCED, which will serve as a project management center of excellence supporting the applied programs and other offices as needed to ensure a consistent approach to implementing capital-intensive late-stage technology demonstrations across DOE. OCED is implementing the more than $20 billion appropriated in the BIL for the new office to deliver cutting edge clean technologies to communities and businesses across the country. These demonstrations will fund projects totaling hundreds of millions or multiple billions of dollars in scale and will unlock massive follow-on investment from the private sector to deploy these technologies, delivering clean energy to communities across the country.

With FY 2023 funding, OCED will initiate a new $150 million program to support full-scale and commercial-scale demonstrations that address integration issues of renewable energy into the U.S. transmission and distribution grids. OCED will also provide $25 million for the Advanced Reactor Demonstration Program, which focuses on the construction of demonstration reactors in the near- and mid-term that are safe and affordable to build and operate.

Demonstration projects prove the effectiveness of innovative technologies in real-world conditions at scale in order to pave the way towards widespread adoption and deployment. The founding of this office represents a new chapter that builds on DOE's expertise in clean energy research and development. OCED expands DOE's scope to fill a critical innovation gap on the path to net-zero emissions by moving clean energy technologies out of the lab and into local and regional economies across the country, proving the value of technologies that can deliver for communities, businesses, and markets.

OCED's BIL programs also include billions of dollars to invest in demonstration projects in rural areas and economically hard-hit communities that are experiencing the first and worst impacts of climate change. The office will consistently engage environmental groups, labor, and communities to help shape program development and execution. In addition to the large-scale projects, DOE will continue to support many smaller-scale pilots and demonstrations that are needed to meet the Administration's climate goals.

Supporting Innovation through Research, Development, and Demonstration

In FY 2023, DOE will continue to play an important role in advancing and shaping clean energy innovation. Through its applied sciences offices, the Department catalyzes the discovery and development of new clean energy technologies and prioritizes scientific innovation as a cornerstone of U.S. economic prosperity.

In order to support the innovation efforts of DOE's applied offices, the FY 2023 Budget Request includes:

- $4.0 billion for the Office of Energy Efficiency and Renewable Energy (EERE) to accelerate the research, development, demonstration, and deployment (RDD&D) of technologies and solutions to reduce energy costs for households and businesses, increase U.S. competitiveness, create good-paying union clean energy jobs, and equitably transition America to net-zero greenhouse gas emissions economy-wide by no later than 2050;

- $297 million for the Office of Electricity (OE) to lead the Department's efforts to strengthen, transform, and improve electricity delivery infrastructure so consumers have access to resilient, secure, and clean sources of electricity;

- $1.675 billion for the Office of Nuclear Energy (NE) supports the diverse civilian nuclear energy programs of the U.S. Government and Federal efforts to research and develop nuclear energy technologies, including generation, safety, and security technologies. The Request consolidates and focuses nuclear energy related research and development (R&D) activities conducted by small businesses and supports university level engineering and science through competitively awarded, university led research and development and infrastructure, universities' research reactor fuel services, scholarships, and fellowships;

- $893.2 million for the Fossil Energy and Carbon Management (FECM) office to conduct research, development, demonstration and deployment (RDD&D) that focuses on technologies to reduce carbon emissions and other environmental impacts of fossil fuel production and use, particularly the hardest-to-decarbonize applications in the electricity and industrial sectors; and

- $700 million for the Advanced Research Projects Agency – Energy (ARPA-E) to identify and promote revolutionary advances in energy and climate-related applied sciences, translating scientific discoveries and cutting-edge inventions into technological innovations.

Progressing Scientific Research

The FY 2023 Budget Request includes $7.8 billion for the Office of Science (SC) to increase investments in Administration priorities including basic research on climate change and clean energy, fundamental science to transform manufacturing, bio-preparedness, and participation and retention of underrepresented groups in research activities. SC's core mission is to deliver both the scientific discoveries and major scientific tools that will transform our understanding of

nature and advance the energy, economic, and national security goals of the U.S. It is the largest Federal sponsor of basic research in the physical sciences and the lead in supporting fundamental scientific research for our energy future. Over decades, the investments and accomplishments in basic research and enabling research capabilities we have made have provided the foundation for countless new technologies that have benefited large and small businesses and launched new industries. These investments have contributed immensely to our Nation's economy, national security, and quality of life.

SC continues this work today, and the FY 2023 Request also supports ongoing investments in priority areas including clean energy, microelectronics, critical materials, quantum information science (QIS), artificial intelligence (AI) and machine learning (ML), and exascale computing, while managing the risks that certain foreign governments, including the People's Republic of China, Russia, Iran, and others, seek to acquire our technologies, using both illicit strategies and legal means that pose unacceptable risks to research security and integrity. DOE manages these risks while maintaining an open, collaborative, and world-leading enterprise.

Energy Earthshots Initiative

President Biden declared to the world in 2021 that America is back at the table for climate action and followed it up with the FY 2022 request which included new funding opportunities for technologies ranging from carbon capture to geothermal energy to extracting critical minerals from coal waste. The climate crisis is our generation's moonshot. Less than a decade after Kennedy declared our Nation's choice to go to the moon we planted an American flag on that cratered surface, and today we choose to solve the climate crisis.

The FY 2023 Request continues that fight with its inclusion of activities supporting the Energy Earthshots Initiative. DOE's Energy Earthshots Initiative will accelerate breakthroughs of more abundant, affordable, and reliable clean energy solutions within the decade. They will drive the major innovation breakthroughs that we know we must achieve to solve the climate crisis, reach our 2050 net-zero carbon goals, and create the jobs of the new clean energy economy. The Energy Earthshots Initiative targets the most challenging technical problems across our energy

economy and sets ambitious but achievable cost and performance goals to accelerate the necessary innovation. DOE plans to launch additional decadal goals in FY 2023 to address remaining solutions that are critical to the climate goals and require coordinated, targeted efforts from DOE to unlock.

Sustaining Investment in Environmental Clean-up

With the FY 2023 Budget Request, DOE is poised to take its environmental management commitments to the next level. The Office of Environmental Management (EM) supports DOE to meet the challenges of the Nation's Manhattan Project and Cold War legacy responsibilities. The FY 2023 Budget Request includes $7.6 billion for EM to cleanup millions of gallons of liquid radioactive waste, thousands of tons of spent (used) nuclear fuel and nuclear materials, disposition of large volumes of transuranic and mixed/low- level waste, huge quantities of contaminated soil and water, and deactivation and decommissioning of thousands of excess facilities.

DOE's environmental management mission is about so much more than just knocking down buildings and cleaning waste out of tanks. It's about keeping promises we have made to the American people by addressing the remnants of our nuclear programs. DOE has an obligation to ensure the air, the water, and the communities surrounding our programs are safe, and that the families in those communities can thrive. The FY 2023 Request will also help deepen EM's talent pool in science, technology, engineering, and math to ensure that DOE's environmental management strategy and workforce is at its best to ensure that clean energy technologies we need to overcome climate change — like advanced nuclear — are safe and secure, so we can deploy them on a global scale.

Ensuring the Nation's Nuclear Security

DOE's FY 2023 Budget Request for the National Nuclear Security Administration (NNSA) is $21.4 billion to support the security and safety of our Nation. The FY 2023 Budget Request ensures that NNSA can:

- Maintain a safe, secure, reliable, and effective nuclear weapons stockpile;
- Reduce global nuclear threats and keep materials out of the hands of terrorists;
- Provide safe and militarily effective integrated nuclear propulsion systems for the U.S. Navy;
- Strengthen key science, technology and engineering capabilities and revitalize the nuclear security infrastructure to be prepared for the future; and
- Modernize the nuclear security infrastructure and provide necessary federal oversight for growing mission requirements.

DOE's priorities for NNSA for FY 2023 reflect the increasingly complex geopolitical environment we face. Regrettably, during the invasion of Ukraine, the Russians announced their nuclear forces were moved to special combat readiness and they also took control of the Chernobyl nuclear exclusion zone and Ukraine's largest nuclear power plant. In other words, the Russians made nuclear threats part of the Ukrainian invasion. In addition, both China and Russia have been deploying more and new kinds of nuclear weapons systems. It is clear that in order to protect the American people and stay ahead of nuclear threats, NNSA must maintain a responsive posture while exercising responsible behavior. This budget request supports those objectives and is fully informed by the 2022 Nuclear Posture Review.

Weapons Activities

NNSA has the responsibility to design, build, and ensure the safety, security, and reliability of the Nation's nuclear stockpile. NNSA achieves this mission using dedicated national laboratories, captive production facilities, and a security site. These facilities provide world-class science and technology program that allows us to design and certify the stockpile without testing and provide the manufacturing expertise to safely and securely produce weapons and materials needed to modernize the stockpile. The FY 2023 Budget Request provides $16.5

billion for weapons activities and supports stockpile certification pursued hand-in-hand with weapons modernization programs and the revitalization of Cold War capabilities and infrastructure refurbishment to modernize and address the degradation to NNSA's facilities over the last 30 years.

NNSA is making real progress with significant achievements over the past year. In June 2021, NNSA completed the last production unit of the W80-1 Alt 369 warhead for the B-52s' air launched cruise missile, and in July completed the first production unit of the W88 Alt 370 warhead for the Navy's submarine-launched ballistic missile system. In November, NNSA's Weapons Programs reached a major milestone with the first production unit for the B61-12 Life Extension Program. NNSA is committed to working to produce 80 pits per year as close to 2030 as possible by establishing a production capability at two sites: Los Alamos National Laboratory (LANL) and Savannah River Site (SRS). Although there have been challenges with the schedule, we have been completely transparent with the Nuclear Weapons Council and Congress. A two-site approach enhances resiliency and flexibility, and we remain confident that we can mitigate any issues that we will have the capability to produce 80 pits per year by the mid-2030s, 40 years since we were last able to do so. We are working closely with the Department of Defense to make sure the stockpile will be militarily effective as pit production gets established. All these successes are the culmination of extensive collaboration across the Nuclear Security Enterprise.

Defense Nuclear Nonproliferation

The FY 2023 Budget Request supports NNSA's role in the protection of the American people not only through deterrence but also through a strong commitment to nonproliferation and arms control. NNSA has a duty to advance nonproliferation, counterproliferation, and counterterrorism. The FY 2023 Budget Request provides NNSA with $1.9 billion to supports the Office of Defense Nuclear Nonproliferation's efforts, including:

- Securing nuclear and radiological materials both domestically and around the world;
- Minimizing and eliminating weapons-usable materials, including replacing nuclear and radiological materials with viable alternatives wherever feasible;

- Controlling the further spread of proliferation-sensitive materials, technology, and expertise; and
- Advancing monitoring and verification techniques that will help achieve future nuclear nonproliferation and arms control objectives.

NNSA has made significant progress in replacing Highly Enriched Uranium with Low Enriched Uranium for civilian applications, increasing the preparedness to respond and lower the impact of a nuclear incident, and providing increasingly capable space-based sensors to monitor nuclear activities. However, like so much at NNSA, the defense nuclear nonproliferation mission is evolving. Emerging technologies such as additive manufacturing, unmanned aerial systems, advanced nuclear reactors, high-powered computing, and artificial intelligence provide opportunities to enhance the nuclear threat reduction mission by harnessing their capabilities to detect nuclear proliferation and aid other missions. Yet these same technologies also introduce new risks, lowering the barrier to proliferation and making it easier for state and non-state actors to pursue nuclear or radiological devices.

Complementing the work of DNN is the Nuclear Counterterrorism and Incident Response (NCTIR) Program, which includes the Emergency Operations and Counterterrorism and Counterproliferation subprograms. NCTIR provides capabilities to counter and respond to nuclear incidents and accidents worldwide. The FY 2023 request for NCTIR is $423.97 million, $46.46 million above the FY 2021 enacted level. The CTCP subprogram sustains the United States' nuclear counterterrorism and counterproliferation activities, enhances nuclear forensic capabilities to attribute the origin of nuclear devices and materials found outside of regulatory control and maintains the Nuclear Emergency Support Team's (NEST) critical nuclear incident and accident response and technical reach back capabilities. The capabilities in this program have been critical to timely assessment and sensor enhancement in Ukraine.

Naval Reactors

The Office of Naval Reactors remains at the forefront of technological developments in naval nuclear propulsion. The FY 2023 Budget Request provides $2.1 billion for Naval Reactors (NR) to continue NR's core objective of supporting the daily safe and reliable operation of the Nation's nuclear fleet. The request supports NR's responsibilities to refine and improve existing technology to ensure that the U.S. Navy's nuclear propulsion plants are increasingly efficient and effective and will be capable of meeting future threats to national security. NR supports the existing nuclear fleet and three major DOE initiatives—the Columbia-Class Reactor System Development, the Land-based S8G Prototype Refueling Overhaul, and the Spent Fuel Handling Recapitalization Project.

NNSA Workforce

To manage this broad portfolio, NNSA depends upon recruiting, training, and retaining a highly technical Federal and M&O workforce. The NNSA federal workforce consists of a diverse team of scientists, engineers, project and program managers, foreign affairs specialists, and support staff that perform program and project management and appropriate oversight of the national security missions related to Weapons Activities and Defense Nuclear Nonproliferation. The FY 2023 budget request for Federal Salaries and Expenses (FSE) is $496.4 million, an increase of $32 million, or 7 percent, above the FY 2022 enacted level.

Conclusion

In conclusion, I reaffirm my commitment to lead the Department of Energy. I look forward to our continued partnership to achieve these ambitious yet necessary goals.

Thank you for the opportunity to be here today. I am happy to answer your questions.

The CHAIRMAN. Thank you, Secretary. We are going to start our questions now and I will start the first round here.

You are undertaking the largest reorganization since DOE's inception at the same time that you are managing DOE's largest influx of funding. So it is a double investment. So if you could help us understand why these organizational changes were necessary, how you all came about the changes that you are making, and did the reorganization have any impact on the budget increase for the DOE this year, which means were you just trying to match up to the money that was coming in and what are the hiring implications of the infusion of funds, are you running into——

Secretary GRANHOLM. Yes.

The CHAIRMAN [continuing]. Some challenges there? Can you just give us a little overview of that?

Secretary GRANHOLM. Yes. Thank you for the question.

So, historically, as you all know, the Department of Energy has been a place for research, development, and some small demonstration. What the Bipartisan Infrastructure Law does is complete that spectrum and allows us to deploy and do large-scale demonstrations in technologies that the research and development side has been working on. So it basically takes DOE from the lab to the street. What we want to do is to make sure that this budget really causes that Bipartisan Infrastructure Law investment to be effective. And you know, that Infrastructure Law funding, that $62 billion, is over five years, so we are making sure in the DOE budget on research and development that we are able to complement it. So for example, making sure that we have the continuous research on hydrogen, even as we are going to do demonstration projects and hydrogen hubs, we have to continue to do the investment in the research and development and learn from what is happening on the street so that it can be reported back to the labs and improved upon. That is true with all of the technologies that you have authorized and funded in the Bipartisan Infrastructure Law. So that is one thing.

We have to make sure that it is implemented well. And so, we have identified positions that we must beef up on the inside of the Department of Energy. For example, we have not done large-scale demonstrations. We do not have those who are expert in managing federal projects who can—other than NNSA and environmental management—but we need to make sure that we have the skill sets necessary to implement and oversee the funding that will be competitively bid out and worked through the private sector. So, both on the spectrum of the new wings, I mean, we basically had one wing of the airplane which was on research and development and now it is balanced out with large-scale demonstration and deployment with the funding that this Committee has supported and certainly that the Congress has provided.

The CHAIRMAN. I have two more questions, but very quickly. One, I had a chance to go to Provence, France to see the thermonuclear experimental reactor, ITER, and anybody who has ever had a chance, you ought to go. It is the most unbelievable thing I have ever seen in my life, what they are doing—and this is multinational —I mean, we had 37 countries involved and we have nine percent investment. We get 100 percent of the technology that

comes from it with the nine percent, but all countries, not only France, but also China, Russia, everyone is involved.

I just want to make sure that we are paying and we have that built into the budget that we are going to be paying our percentage as far as for full funding for the portion of ITER—I think it is about $250?

Secretary GRANHOLM. $240.

The CHAIRMAN. $240, Okay.

Secretary GRANHOLM. $240 million.

The CHAIRMAN. We are good there?

Secretary GRANHOLM. Yes, we are committed to doing that. And by the way, in order to support that, we build out the supply chain here and we send it there. So it is an obvious opportunity for us to create and build out that supply chain in the United States.

The CHAIRMAN. What it does, it is incredible. What they are attempting to do is replicate the fusion process of the sun for the production of massive amounts of energy. This one, it is commercial scale. It is about 500 megawatts. The temperature in the core will be 150 million degrees Fahrenheit for the energy plasma. I just recommend, if you get a chance, just stop. It is worth seeing.

Finally, I wanted to ask you about the invasion of Ukraine. Approving the expanded exports of the four U.S. LNG facilities is extremely important for us. However, I am concerned about whether there is sufficient long-term certainty for the natural gas producers and exporters to ramp up. They depend on long-term contracts, and as you know, we are going to go way beyond 2030. But the thing I am saying is, are we connecting and working with our foreign allies? Are they going to be able to match up with the LNG terminals to receive this influx that we are sending in that direction to try to give them the stability?

And next, are we all making sure that we can convert that to hydrogen and ammonia as the new, cleaner technologies come on? So, the same infrastructure, we build the gas lines here. They are dual purposed. We build the LNG terminals. They can handle hydrogen and ammonia with LNG?

Secretary GRANHOLM. Yes, part of the budget actually supports that through our Fossil Energy and Carbon Management Office to make sure that the LNG exports can be hydrogen-ready, and we are studying the materials, et cetera—the steels that are necessary to make that happen. On the first point, of the increased supply for liquefied natural gas, over 75 percent has gone to Europe. As you know, it is on a global market. The market prices for natural gas in Europe today are over——

The CHAIRMAN. 30?

Secretary GRANHOLM. I think they are 32.

The CHAIRMAN. I think they stand between 29 and 33.

Secretary GRANHOLM. Yes, 32. That obviously causes supply—long-term, we have 30 billion cubic feet of liquefied natural gas permitted, both through DOE and through FERC, that is waiting for the investment in the infrastructure to——

The CHAIRMAN. My only thing is making sure that the infrastructure we are putting in place now, whether it be the pipelines, whether it be the transportation, whether it be the LNG terminals,

are going to be able to be utilized in a multipurpose, so, with hydrogen going to be coming on strong.

Secretary GRANHOLM. Right.

The CHAIRMAN. With the type of coating it takes for our pipelines that we need to build and complete and all the other things so we can move, and green ammonia is going to be great.

With that, I am sorry I went over time.

Senator Barrasso.

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

Madam Secretary, last month Gina McCarthy, the White House National Climate Advisor, stated, "President Biden remains absolutely committed to not moving forward with additional drilling on public lands." So please give me a yes or no. Is the President committed, as Gina McCarthy states, to no additional drilling on public lands?

Secretary GRANHOLM. I believe the Department of the Interior just released a plan which would allow for additional drilling on public lands.

Senator BARRASSO. Does the President agree with his Climate Advisor? That is what I am asking. Does he confirm what the Climate Advisor has said, or does he contradict what the Climate Advisor is saying?

Secretary GRANHOLM. The President has called for increased supply, and he has authorized and supported the Department of the Interior for additional leasing, for additional supply, on federal lands. And he has called for the oil and gas industry to increase supply——

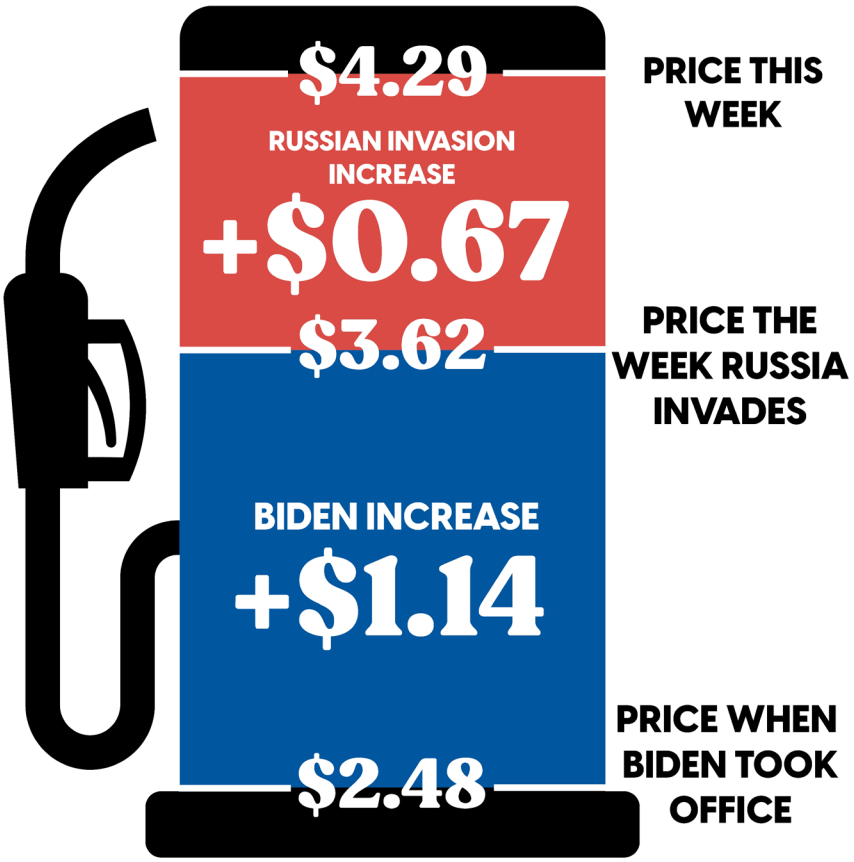
Senator BARRASSO. Then perhaps his Climate Advisor——

Secretary GRANHOLM [continuing]. On private and public lands.

Senator BARRASSO. Perhaps the Climate Advisor then should not go and contradict the President after a statement that he makes.

One week after President Biden was inaugurated, the retail price of a gallon of gasoline averaged $2.48.

[Chart depicting gasoline price increases follows:]



Source: EIA, Weekly U.S. All Grades Retail Gasoline Prices

Senator BARRASSO. The week before Russia invaded Ukraine, the retail price of a gallon of gas was $3.62. It is a difference of a $1.14. By the week of May 2nd, the retail price of gasoline rose another 67 cents. So we start at $2.48. Biden's increase—$1.14. You add Putin on top of that with the Russian invasion, another 67 cents. People in Wyoming were paying over $4 a gallon this past weekend.

So the vast majority of the increase in the retail price of gasoline happened before Russia invaded Ukraine. It is a Biden price hike. We need more domestic production to lower the prices. Six months ago today, you famously laughed when asked what the Administration could do to increase domestic production, and prices have only increased since then after that point. What are you doing to increase domestic production and lower prices for American families?

Secretary GRANHOLM. We are calling upon more increased production. Let me be clear that the price increase in gasoline coming out of COVID was because the oil and gas industry had shut down production because of reduced demand during COVID. So, yes, there was some increase because the supply was not keeping up with demand as the economy opened up. However, let us be very clear that it is the contraction from the loss of Russian oil on the market, which is rightful, because the United States and other countries have refused to finance this war, but it has removed supply from the market, which is why the President has called for an increase in our domestic oil and gas production. The Energy Information Agency has said that we will see an increase of about a million barrels per day. However, Russian oil off the market has taken about a million and a half to two million barrels off the market, and then the European Union action will also take an additional amount off the market. We are asking the oil and gas industry to increase supply.

To your point that you made in your opening statement, it is not government policy that is preventing the oil and gas industry from increasing supply. The Dallas Fed in March did a survey of the oil and gas executives, and they said—94 percent of them—said that the slowdown was due to reasons other than government policy, and the biggest reason they gave is because Wall Street is preventing them from increasing capital investment in wells because they prefer fiscal discipline, which would mean that they want to see more shareholder buybacks, but we want the oil and gas industry to increase production. Some are. We would like to see more of it so that we can address the issue of people's pocketbooks. The President is very concerned about the price right now because, of course, 70 percent of inflation is because of the price of fuel.

Senator BARRASSO. Mr. Chairman, let me just point out that in spite of what we have just heard from the Secretary, this Administration has been actively discouraging and browbeating lending institutions to not loan money for this sort of thing, because they say gas is going to be gone in 10 years, so go invest in a 30-year project. We have had John Kerry, on behalf of the Administration, going out and attacking lending institutions. Then we have the FERC in here who were preventing pipelines from being built to move energy. So it is very hard to produce energy when this Administration has continued to put their finger down against it.

I just want to move on to uranium sanctions. As we have discussed on the phone, we need to stop funding Russia's war in Ukraine. Spin reported that even Germany, which depends on Russian energy, is backing a European Union ban on Russian uranium. President Biden can ban U.S. imports of Russian uranium today. Will President Biden ban imports of Russian uranium?

Secretary GRANHOLM. I will let the President make that statement, but I can say that this is a point on which I think we have a lot of agreement, which is we should not be sending any money to Russia for any American energy or for any other reason. You are aware, I think, but I think we discussed this a little bit on the phone, that we have stood up inside of DOE, under Dr. Huff, a tiger team, to develop a full uranium strategy. We want to make sure, for example, that we are able to supply both HALEU as well as low-enriched uranium to our civilian nuclear fleet. And if we move away from Russia right away, we want to make sure we have the ability to continue to keep the fleet afloat. So they are developing a full-on uranium strategy that is going through the interagency process, and we look forward to briefing you on that.

Senator BARRASSO. Mr. Chairman, in a sense of bipartisanship, I am looking forward to voting to confirm Dr. Huff today——

Secretary GRANHOLM. Thank you for that. Thank you to this Committee.

Senator BARRASSO [continuing]. And I would encourage all of the members of this Committee to vote also in the affirmative, and I am looking forward to speaking on behalf of her nomination today because I think she is terrific and is going to be a very welcome addition. Thank you.

Secretary GRANHOLM. That is great. Thank you.

The CHAIRMAN. Thank you, Senator.

Senator Cantwell.

Senator CANTWELL. Thank you, Mr. Chairman.

Last night, Madam Secretary, we moved to go to conference on the U.S. Innovation and Competition Act. And one of the provisions in the Senate bill is providing DOE with $17 billion in increase in authorization over five years. Do you support increasing funding for cutting-edge R&D at our national labs and increasing the capacity in many areas to the types of research that we need to do in conjunction with what we are doing with the National Science Foundation?

Secretary GRANHOLM. Yes, ma'am. We certainly need to continue to invest in our cutting-edge research through the 17 national labs.

Senator CANTWELL. Okay.

One of our priorities as a nation is cleaning up the Hanford Reservation. It is one of the most contaminated sites in the Western Hemisphere, and I am disappointed that the President's budget request is lower than the current spending level. And I believe when you were here before us, you provided information about what you were willing to support to make sure that you were meeting the Tri-Party Agreement, the agreement that makes sure that our funding levels meet the milestones on cleanup. So what is the Tri-Party Agreement compliance number for Fiscal Year 2023?

Secretary GRANHOLM. The number for 2022 was $3.3 billion. The number for 2023 will be above that. Obviously, we want to com-

plete the framework discussions with you on the budget and we know that the number that we have requested at $2.5 billion, which is a big number, it is the biggest number of EM, but we know that this is a framework and we want to work with you on it.

Senator CANTWELL. So you are saying it does not meet that milestone, at least last year's milestone, and we need to keep working on that number?

Secretary GRANHOLM. Correct.

Senator CANTWELL. Okay. Thank you. I appreciate that.

Now, I know you have been busy on many fronts as it relates to what is going on in Ukraine and had to pull out of a visit to the Hanford site.

Secretary GRANHOLM. So sorry.

Senator CANTWELL. But we want to welcome you, the Chairman, the Ranking Member, any time, to please visit the Hanford site——

Secretary GRANHOLM. I will.

Senator CANTWELL [continuing]. And to visit the national labs that are there as well because there is so much work going on at our national labs, particularly in the area of cybersecurity. Their expertise is amazing, and I feel like we need to continue to do more to make sure that our electricity grid is protected. As we see from what is happening on the international front, we need to keep taking every step possible to make sure that we have the next generation of technologies to help us.

I also wanted to ask you about continuing to look at ways to scale commercialization of technologies for long-haul trucks, for example. Is there a way to construct incentives to speed the adoption of transportation electrification? We are seeing companies like PACCAR and others dealing with the chip shortage, but they are helping to make a product more affordable either in lightweight materials, but also in making sure that we have something that-is a tech-neutral manufacturing incentive. So do you agree that there are opportunities for us to move more quickly in this area?

Secretary GRANHOLM. Absolutely. And I hope that Congress considers that very soon. The time is fleeting. And that is not just on battery or vehicle manufacturing, but on the whole suite of energy generation.

Senator CANTWELL. Okay. Also, you provided a video. We were just out at the grid launchpad groundbreaking and we hope that you will come to look at that in the future.

Secretary GRANHOLM. I will.

Senator CANTWELL. The launchpad, we think, is the scalable level of battery technology storage that we need to have. So I want to make sure that we are continuing to support those kinds of efforts at the Department of Energy.

Secretary GRANHOLM. One thousand percent, both on transportation storage as well as grid storage. Both have to happen. The Energy Efficiency and Renewable Energy Office is doing the research on that. The labs are working. I mean, obviously, PNNL is the classic example of a lab that is being on the forefront on grid storage. Other labs are doing that as well, but they all work together. And of course, the funding that the Bipartisan Infrastructure Law provided, both on vehicle as well as grid storage, is going

to be critical in moving us forward. Thank you so much for that investment because it will allow the technology that is being researched at PNNL, and grid storage to be taken to commercial scale outside of the labs.

Senator CANTWELL. Great, thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Senator Lankford.

Senator LANKFORD. Mr. Chairman, thank you.

Thanks for being here in the dialogue on this.

So as I look at the Energy Information Agency and some of their facts and data that they put out in the past year, they anticipate over the next 30 years an increasing demand for oil, gas, coal, renewables. They predict that nuclear is going to go down, actually, globally over the next couple years, but there are a lot of issues that are there. So my question is, they are projecting an increased demand globally for oil, gas, and coal. What is America's part in that? And you talked about the permitting, the liquefied natural gas, and increasing that ability to be able to get that out. What else are we going to do to help meet that demand because clearly, we do not want Russia to be able to meet that demand and others. What are you actively putting in place, knowing that the prediction is over the next 30 years that we are going to need increasing supply worldwide?

Secretary GRANHOLM. Yes, clearly worldwide and in the United States. I mean, the demand for electrification and for more energy, generally, is going up.

Senator LANKFORD. Right.

Secretary GRANHOLM. As certainly, the developing world gains more access to advanced technologies, et cetera.

This is really an opportunity for the U.S. to lead, not just inside the U.S., but the world, and we have done that. Certainly, we are the number one exporter of liquefied natural gas, the number one—all of that. But we can also do the same thing with nuclear technology—advanced nuclear technology—and we have partnerships with countries, particularly Eastern Bloc and some others around the world who are really interested in developing that. The same is true with advanced technologies related to hydrogen.

Senator LANKFORD. Right. All those are pretty far on the horizon. For instance, we were having a conversation about who we are going to vote for today, and I will be voting for as well, dealing with nuclear energy later on today. When she was sitting in the same chair and we were talking about this, and I asked when is the next nuclear power plant going to be permitted in the United States, the hope was by the end of the decade. Now, I appreciate your honest answer on that, but when we talk about trying to add more nuclear in this and more other advanced—whether it be hydrogen, whatever it might be—we are decades away, as we anticipate for the next 30 years or so. And I guess what I am trying to figure out is, this is a complicated formula. We all know where we are headed long-term, but we all know it is not next year, next year, the next year. It is a slow process to be able to get there. The anticipation is for the next 30 years, at least, we are going to have increasing demands for oil, gas, and coal. If we continue to allow

infrastructure to be able to die off in the next 30 years, we are going to continue to have price spikes if we continue to discourage investment in those areas.

You have read, I am sure, the JP Morgan study to be able to look at the CapEx deficit in oil and gas, especially. Just in those two areas, they anticipate in the next eight years we will have a CapEx deficit investment of $720 billion in the United States. That is big number. That is, we are not investing enough into what we know we are going to need. So the question I am trying to figure out is, what are we doing to address that, because if we have declining infrastructure and increasing demand, at least for the next 30 years, we have a problem coming that is going to continue to rise.

Secretary GRANHOLM. But you see, the globe is moving toward decarbonizing solutions. And so, that is why you all have provided—maybe not you—but many have provided in the Bipartisan Infrastructure Law for the investments in carbon capture, for example, to help decarbonize the existing fossil fuel. That is what the world is asking for as well. And that is why Wall Street——

Senator LANKFORD. I get it. I am just trying to figure out, but the infrastructure still has to be there in place. We still have to have pipelines to be able to move it.

Secretary GRANHOLM. Yes.

Senator LANKFORD. Again, the Energy Information Agency says in the next 30 years we are going to have an increasing demand for oil, gas, and coal.

Secretary GRANHOLM. Yes.

Senator LANKFORD. But we will have a decreasing investment into those areas. That is a bad formula for us. That is why I am trying to see what are you all doing looking over the horizon to see how we——

Secretary GRANHOLM. I mean, that is what I am saying, is that we have to provide the technology to do what the world is asking for, which is to provide energy solutions, whether they are fossil fuel-based or they are renewable-based or other clean technologies that are moving in the direction that the world is headed, which is to decarbonize. And so, for the natural gas industry, that means addressing the methane flaring and the methane leakage so that those technologies become much more accessible and desired across the world. Those are the solutions that will help to increase the deployment.

Senator LANKFORD. I think we are literally talking past each other on this because you are answering a question I am not asking. And so, I wish we had more time to be able to——

Secretary GRANHOLM. You are saying what are we doing.

Senator LANKFORD. Right.

Secretary GRANHOLM. Right, what are we doing? We are developing the technologies that will make those very things you are talking about more in demand. The reason why Wall Street—one of the reasons why Wall Street is projected to continue to pressure down on CapEx is because they too want to see a movement toward clean. These oil and gas industries, many, some of the businesses are diversifying——

Senator LANKFORD. Right.

Secretary GRANHOLM [continuing]. Into broader energy companies.

Senator LANKFORD. Sure.

Secretary GRANHOLM. But that is what, that is where everybody is going.

Senator LANKFORD. But it is interesting you mentioned the Wall Street thing. When Wall Street actually answers this question, they have four different reasons, and you said this is not what the Dallas Fed says, but when Wall Street answers the same question to why they are not doing some of this investment, one of their answers is restricted access to capital. The other one is uncertain regulatory outlook for fossil fuels. It is tough to be able to do an investment into a pipeline that everyone knows we are going to need for the next 30 years plus, because even the Biden Administration's own numbers say we are going to continue to need that, but it is tough to actually do that investment.

Secretary GRANHOLM. But the point is, excuse me for interrupting you. The point is, I do not think we are talking past each other. The existing pipeline—I mean, to Senator Manchin's point—we should be investing in pipelines that are ready for the next generation technologies as well. We should be investing in pipelines that have buttoned down the problem that the world is trying to solve, which is climate change, so, investing in leak-free infrastructure, making sure that infrastructure is ready to be converted. The technology solutions are how we are going to get there by decarbonizing the existing fossil fuel offerings and increasing clean and renewable.

Senator LANKFORD. Sometime we will get more time to be able to clarify this, to be able to go from there.

So, Mr. Chairman, thank you.

The CHAIRMAN. Senator Heinrich.

Senator HEINRICH. Secretary, America has dramatically increased our production of oil and gas over the last decade. Certainly, New Mexico has done its part for the country there. Yet, as we know, prices of oil, fossil gas, gasoline, they are all at record highs. It is almost as if gasoline prices are actually a reflection of a global commodity market. Spoiler—they are.

[Laughter.]

Senator HEINRICH. Can you elaborate on how this managed transition from fossil energy sources to clean domestic renewable energy creates real American independence and also buffers consumers from the incredible swings of fossil fuel commodity prices?

Secretary GRANHOLM. Yes, thank you for raising this. This is not a surprise that we are paying $110 per barrel today and so are the people all over the world. This is an issue that is happening across the globe because oil is traded on a global market. And so, the question is, how do we increase supply in the immediate so that we can reduce the pressure so that supply and demand can meet each other and at the same time, press on the accelerator to move toward clean, because you do not see the volatility with electrified cars. You do not see increases because of access to the sun, or access to wind, or access to battery technology, for which the price keeps going down and not up. And that is true with solar and wind as well.

The smartest move over the medium- and long-term, and starting right now, is to diversify our energy supply and create the millions of jobs that would go with that, not just in the United States, but the demand for those products globally is going to be, by 2030, $23 trillion. We should be doing this for our own economy and for our own energy security. We can walk and chew gum at the same time.

Senator HEINRICH. You mentioned stock buybacks. Do you know how much oil and gas stock buybacks increased in the fourth quarter of last year in the run up to these record prices?

Secretary GRANHOLM. A lot. Something tells me you may have that number in front of you.

Senator HEINRICH. According to Bloomberg, 2,181 percent. And we wonder why the prices are as high as they are.

I want to ask you about something else. Last week, the LA Times wrote a short piece about both the challenges and opportunities of building clean energy projects in the West. And when asked about the Commerce Department's investigation of the Auxin solar tariff petition, the reporter writes that you lightly slapped your forehead with both hands and looked down in a gesture of frustration. According to the reporter, you described the investigation as "friendly fire" on the Administration's clean energy agenda and said that the "Commerce Department needs to keep the investigation narrow and resolve it quickly." If that is accurate, I completely agree with that sentiment, but I was hoping you could elaborate on what's at stake in solar energy if this thing drags on for months or years?

Secretary GRANHOLM. At stake is the complete smothering of the investment and the jobs and the independence that we would be seeking as a nation to get our fuel from our own generation sources. I know it is an adjudicative process that is in the Department of Commerce and therefore, it is not in the Department of Energy's purview, but I certainly am deeply concerned about being able to achieve the goal of getting to 100 percent clean electricity by 2035, if this is not resolved quickly.

Senator HEINRICH. Yes, I am hearing from manufacturers, from installers, all about laying people off now, about projects being canceled. It is not up to any of us to tell Commerce how to resolve that process. However, if it is not done really quickly, we are going to destroy an entire industry.

Thank you, Chairman.

The CHAIRMAN. Thank you, Senator.

Senator Marshall.

Senator MARSHALL. Thank you, Chairman. Welcome, Madam Secretary. Glad that you are here with us today.

The last time you filled your car up with gasoline, do you remember what the price was?

Secretary GRANHOLM. I drive an electric vehicle.

[Laughter.]

Senator MARSHALL. Do you know what the price of gasoline is in Washington, DC?

Secretary GRANHOLM. I know that on average, the price of a gallon of gas today across the country is $4.25.

Senator MARSHALL. So, it is over $5 a gallon here.

When you were Governor of Michigan, what was the price of gasoline the last year you were Governor?

Secretary GRANHOLM. I don't know. It was a lot less.

Senator MARSHALL. Probably, you know, around $2-3 a gallon, something like that.

You know, back home in Michigan, I assume you still have lots of friends back there and you guys have relationships. What is the number one concern of people back home?

Secretary GRANHOLM. It is not just back home, it is across the country, the number one concern is inflation, and that is fueled by the price of fuel.

Senator MARSHALL. Okay.

I took Economics 101 from my track coach in college, so I am sure it was not quite the Econ 101 of some of the bigger universities, but he taught me that all things else being constant—if you decrease supply the price is going to go up of any product. Would you agree with that?

Secretary GRANHOLM. If you increase supply——

Senator MARSHALL. If you decrease supply.

Secretary GRANHOLM. Decrease supply, yes, the price will go up, yes.

Senator MARSHALL. Okay. Have your policies resulted in decreasing supply of oil and gas?

Secretary GRANHOLM. No, sir.

Senator MARSHALL. Okay.

We were making 12 million barrels of oil per day in 2019, pre-COVID, and now it is 11 million barrels per day. Why have we stopped producing that much oil? What has happened, then?

Secretary GRANHOLM. You say, "you"—you mean why has the oil and gas industry stopped producing that. It is because of the fact that during COVID, demand went down, so supply went down. Wall Street, as we have been discussing, has demanded that there be fiscal discipline on the part of the oil and gas companies when it comes to reinvesting that. And so, there has been a constraint on investment in favor of the shareholder buybacks that Senator Heinrich was referring to, but most importantly, in the most recent, is that supply has come off the market in terms of Russian oil and gas, rightly, because of countries like the United States saying we will not buy oil from you in order to finance Putin's war. If a million and a half to two million barrels comes off——

Senator MARSHALL. So, I ask——

Secretary GRANHOLM. That means the global supply has reduced and since oil is traded on a global marketplace——

Senator MARSHALL. So you do not believe any of your policies have impacted the supply of oil and gas in this country?

Secretary GRANHOLM. Nor do the CEOs of the oil and gas industries, 94 percent of whom have said that the failure to produce more has nothing to do with the policies of government.

Senator MARSHALL. Yes, I would argue that point, and I think most Americans would as well. I grew up in the oil and gas industry. I am still connected to it. And those folks are afraid to invest because of your policies—your overaggressive policies. And I just hope that your economists would stop and take responsibility that the decreased supply in this country is what has led to the in-

creased price, and your policies are responsible for that. I understand that oil is a world commodity, but when we were a net exporter of oil, we were not as dependent upon that world market. So you could say the same thing about it. Wheat is a world commodity, but if there is enough of it to feed ourselves, that certainly gives us much more control. I do think your policies have contributed significantly to this fear of investing. People are so scared to invest in this because it takes a year or two to turn this product around. It is not like turning a switch on and off.

You know, I want to go back to inflation just for a second more. You know, my son called me in January and said his utility price had doubled. And he said, Dad, is this a mistake, or what has happened? Why do you think utility prices have doubled in America?

Secretary GRANHOLM. I think utility prices, fuel prices are constrained by the same things that we are seeing in other inflation-affected areas, which is supply chains are slow to catch up with the opening up of the economy after COVID. I think that is a big reason for the inflation, in addition to, as we have discussed, the price of fuel, which is a global price, the price of oil.

Senator MARSHALL. What policies are you implementing now that will decrease the price of gasoline at the pump and decrease my son's utility bill?

Secretary GRANHOLM. Well, as you know, oil, which gasoline derives from, is traded on a global market, and what the President has done is tried to replace the lost barrels of oil from the Russian oil that has been pulled off the market by releasing 180 million barrels—a million barrels per day—from the Strategic Petroleum Reserve. The Energy Information Agency has said that the oil and gas industry will be ramping up, and they have started slowly, to be increasing to another million barrels per day by the end of this year. They will be at record production by the end of this year. We are at record production for natural gas production and natural gas export.

This Administration, to your point about instituting policies, has issued more permits for oil and gas drilling in the first year than the Trump Administration did.

Senator MARSHALL. That is totally deceitful to describe that as a solution. You only issued about 10 or 20 percent of what we needed——

Secretary GRANHOLM. That's not true, sir.

Senator MARSHALL [continuing]. And then you do not allow us to build the infrastructure of what we would need to do as well. So I think that is just disingenuous to go down that rabbit hole as well.

But thank you, I am over my time.

The CHAIRMAN. Thank you, Senator.

Senator Cortez Masto.

Senator CORTEZ MASTO. Thank you, Mr. Chairman.

So, let's put this to bed, because I think the facts are important, and Secretary Granholm, I do think it is important to talk about the Biden policy because we are talking about supply and demand. So, correct me if I am wrong, because in fact, the BLM, under the Biden Administration, has approved more permits to drill last year

for oil and gas than it did in the first three years of the Trump Administration?

Secretary GRANHOLM. Correct.

Senator CORTEZ MASTO. Oil production on federal public lands is higher now than at any point since at least 2003?

Secretary GRANHOLM. Correct.

Senator CORTEZ MASTO. And the oil and gas industry has more than 9,100 approved permits to drill that have not yet been put in use and 14 million acres of leased public lands that have not yet been put into production. Is that correct?

Secretary GRANHOLM. That is correct.

Senator CORTEZ MASTO. Great. Because I do think my consumers, and across the country—we need to deal in facts. We really do. The truth matters. It still does, including in this body.

So, let me jump to something else, Secretary Granholm, that you and I have talked about, and thank you for coming to Nevada. Thank you for talking and really focusing on what we are doing to make these big, bold investments that you have talked about. One of the things you and I have talked about are nuclear waste and consent-based siting, and as you, the President, and the Administration have repeatedly stated that Yucca Mountain is not a viable solution for a repository. Instead, there is an urgent need for the U.S. to incorporate the consent-based framework and findings of the 2012 Blue Ribbon Commission on America's nuclear future. With this in mind, I am interested to learn more about the $53 million request for the consent-based siting process in the Department's Fiscal Year 2023 budget.

Can you please elaborate on this request and explain how you intend for these funds to contribute to the Department's consent-based efforts should it be appropriated by Congress?

Secretary GRANHOLM. Yes. As you know, first of all, the consent-based siting process has begun, and our Office of Nuclear Energy has put out a request for information for seeing whether there is some interest on the part of communities across the country who would be willing to have this discussion. That request for information resulted in over 200 comments. You know, some were in favor, some opposed. Those comments are being evaluated and will be made public, I think, within the next couple of weeks. The next step is to be able to put out a funding opportunity announcement to begin this conversation. And so, that funding that you describe, I think it may be a little bit less than that, but the funding that is in the budget for that is to be able to begin that conversation and understand the needs of communities who might be willing. As you noted, Yucca Mountain is off the table. So the question is, are there communities that may have, you know, the openness to be able to do that? Obviously, we would have to come back to Congress. There would be some need to compensate communities for their willingness to do this and obviously compensate them for any infrastructure that would be necessary.

But that process has begun. And the second step of it will happen, I believe, in early fall, where we will issue the funding opportunity announcement to begin that conversation.

Senator CORTEZ MASTO. Thank you. I appreciate that.

Let me ask you on hydrogen, because you were just with me in Nevada, and thank you so much for taking a tour of the new Air Liquide Hydrogen facility in North Las Vegas with me last month. I was pleased to see that the FY23 budget featured a 24 percent boost for the hydrogen fuel cell technologies program within the Office of Energy Efficiency and Renewable Energy. How does the FY23 budget ensure that clean energy is utilized in applications that represent a clear pathway for systemically reducing carbon emissions?

Secretary GRANHOLM. Yes, I mean, the wonderful thing about what Congress has done in providing the Bipartisan Infrastructure Law funding—for example, for hydrogen hubs—is that it allows for the stages of research that have been happening in hydrogen, and I am assuming your question is related to hydrogen, actually get deployed. And we get to see a variety of applications. So, you know, the Air Liquide site that we saw potentially could have been using gas from landfill waste. That is one feed stream that we might be looking at, or natural gas or renewable energy. And so, the research that has been done on hydrogen—and is being done—it is a cross-cut across the Department because there are some fossil fuel feedstocks and there are some renewable feedstocks, but it will be informing the hydrogen hub funding opportunity announcement, and then the awards.

So the research part and the deployment part are tied very closely and that is why we have to keep the research part very active.

Senator CORTEZ MASTO. Thank you.

Thank you, Mr. Chair.

The CHAIRMAN. Thank you.

Senator Cassidy.

Senator CASSIDY. Thank you.

Madam Secretary, thank you for being here.

I have enjoyed our offline communications, thank you for that.

Secretary GRANHOLM. Thank you.

Senator CASSIDY. I think an ongoing issue of debate is whether or not the Administration is or is not encouraging industry to produce oil and gas. And this has all the implications at the gas pump—the mom sitting at home who cannot afford her gas and she cannot afford an electric vehicle, her pickup truck is 15 years old. She is frustrated and she would like to have answers. So, with that, I approach this conversation. And we know that if the Administration sent signals—you rightly say that you cannot turn on production like that—but if the Administration sent signals now that there was going to be increased production, futures prices would fall. There is an inverse correlation between supply and price, and if investors are assured about future supply, then price can have a downward pressure now. So all of this is beyond finger pointing. It is reality as to the implications for that mom sitting at home unable to afford a nice new electric car.

So with that said, I think it is important to note that you have mentioned some oil companies saying that government regulation is not an issue, but I think it is important to say that the independent producers feel as if it is, and the IPAA—their members produce 80 percent of the oil that is consumed in our nation. They sent a letter dated March 18th, to the President, in which they say

specifically that government actions are chilling the ability of them to produce.

[The letter referred to follows:]

March 18, 2022

The Honorable Joseph Biden
President
The White House
1600 Pennsylvania Avenue NW
Washington DC, 20500

Dear Mr. President,

Our nation's energy security is under attack and at risk.

There simply are no words to describe the horrific aggression being waged by Vladimir Putin and his henchmen. As citizens and businesspeople of America, we support you in continuing to take strong and punishing actions against the Russian regime and its allies.

As you are well aware, this geopolitical crisis has once again brought to the forefront the need for American energy independence, through a diverse and robust deployment of all of the rich and plentiful energy sources we have in the United States. No other nation has an enormous and diverse enough fuel mix – from oil and natural gas to coal, hydropower, nuclear, wind, and solar – to respond in a comprehensive, robust manner that increases security for the free world.

We strongly believe this is a moment in time where we can, and should, come together as one nation to fortify, deepen, and expand our energy capacity and capability.

Indeed, we have heard certain parts of your administration's call for our industry to step up. In particular, we listened with great interest to the recent remarks of Secretary Granholm at CERAWeek in Houston.

To that end Mr. President, we as representatives of critically important small and midsized energy producers are committed to do what we can at this moment on behalf of the American people. We certainly understand first-hand the impacts higher costs, driven by inflation and related factors, can have on small businesses and their employees.

However, there is a key challenge standing in the way of unity: the words and actions of you and members of your administration.

In particular, it's regrettable that you and your White House team have continued to mischaracterize facts regarding our industry – often maligning our motives, and frankly, in some cases, advance complete and total falsehoods.

For example, you have said oil companies could be drilling right now because we have over 9,000 approved permits, a misleading statement at best. More about that below. Also, just last Friday, you said that companies "would rather take those profits and buy back their own stock rather than take that money and invest it in pumping new oil."

With respect, Mr. President, how do you know what motivates oil company business decisions?

Perhaps the worst mischaracterization of all by you and your administration is when you have said that you are doing nothing to hold back energy production. That is just not true.

From the first day of this administration, the very tone and tenor of your administration's attitude toward oil and gas production in the U.S. – and the people who make it happen – has been consistently and openly hostile. For example, key members of your administration have repeatedly singled out U.S. oil and gas as the primary driver in the causes of climate change – a position that just does not square with the facts, given other factors in the U.S. economy as well as the extraordinary harmful pollutants emitted by international bad actors such as Russia and China – and indicated oil and gas production must come to an end in the United States. A position the administration continues to take today.

Unfortunately, such an approach has an obvious and a demonstrable chilling effect on energy company business decisions, especially ones that involve millions of dollars in infrastructure. Surely in your over 40 years of government service, you have learned that government officials' words and deeds impact business decisions.

In addition, your personal commitment to conveying that chilling effect, and sending the clear message that energy companies, regardless of size, and their employees are no longer welcome in "President Biden's America" began early. For example, on June 4, 2019, you released your campaign's climate agenda. In it, you stated that it would be your administration's goal to have a 100% carbon-free economy by 2050. A goal you have repeatedly stated as president and have continued to actively highlight (i.e., visiting a Ford plant that is building electric vehicles) and seek to implement.

Now, should there be any doubt that your hostility toward our industry was just words, on day one of your presidency you personally cancelled the Keystone XL Pipeline. A week later, you issued an executive order enacting a moratorium on new leasing on public lands and waters. That moratorium has become a de facto ban by virtue of inaction by the Department of the Interior and litigation overturning the offshore sale which your administration has not sought to appeal. In fact, your administration then did not resume new lease and permit work until a court in Louisiana – in response to a lawsuit – forced your appointees to resume action.

There should be no confusion: since the time you first began campaigning for, and since becoming, President, you have expressed deep hostility toward the oil and natural gas business – and by extension, the thousands of very hard-working men and women – union and non – in very good paying jobs, who bring energy to the nation.

Given all we have described above, combined with the repeated distortions and half-truths that have been expressed by White House officials, we believe it's important to set the record straight and provide a bit of context on statements that have been made regarding energy production on federal lands and elsewhere.

For example, on March 3rd, White House Press Secretary Jen Psaki, in response to a question about increasing domestic oil production, attempted to shift blame to oil companies by citing "9,000 approved oil leases that the oil companies are not tapping into currently." She has since adjusted her statement to indicate she was referring to permits instead of leases.

To clarify first on the matter of the "9,000 unused leases." Language and facts matter, so it's important to draw a distinction between leases and permits.

Leases

There are about 37,496 onshore leases in effect and actually 12,068 nonproducing leases, a 66% utilization rate, which is quite high. But there are many reasons not all leases will be used.

- Many leases are held up in litigation by environmental groups. For example, Western Energy Alliance is in court defending over 2,200 leases, most of which cannot be developed while those cases are ongoing.

- Companies must put together a complete leasehold before moving forward, particularly with the long horizontal wells that can cut across multiple leases. Sometimes a new lease is needed to combine with existing leases to make a full unit. Since the leasing ban remains in effect with no onshore lease sales held since 2020, some leases are held up, waiting for new leases or for the government to combine them into a formal unit.

- Before allowing development on leases, the government conducts environmental analysis under NEPA (the National Environmental Policy Act), which often takes years to complete. Many leases can be hung up by NEPA or awaiting other government approvals.

- Finally, not all leases will be developed because, after conducting exploratory work, companies may determine there are not sufficient quantities of oil and natural gas on them.

Permits

There are 4,621 permits to drill awaiting approval by the Department of the Interior's Bureau of Land Management. ***Your appointees could approve these permits now, enabling companies to forward with development***.

So, yes Mr. President, your administration is "holding the industry back" in direct contradiction to your statements last week when you said your administration was not. The most recent example: according to published reports this week, the US Bureau of Land Management approved 95 permits to drill in January 2022, compared with 643 in April 2021 – the height of the pandemic.

If you want to truly be helpful, pick up the phone and direct Secretary Haaland to approve the permits immediately. We stand ready to assist in any way possible.

Now, it is true that there are also about 9,173 outstanding approved permits, but there are factors that cause companies to wait to drill those wells:

- Because of the uncertainty of operating on federal lands, companies must build up a sufficient inventory of permits before rigs can be contracted to ensure the permits stay ahead of the rigs. Companies drill wells in a matter of days and rigs are very expensive, so it's a delicate balancing act.

- The federal permit to drill is not the only government approval required. Rights of Way (ROW) can take years to acquire before companies can access their leases and put in natural gas gathering systems. With the pressure not to flare from regulators and investors, most companies cannot drill before gathering lines are in place. Timely approvals of ROWs would enable companies to develop sooner.

- Your administration has worked with anti-oil-and-gas activists to stop or slow pipeline infrastructure. Without pipelines to move the oil and natural gas produced, wells cannot be developed.

- Capital must be acquired. Activist investors, encouraged by an administration intent on expanding its financial regulatory powers, have worked to de-bank and de-capitalize the industry. Many companies, particularly the small independents who drill the majority of federal wells, are having difficulty acquiring the credit and capital necessary to develop.

By ending bureaucratic efforts to deny financing to the industry, you would be sending a powerful signal to the U.S. and world markets that investments in oil and natural gas in the U.S. are safe and new production should move forward.

However, regrettably, as we see it, your administration has – to this point – embarked on an agenda of regulatory overreach, given the extensive new regulations in the works within your administration.

The continued uncertainty of looming new bureaucratic requirements that serve no environmental or economic benefit puts a damper on incentives for new investment and development, especially on federal lands, where the excessive paperwork and seemingly pointless requirements are most extreme. Consequently, companies prioritize their nonfederal leases because there's less regulatory risk from the actions of your administration.

Further, Mr. President, your drive to decarbonize the economy at all cost approach fails to take into account that, according to the federal Energy Information Administration, transitioning power plants to natural gas has actually been the leading driver of lowering carbon emissions in the United States since 2005.

It doesn't have to be all or nothing. The United States needs all forms of energy working in coordination with new technology development to move towards an attainable lower carbon future.

In sum, we believe the best way forward is a commitment to energy independence that starts with the recognition that oil and natural gas is a strategic energy asset necessary for providing the United States and its allies with energy security now and for decades.

So, despite the challenges and concerns outlined in this letter, we believe the time is now to work together to address our energy and, indeed, national, security needs.

To that end, we hope that in the days and weeks ahead, you will return to the spirit of your inaugural address when you said: *"Let us listen to one another.... Show respect to one another.... And I pledge this to you: I will be a President for all Americans."*

We stand ready to work with you and your administration as well as reasonable voices in Congress to ensure we are united against the threat to democracy that is Valdimir Putin.

We look forward to future discussions.

Western Energy Alliance
Permian Basin Petroleum Association
US Oil and Gas Association
Independent Petroleum Association of America
National Stripper Well Association
Mid Continent Oil and Gas Association
New Mexico Oil and Gas Association
North Dakota Petroleum Council
Illinois Oil and Gas Association
Energy Workforce & Technology Council

Senator CASSIDY. My colleague from Nevada rightly points out that there are a lot of leases out there. The folks from the IPAA, who make 80 percent of the oil, say that leases are ineffective without a permit, and that the amount of permitting that has been allowed in 2022 has dramatically fallen off from the permits in 2021. They also point out that there is a big pressure—rightly so—a big pressure to limit methane release—associated gas—when they are producing, but if you are going to limit methane release, you have to have the permits for the gathering pipelines in order to capture that methane. And those permits, as we have discussed before, have been incredibly hard to come by.

So, on the one hand, do not produce the methane, but on the other hand, we are not going to give you the permit to have the pipeline to gather the methane so that it can be shipped elsewhere. But if you release that methane, we have a rule we are about to club you with. Now, I think everything I am saying is, frankly, indisputable. I can show you the regulations that have had a chilling effect upon the financing of these projects. And it can be the Department of Labor rule reversing a Trump Administration rule as regards the rule of the ability of investor funds to use ESG as a criteria by whom to fund. This Administration's Department of Labor is allowing ESG to play the role, which is chilling the financing. It can be this SEC rule, which is telling the companies you have to come up with your upstream and downstream emissions profile so that investor communities should take this into account.

I mean, how I use my gasoline is going to impact how one of these publicly held independents is going to be viewed by the investor community. That is this Administration's rule. Three Democrats voted for it. One Republican voted against it. And so, as you speak of the financing mechanism, clearly, financing is having a role here and the Administration is enabling financing to be inhibited. There was some progress where the EX-IM Bank said they will begin to do domestic production—their Make More in America initiative. It was approved by the Board on April 14th, but it is on renewables, energy storage, semiconductors, biotech. There is nothing about fossil. We are now in a scenario where if the Chinese decide to help fund one of these projects that otherwise cannot get funding because of everything I have just described, they can buy our natural gas at Henry Hub and sell it on the open market at three to four times the price because we cannot get domestic financing. And that is a plausible scenario.

I think the reason that we are so frustrated is that if you look at the reality, the context of this Administration's attitude toward fossil, you have killed financing. I hate to be accusatory, but talk to the IPAA, those folks cannot get the financing they once did. If the Administration, on the other hand—going back to my original point—sends the signal that over the next year and the next three years, we are going to do our best to help financing, you are going to put a downward pressure on that price, and that mom will be able to spend some of her disposable income on a night out at the movies with her husband as opposed to, oh my gosh, I have to fill up my 15-year-old pickup truck and I sure wish I could afford an electric vehicle, but that is beyond my means because I am paying for everything at higher prices. And I don't usually spend my whole

time venting. I apologize. But I feel like there has to be some context to these valid points, but when you look at the daggone reality, Department of Labor, SEC, FERC, doing everything they can, BOEM, everything they can to kill domestic production. Financial markets have picked up on it. And so these folks cannot get capital, and that was their complaint.

I apologize for spending my whole time complaining, but I just felt like there had to be some context. I yield.

The CHAIRMAN. Thank you, Senator.

I am going to add to that because there are some conversations going on, some negotiations that have been very, very fruitful. Everything you have said is absolutely correct. We have been working with that. The Administration has acknowledged that we all have to be in this together. And right now, putting a fee on methane when it is not even feasible to be able to take the methane off and take it to market, so it is just basically designed to take someone out of business or put them out of business.

Senator CASSIDY. By the way, because FERC would not give the pipeline to gather it.

The CHAIRMAN. Well, let me just tell you this, we are working on negotiations that they will not be able to apply a methane fee if a pipeline is prohibited from being able to take the methane off. So you are either with us, and we are all in this together, and we understand we have to have infrastructure, or we are not. And we are making some good movement on this. And I can tell you, I feel very strongly about that, and I said that we have to have reliable, dependable, and affordable—and we have to reduce our emissions. We have talked about this. They are getting it. They understand it. Let's just see what happens, the end result, but we have had, between us and EPW, Senator Carper and Senator Capito and their committee have been working with us and I think we have good movement on this, some reasonable things.

Okay. I'm sorry.

Senator Kelly, if you will.

Senator KELLY. Thank you, Mr. Chairman.

Secretary Granholm, I want to discuss a little bit about Russian oil for a second here. This is with regard to the SPR. The SPR can be used to store oil from and for foreign nations. In fact, there was an estimated 25 million barrels of Russian oil in the reserve, and this is according to DOE reports published last year. Currently, I strongly feel that we must be certain that no Russian oil enters the reserve, and that includes oil from companies still active in Russia. Oil service companies—U.S. companies—that were doing business in Russia, claim to be winding down operations. But if you just look at some of these companies' websites, the last things they have said about operations in Russia were seven weeks ago, in March. On March 18th, Schlumberger said, and this is a quote, "Immediately suspend new investment in technology deployment to our Russian operations." On the same day, Halliburton, a little bit better, Halliburton said, and I quote "we will prioritize safety and reliability"—I am not sure why reliability matters so much if you are winding down operations, but—"prioritize safety and reliability as we wind down operations in Russia." Baker Hughes, the next day, and this is another quote, "Suspended new operations and fulfills

current contractual obligations." That does not sound like winding down operations in Russia. It sounds like not starting anything new.

All of these three companies are listed on the New York Stock Exchange, have headquarters here in the United States, and other producers certainly could be evading sanctions by blending their own oil with Russian oil at sea. So Secretary Granholm, I want to find out—what do you know about U.S. oil services companies continuing to operate in Russia?

Secretary GRANHOLM. I only know what has been publicly reported as well. And I think your point underneath what you are saying here is very valid that we should be encouraging, with whatever tools we have, to have full withdrawal from Russia, to not assist in any way in the regime that is engaged in these atrocities.

Senator KELLY. Because especially Schlumberger and Baker Hughes, I mean, just what they have said, it just sounds like they are going to continue business as usual and just not do anything new, and that really concerns me. So I appreciate that. I think the Administration should take a long and a hard look at this and see what more we can do. And if there are wind-down claims, how do we confirm the accuracy of these claims, and if in some cases they are not even claiming to wind down existing operations, that really concerns me.

And with regards to the SPR, I would like a written response from the Department on how it will certify that no business operating in Russia is involved in the storage of oil in our Strategic Reserve.

And then I have one final question for you, and this is, again, with regards to the SPR. Will the Department use the revenue from recent sales to refill the SPR with domestic oil and expand its maximum capacity from about 700 million barrels to a billion barrels of oil?

Secretary GRANHOLM. Well, I think the maximum capacity is just over 700 million. We would have to build out new facilities in order to do that. I will say that today we are announcing the start of the buyback plan, and this is partly—Senator Cassidy, I know you and I have had this discussion about how to refill the SPR by sending those downward price signals. And so, the first part of that will be today. We will be announcing a future call, starting in the fall, for producers who will replenish the first chunk, and we will do a series of these so that we can continue to replenish and give the price signals that you were describing to the oil and gas industry that there will be future opportunity—obviously, American made.

Senator KELLY. Thank you. I yield back.

The CHAIRMAN. Thank you, Senator.

And now we have Senator Daines. Snuck right in there.

Senator DAINES. I did.

Chairman Manchin, thank you. Secretary Granholm, welcome back to the Committee.

Over the past month, I have met with several eastern European leaders—prime ministers, presidents, direct face-to-face conversations about Russia's ongoing war of aggression against Ukraine. The wrath of Putin's invasion has been felt throughout Europe and

the world. Many have called what happened on February 24th Europe's 9/11. And it served and should continue to serve as a wake-up call for many countries. Vladimir Putin has weaponized energy. That message was clear from every leader I met with. I had Ukrainian leaders in my office back in September from Odessa pleading with us to stop the Nord Stream 2 Pipeline. They said Vladimir Putin has weaponized energy. It fell on deaf ears in the Administration. It was not until after the invasion that we finally started to see some action from the Biden Administration on that pipeline. They want and they need the United States to step up and help cut off Russia's energy dominance in the region and help supply them with American-made energy that includes oil, that includes natural gas, as well as cutting-edge nuclear energy technology, which all provide reliable baseload power.

Unfortunately, President Biden has not seemed to get this message as he remains laser focused on hampering made-in-America energy. Instead of supporting American energy and supporting our allies, he is looking to other world leaders. But it is clear the world is safer when the United States leads in energy production. It will not only undermine Putin's energy stranglehold on Europe, it will create more American jobs. We can do this by opening up more LNG ports, working with countries to remove costly barriers for energy imports, and supporting more nuclear plants. Secretary Granholm, I was encouraged to see you recently approve LNG export authorizations. Thank you. But we do need to do more.

The question is, what is the Department of Energy doing to reduce barriers and increase energy trade with Europe?

Secretary GRANHOLM. We are certainly part of making sure that enough volumes of liquefied natural gas go to Europe, which is, of course, what they have been asking for as they contemplate what they are doing with respect to both gas and oil. As you noted, we have permitted every LNG terminal that has been requested of us that is in our domestic space. So there are no pending permits. They have all been permitted. There are two in Mexico that have not begun construction, and for other reasons are on hold—or not on hold, but we are looking at those. But the others have all been permitted. We have also permitted an additional—"we" meaning the last Administration—had permitted, and are still waiting on an additional 30 billion cubic feet of liquefied natural gas from terminals, about 12 additional projects that are looking at financing.

So we believe that it is important for us to be allied in supplying the liquefied natural gas to Europe. The President has called for, by the end of this year, an additional 15 billion cubic meters.

Senator DAINES. Yes, the Europeans, I mean, the fear is in their eyes.

Secretary GRANHOLM. Yes.

Senator DAINES. You saw the Russians shut off Bulgaria and Poland.

Secretary GRANHOLM. Yes.

Senator DAINES. I mean, this is—it is very, very serious, the inflationary pressures, what this means here where literally Vladimir Putin has Europe over a barrel right now.

Secretary GRANHOLM. Yes.

Senator DAINES. We warned the Europeans about that. We tried to warn the Administration about that. I am concerned in our own country, that with this kind of anti-energy philosophy we see, and I appreciate we do the LNG, but it just concerns me we don't put America in the same position at some point.

I want to move on to carbon capture technology. I just was in eastern Montana last week celebrating the success of opening the CO_2 pipeline that will move CO_2 captured at a helium processing operation in Wyoming and inject it back into the ground for enhanced oil recovery so we can sequester carbon and actually extract more oil out of some of these oil wells that are 50 to 60 years old. It is the type of project I think we need to be supporting to reduce carbon emissions. What is DOE doing to support carbon capture solutions in Montana, both in the energy and the industrial sectors?

Secretary GRANHOLM. Yes, thank you for asking. In fact, today we are putting out a notice of intent on carbon capture, particularly in this portion is $2.5 billion, saying that we are looking for places that have good geology to be able to store the carbon. We want to characterize and verify where might be in the country the best places to store CO_2. And obviously, the region that you are in has a lot of good geology to be able to do that so you should——

Senator DAINES. Thank you, and I am out of time. I will follow up with just a quick question. We asked for a report on the jobs lost with the Keystone XL Pipeline cancellation. It was due on February 13th. I would just ask if you would follow up with that and get that report back to us. I will tell you, as European leaders try to process why our President canceled an oil pipeline, why he stopped new leases on federal lands, the response from the leaders is, what in the world are you doing over in America? So, thank you.

The CHAIRMAN. Senator Hickenlooper.

Senator HICKENLOOPER. Thank you, Mr. Chair.

Secretary Granholm, let me just first say, it is always a pleasure to have a former Governor before us because I don't feel any reluctance to ask wonky, granular questions, and I appreciate your coming here today, but I also appreciate your service and the fact that you have come back into government at this level and put up with a lot of challenges through a very, very difficult couple of years. You are to be commended.

Last year, in Colorado, we enacted bipartisan legislation that requires our transmission utilities to join an organized wholesale market by 2030. And obviously, we are pushing the potential to promote grid reliability and efficiency. Hopefully, it will lower costs. I think there is great opportunity to lower costs in rural parts of the state. The Department of Energy's budget establishes the Wholesale Electricity Market Technical Assistance and Grants program. And I was just going to ask you if you could talk a little bit about how this program could help Colorado and other western states voluntarily explore their options with respect to these wholesale electricity markets.

Secretary GRANHOLM. Yes, we would love to see a western regional transmission organization so that the states in the West that now have individual markets might be able to share generation of energy among each other. I mean, if there is an oversupply of solar in Arizona, for example, and a need in Colorado to be able

to ship the electrons across through a regional transmission organization that would also prioritize cost, it could lower cost for people who are in that region as well as supply clean energy and just make better bulk purchasing decisions. They have these regional markets, of course, in a number of places in the country, and I think the West could benefit from it too.

Senator HICKENLOOPER. We will be applying for some of the technical assistance. And it is, if you think about it as a metaphor as world trade, the more trading you do with more different countries you, basically, everyone gets benefits.

Secretary GRANHOLM. Right.

Senator HICKENLOOPER. You know, keep peoples' tempers down and make sure everyone gets along and has the same forward vision. There is great benefit to collaborating like that.

I wanted to hear a little bit about—you have put a lot of effort into the R&D in terms of the effort to get to net zero by 2030—and I just wanted to hear how that, so much R&D—I support it 100 percent. In other words, I believe that we have to continue investing in the research on every level if we are going to address climate change successfully and make sure that people don't get killed at the pump when they are filling their gasoline tanks. How is that going? Is the R&D—do you feel you are still on track to get to net zero by 2030?

Secretary GRANHOLM. Yes, I mean, by 2050.

Senator HICKENLOOPER. I mean 2050.

Secretary GRANHOLM. We have put forth a number of big goals in terms of cost reductions for clean energy, for example. We have launched a number on the R&D side of Earthshots. One Earthshot to reduce the cost of clean hydrogen, for example, to $1 for one kilogram within the decade. The same to reduce the cost of carbon dioxide removal, atmospheric as well as terrestrial. We are launching this Earthshot on long-duration storage to reduce the cost of long-duration storage by 90 percent. And that, of course, is utility-scale storage, which would make wind and solar essentially a baseload power if we could crack the code on that. We have launched goals to reduce the cost of solar and wind to just pennies per kilowatt-hour—same thing with offshore wind.

So if we are able to continue to move down these—and there is all kinds of research going on, on the continuous improvement and taking them to scale, which is partially what the Bipartisan Infrastructure Law allows us to do is to take some of those ideas to scale so that we then can continue the downward price on cost for everyday citizens.

Senator HICKENLOOPER. And that 2030 was when you were going to reduce the cost of solar by 50 percent, I think.

Secretary GRANHOLM. Correct.

Senator HICKENLOOPER. I conflated those two things, but all these goals, I mean, I think that the efforts and the focus you are bringing to that is probably some of the most important work that is being done to address climate change anywhere. So, again, Godspeed.

I have a bunch of other questions. I am out of time, so I will yield my 16 seconds back.

Secretary GRANHOLM. Thank you.

Senator HICKENLOOPER. But I will submit the questions separately.

Secretary GRANHOLM. Very good.

Senator HICKENLOOPER. Thank you.

The CHAIRMAN. Senator Lee.

Senator LEE. Thank you, Mr. Chairman. Thank you, Secretary Granholm, for being here today.

Maria Robinson, who has been nominated by President Biden to lead the Department of Energy's Office of Electricity recently stated that she does not believe that the residents of her home state, Massachusetts, pay too much for energy. Yet, the people of Massachusetts are paying energy costs at a rate 72 percent higher than the national average. What do you think about this? Do you think paying 72 percent more than the national average, which is already significant, and people are feeling the pinch, is that too much to pay for electricity?

Secretary GRANHOLM. I think paying anything more than is absolutely necessary is too much. I don't know when she said that statement. I don't know if it is taken out of context, but we would all like to see the price of energy reduced.

Senator LEE. Right.

Now, it is, of course, the statutory purpose of the Department of Energy to provide, "an adequate and reliable supply of energy at the lowest reasonable cost." So, I believe it is clear that Ms. Robinson's views are not compatible with that mission, and if you review the statement and conclude that it was not taken out of context, it was sufficiently in context, that you cannot differentiate it, you cannot set it aside as something that didn't apply here somehow, I assume that you would advise that the nomination be withdrawn?

Secretary GRANHOLM. No. And when was it said?

Senator LEE. It was—yes, so these were very recent. These were in her questions for the record to the Committee when she came through the nomination process, which we have received in the last few days—few months. No, it has been a few months now. So these are recent. And it is concerning.

Yes, so when asked whether she believed that the cost of electricity in Massachusetts was too much, she provided a one-word answer—"no." So this was not in a larger context. That is troubling to me. Any response to that?

Secretary GRANHOLM. You know, again, I have not seen what she was responding to. I don't know exactly when it was submitted. But I do think we should be lowering the cost of fuel all the way around.

Senator LEE. Right.

In today's New York Times, "Electric Bills are Latest to Spike." So Americans are feeling the pinch when they buy everything from housing to healthcare, gasoline to groceries. And now electric bills are spiking. So to have somebody who is nominated to head the Office of Electricity within the Department, the Department whose whole job is to provide, "an adequate and reliable supply of energy at the lowest reasonable cost." It seems a mistake to me. It seems tone deaf to the American people who are suffering.

Now, energy reliability is also a concern. Since this Administration has taken office, it has not done anything, as far as I can tell,

to address our growing dependence on intermittent sources of energy, like wind. For instance, the Biden Administration has actually advocated for the extension of the production tax credit, the one that subsidizes these intermittent sources, like wind. Now, are you aware that in some places the production tax credit actually provides federal subsidies to wind energy to the point that producers are actually paying people to consume the energy that these producers are making?

Secretary GRANHOLM. I would like to see your information on that.

Senator LEE. Okay. I would be happy to provide it. I assume you are—I cannot imagine that you are disputing the fact that it does occur.

Secretary GRANHOLM. What I know is that we have to provide American energy with a silver buckshot approach, not a silver bullet approach. We have to be investing in the production of clean energy. We have to be investing in the technology to get us to those energy sources, including the decarbonization of the existing fossil fuel industry.

Senator LEE. Okay. Decarbonization of the existing fossil fuel industry is not your mission. Your mission is to provide an affordable, adequate, and reliable source of energy at the lowest reasonable cost. If you are not determined to advance that mission, in fact, if you are undertaking other efforts that do that, then we have a problem. You know, if the Department does not want to pursue the statutory mandate for which it was created, perhaps the Department should not exist.

Would you dispute, Madam Secretary, at a minimum, this shows a market distortion, that it creates a market distortion? The minute you are—you are federally subsidizing something to the point that you are actually paying people to consume electricity. Does that not create market distortions?

Secretary GRANHOLM. We have federal subsidies for all kinds of energy, including fossil fuels. So the question is, do we want to see the United States build on these energy sources, or do we have to rely upon technology or fuel from others? And we need, in the United States, to become American energy independent, and that includes the technology for clean energy as well.

Senator LEE. Yes, but those sources, at least, are baseload power. Baseload power is something that is essential. It is the sine qua non of your ability to fulfill your statutory mandate to make sure that Americans have access to an adequate and reliable supply of energy at the lowest reasonable cost. And at a minimum, I would imagine that you would have to concede—that you would want to concede. I don't know why you would even try to dispute the fact that the minute we are subsidizing—the question of whether, to what extent, and in what ways we should subsidize this or that source of energy, that is a different question than the one I am asking.

I am asking whether, when we get to the point where we are subsidizing something—wind, here to the point that the producers of that energy are actually paying people to consume it, does that not reflect that is something is dangerously wrong and that we are creating market distortions?

Secretary GRANHOLM. No, it does not. It says that we want to further this energy source. And if you add batteries to renewable, they essentially become a form of baseload power. So that is why the technology that is being worked on at the Department of Energy and the investments that this Congress has made in the Bipartisan Infrastructure Law in battery technology are so important to create clean, dispatchable, baseload power. And yes, we are competing globally for this. And so, we want to make sure that we have adequate supply, and that means early-stage technologies often require some kind of subsidy. And even very well-established technologies, like oil and gas, are benefiting from subsidy as well.

Senator LEE. Does that technology exist today?

Secretary GRANHOLM. Yes.

Senator LEE. To provide baseload power—baseload power?

Secretary GRANHOLM. The technology exists in terms of battery storage, and we are continuing to improve it, but the question is, if we take it to scale, can we make it more affordable?

Senator LEE. And in the meantime, we are creating a massive market distortion that is perpetuating high energy prices. This is why the American people are suffering. This is why the American people are being left out. They are being told that they can go eat cake, and I find that unacceptable.

Thank you.

The CHAIRMAN. Senator King.

Senator KING. Thank you, Mr. Chairman.

First, Senator Granholm, we are having a community climate and energy conference in Maine in June. Governor Mills has asked me to convey an invitation to you. We would love to have you. June is a great time to visit Maine. So please see if that is a possibility.

Secretary GRANHOLM. Will do.

Senator KING. Thank you.

This has been a fascinating discussion, and instead of mixing apples and oranges, we have been mixing gas and oil. Let's talk about them separately. As you kept trying to point out to Senator Marshall, oil is a global commodity. The price of oil is affected marginally by what is going on in the U.S., but it is affected by everything from Iran's sanctions to Russia's removal from the market to how oil is produced in Venezuela or Nigeria. It is a worldwide commodity. It is not something that we can set. The oil companies wake up in the morning and they look in the Wall Street Journal and if it says it is $101 a barrel—Brent crude—that is the price.

The high price of gasoline is a reflection of the high price of oil. And the high price of oil is a reflection of the global market. I was in Germany with Senator Marshall. I did the calculation. We drove by in the buses—at gas stations they are paying $8.50 a gallon, not $5, not $4.50. At that time, it was almost exactly double the price in the United States. So, to blame President Biden or any other individual for the worldwide price of oil to, you know, the Keystone Pipeline, is just nonsense. So I think we really need to be clear about that. The high price of oil is a global price that is high everywhere in the world. The inflation of gasoline is high everywhere in the world. And in fact, in many places in the world, it is worse than here. Is that correct?

Secretary GRANHOLM. That is correct.

Senator KING. Now, let us talk about natural gas. Electric bills, as the Senator points out, are going up. Why? Because natural gas is going up. Why? In my view, talking about regulations on methane is, as my mother used to say, straining at gnats and swallowing camels. The camel here is exports of natural gas. And this is where I take issue with you because you proudly said we have approved every applicant for LNG. Approved applications now constitute 57 percent of U.S. production. Natural gas is not a global commodity. It is a local commodity. The price has been very different here. It was about $3.50 here for a million BTUs and it was $13 or $14 in China. That is an advantage to the United States. We have now vastly increased the capacity for exports. Supply and demand, there is—we have dramatically increased the worldwide demand for our natural gas. We are now the largest LNG exporters.

I sat in this Committee five years ago with a representative of the natural gas industry. He said, we will never go above nine percent of our production, so it will not affect domestic prices. Well, we are now at about 15 percent. We are headed for over 50 percent. That is what happened in Australia. Natural gas prices domestically in Australia almost tripled. And it is already happening here. My colleagues argue that we have to export more. And I understand helping the Europeans and dealing with Russia. The problem is, we are building 35-year assets in terms of LNG. We are going to be committed to 50 percent of LNG. LNG gas is going to become a global commodity, and our advantage vis-à-vis China is going to be eliminated. Thirteen percent of our LNG now goes to China. We are exporting our advantage in price.

I hope that you will take a closer look at these applications because the standard is supposed to be the public interest. I believe domestic natural gas prices are part of the public interest. Can you give me some thoughts on this?

Secretary GRANHOLM. Yes, thanks for raising it, and your point about the supply of natural gas and whether it is increasing to accommodate the increased volumes of production or whether it is a zero sum is an important point. I know that a couple of years ago, I think in 2018, our Fossil Energy Office—then Fossil Energy Office—did a study to determine whether, in fact, increases of exports cause prices to go up in the United States. At that point, it said no, basically. The Energy Information Agency, because of the increases that we are seeing, is looking at this again, and they will have a report out hopefully by the end of this year. Let me just——

Senator KING. I hope, before you make more approvals of these long-term commitments, that you will have that data in hand because——

Secretary GRANHOLM. For sure.

Senator KING [continuing]. It is hard for me to believe that 57, from zero to—it was zero six years ago, to 57 percent of daily production is not going to affect domestic price.

Secretary GRANHOLM. I will just say, on the four permits that we just granted, those were permits requested to take existing volumes that would have been sent to free-trade-agreement countries, and allow them to be diverted to Europe. So it was not an increase

in volume as much as it was a permission to allow non free-trade-agreement countries to be able to get it.

Senator KING. I want to support the Europeans, and I think getting them off Russian oil and gas is an absolutely important geopolitical decision on our part, but I also want people to realize that there is a price to be paid, and that we are going to be paying that price, in terms of electricity, because largely in many areas, in New England, it comes from natural gas. Our electricity bills have skyrocketed. Why? Because natural gas prices have skyrocketed. Why? In part because of a lack of investment in production, but I believe in part also because of a substantial increase in exports.

So, let's not point fingers and say it is any individual's fault. This is a worldwide problem, but part of the fault, I believe, is that we have to really think hard about this policy of wholesale exports of natural gas unless domestic production significantly increases. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator, with all due respect, if we could get a good pipeline up to you all in the Northeast, we could give you a lot of West Virginia gas.

Senator KING. I totally agree. I totally agree, and that is one of the major issues, is pipeline capacity. That is why the Marcellus and——

The CHAIRMAN. Marcellus shale and Utica——

Senator KING. Cannot get the gas out.

The CHAIRMAN. Marcellus and Utica would take care of the Northeast, more than enough.

Senator KING. When I was Governor of Maine, we permitted a Greenfield pipeline project from Nova Scotia to Boston, through the state. I helped work with the companies——

The CHAIRMAN. We can build you one and also have it be able to be coated to where it could carry hydrogen too, as we transition in, and be able to give you both.

Senator Hyde-Smith.

Senator HYDE-SMITH. Thank you, Mr. Chairman, and I certainly want to be associated with Senator Cassidy's remarks. I think that since we had been in these circumstances, he put it so eloquently of exactly what is going on there. And I cannot imagine, Governor Granholm, how hard your job is. When I go to Mississippi, whether it is in the grocery store or at church, I cannot take two steps without just being covered with, can you please explain to me why this Administration shut down the Keystone Pipeline? Can you please explain to me why immediately our gas prices are to the point where we cannot afford them? And it has really hit everybody in the country and has hit everybody in Mississippi, including the industry of our Ag products when they have to fill up those big trucks to take products to harvest, and they have to buy a 150 gallons at a time. It is devastating, to say the least. But we have talked about natural gas. We have talked about infrastructure and the permitting process. But the data from the Energy Information Administration shows that natural gas is the most affordable way to heat homes and that gas appliances deliver significant savings for consumers. Plus, the EPA states residential natural gas use accounts for less than five percent of U.S. emissions.

So why does the proposed funding for clean energy infrastructure programs, such as the $150 million for tribal homes and colleges to transition to renewable energy—it does not even allow for natural gas. Can you answer that?

Secretary GRANHOLM. One of the reasons why the focus is on renewable energy is because renewable energy can be produced right there on site. It does not require additional infrastructure. It can be produced and dispatched with microgrids, for example, for tribal communities, they are very interested in that. And we are in lots of conversations with tribes across the country, and they are very interested in using the resources from the sun and the wind to be able to produce energy for their people, their 30,000 tribal homes that do not even have energy at all. And so, they want to get it quickly. They want to get it in a way that is cheap. And so, renewable energy is the choice that they have made.

Senator HYDE-SMITH. And so natural gas is completely eliminated and not even allowed.

Secretary GRANHOLM. In terms of the focus that we are bringing on it, we are focused on renewable sources and renewable technologies because natural gas technology is well along, and of course, there is always the methane issue with respect to natural gas. Though many of the natural gas producers are very enthused about making sure that they button down their pipelines so that there are not methane releases, but methane, of course, is an extremely potent greenhouse gas emission, and we would want to partner with the natural gas producers to make sure that they will eliminate those methane emissions.

Senator HYDE-SMITH. We have talked about the effects on Americans—Vladimir Putin's effect on America—lives here at home. And I agree with your written testimony that I read in which you state the impact on gas prices has highlighted the national security importance of the energy investments. And I can also appreciate the need for clean energy, but it will take years or decades to move away from using oil and gas. And so, American families and businesses, you know, they are hurting right now. What investments is your Department making into U.S. energy security that will help the situation we are facing right now, not 10 or 20 years down the road?

Secretary GRANHOLM. I think we have to do both. We have to focus on the now, which is why we are calling for increased production of oil and gas. It is why we have released from the Strategic Petroleum Reserve, which is the big tool that we have. It is why the Department of Energy has been agreeing to the permits for liquefied natural gas as well. It is why the Administration has been so quickly permitting. The question is, what can we do both on the immediate as well as with our eye on the long-term. And that is why investments in both the technology and the deployment of renewable have to happen also.

American-made energy can make us energy independent and can increase our security. And I think that this, you know, focus on it has to be fossil or it has to be renewable, we can clean up the fossil side and we can invest in renewable. And that is the mission of the Department of Energy.

Senator HYDE-SMITH. And I guess because it is such an aggressive mission that that is the reason, you know, during that time period, you know, we literally had businesses that are closing because they just simply cannot afford the energy cost associated with the businesses and transactions that they are obligated to. And I, you know, I just think that it is a pretty aggressive mission and maybe not enough time given to these businesses and these companies to adjust, and for 10 to 20 years down the road of the infrastructure that would be there.

Secretary GRANHOLM. The goal is to get to net zero by 2050. So we do have a transition period. And in the meantime, like right now, the Administration is helping with, for example, low-income home energy assistance—$100 million for that. We are making sure we are also releasing funds for the weatherization program to help everyday citizens reduce their costs and weatherize their homes, but the Administration is very focused on both the now and trying to relieve the pain that they can—increase supply, but also invest in the future.

Senator HYDE-SMITH. My time is up. Thank you, Mr. Chairman.

Senator BARRASSO [presiding]. Thank you, Senator Hyde-Smith.

Senator Hirono.

Senator HIRONO. Thank you, Mr. Chairman. Welcome, Madam Secretary.

Yes, there is a lot of concern about the price of gas at the pump, and it is impacting all of our families, and Hawaii faces one of the highest prices in the country for gallon of gasoline, it is around $5.27 per gallon. That is the highest in the country. And skyrocketing oil prices in 2008 solidified Hawaii's commitment to move toward renewable power. So we are now at about 30 percent toward our goal of 100 percent renewable power by 2045, but that does not include gasoline. We are talking about electricity.

How will the President's budget help us to accelerate the transition to renewable power, electric vehicles, and other zero-emission transportation options so that we are not dependent on the whims of Russia, OPEC, and the global oil markets?

Secretary GRANHOLM. Yes, we know that, for example, people cannot afford today—not everybody can afford today—an electric vehicle. And so, we want to make sure that we bring down the price of that vehicle. And the reason why that vehicle in many models is expensive is because of the price of the battery. And so, we are all-in at the Department of Energy in bringing down the price of the battery, both through technology, making sure that we are building out the supply chain for that battery inside of the United States so we can control the inputs for it. So that is one thing, and the second thing I am hopeful that this Congress will do is to extend and expand upon the tax credits that will reduce the price of the electric vehicle at the dealership. And that is something that, I think, would be a great assistance for folks who are paying over $5 a gallon today.

Senator HIRONO. Does the President's budget include any tax credits for electric vehicles?

Secretary GRANHOLM. No, the President's budget does not include the tax credits. We are hopeful that Congress will approve them in the very near future.

Senator HIRONO. Why didn't he include that then? Nevermind, I think that is a rhetorical question. Thank you for saying that we need to do more to encourage lowering the price and affordability of electric vehicles. I agree with you.

So Hawaii and remote communities in our country, we face unique barriers to accessing affordable, sustainable, and clean energy, and DOE's Energy Transition Initiative program— the ETI—supports communities like those in Hawaii with energy transition efforts by facilitating the sharing of best practices and providing important technical support. And I know you are well aware that places like Hawaii and remote areas are vulnerable to severe weather conditions and that there are disruptions to our energy as a result. So, construction of microgrids in places like Hawaii and remote areas is really important. And the ETI is currently helping assess which communities on Oahu could most benefit from microgrids, and on Kauai, it is doing much the same thing.

Can you explain more about how the Energy Transition Initiative is helping remote and island communities address high energy costs and unreliable infrastructure and what impact additional funding for the program would have on communities in states like Hawaii?

Secretary GRANHOLM. Yes, the 2023 budget is requesting an additional $34 million to be able to support that program, and the theory that no community should be left behind, and islanded communities are often overlooked, and we want to make sure we take advantage of the natural assets they have to be able to move toward clean energy. So, for example, in Hawaii you have so much geothermal, which is a huge opportunity. It is one of the reasons why Hawaii is such a robust renewable portfolio standard, but there are other issues related to that. How do you get access to that power? And microgrids are one solution. Offshore wind, solar—there are so many renewable solutions, but you also have to add battery technology.

So, the point is, you have to have technical assistance for these communities to be able to see what the options are based upon their comparative advantages, and that is what this program does.

Senator HIRONO. Thank you.

I just want to note that with regard to geothermal, there are very important cultural issues that exist in Hawaii with regard to resorting to geothermal. I know that you were already asked about the investigation that is being conducted by the Commerce Department relating to solar components and the possibility of additional tariffs that this part of our industry is facing. So my question is, what resources could the DOE make available to address short-term impacts on solar projects and address longer-term issues relating to the solar supply chain?

Secretary GRANHOLM. Well, it does beg the question about building out the full supply chain for solar inside the United States so we do not have to worry about the import issue. And that is why one of the President's requests of Congress is, for example, the Solar Energy Manufacturing Act, which would help to bring down the cost of manufacturing solar in the United States and all the components included. We are very supportive of that. We are also supportive, of course, of being able to use the advanced manufac-

turing tools that have been provided through the Bipartisan Infrastructure Act to accelerate solar. We have a request in our Energy Efficiency and Renewable Energy budget for a solar accelerator to advance solar manufacturing in the United States. That is $200 million we are requesting in this budget for.

Senator HIRONO. Mr. Chairman, all of that is going to have to happen pretty fast because the solar projects are coming to a screeching halt as a result of the potential outcome of the Commerce Department's investigation. So I hope that your Department can figure out how you can be of help right now.

Thank you, Mr. Chairman.

Senator BARRASSO. Thank you, Senator Hirono.

I have a couple additional questions and I know Senator King does as well.

I just wanted to ask about LNG exports. I think we need to do everything we can to cut off funds to Russia's war machine, and I heard Senator King's comments. To me, that includes money they are receiving from natural gas, and I believe we have an abundance of natural gas to support our allies, partners in Europe. Some of it is still in the ground, some of it we do not have the pipelines for. I think we need the export potential, the infrastructure, you know.

You referenced that there were two more applications for facilities in Mexico which use natural gas from Rocky Mountain states. These applications have been pending, I know, since the start of the Administration. When can we expect the Department to act on these two applications?

Secretary GRANHOLM. Yes, those are—those applications—the terminals are not even under construction yet. We are taking a look at it. We are also looking at what is happening in Mexico with respect to their energy reform and have concerns about that and the questions that have been raised about violation of the USMCA. So we are watching all of that. Know that we are well aware that those are pending, and since they are not under construction yet, and we are watching what's happening in Mexico. We are taking all that into consideration.

Senator BARRASSO. Yes, my thought was that if we approved these applications—or you do—it would send a strong signal to Mexico. So that would be my recommendation.

You know, with regard, and we talked about this by phone—the uranium reserve. Congress gave the Department $75 million to establish a Strategic Uranium Reserve back in 2020. During last year's budget hearing, you stated that the Department, "plans to be ready to start purchasing uranium by the end of calendar year 2021." So the Department had not made any of that purchasing yet. Last week you said a funding opportunity announcement would be issued in June. So if the Department followed the directions provided by Congress, we would already have the reserve. Will you commit to this Committee that the Department will purchase uranium this calendar year?

Secretary GRANHOLM. Yes.

Senator BARRASSO. Okay.

You stated the Department would make limited amounts of this high-assay low-enriched uranium available for advanced reactors.

Limited amounts are not going to get the job done. The two advanced reactor demonstration projects—one is going to be sited in Wyoming, and one in Senator Cantwell's State of Washington. I think they need about 20 tons of high-assay low-enriched uranium. The Department has uranium that can meet that need. I think you simply need to prioritize that work. Will the Department make 20 tons of fuel available for these two reactors?

Secretary GRANHOLM. This is all part of the uranium strategy that I am talking about. We are very committed to making sure we have enough HALEU available for those advanced reactors, and the question is, what is the best way of doing that? We have to build up the full supply chain here in the United States to be able to do that. And we are focused on that as part of this uranium strategy, which you should be hearing about from Dr. Huff within the month, maybe.

Senator BARRASSO. Well, that would be terrific.

Secretary GRANHOLM. Yes.

Senator BARRASSO. Because I am ready to go to the floor and make a speech recommending her confirmation today.

Secretary GRANHOLM. Thank you so much.

Senator BARRASSO. The vote is scheduled for 1:45 today.

You know, you have spoken of the urgent need to increase the domestic supply of critical minerals for renewable energy technologies and EV batteries. You just pointed out the importance of the battery and bringing down the cost of the battery. On March 31st, President Biden issued an executive order to increase domestic production of critical minerals, and we have had two hearings on the topic of what the needs are, what is available right now worldwide. You know, to me that order does not do a thing in terms of addressing the biggest hurdle preventing more domestic production because it takes an average of ten years to obtain a federal mining permit. That is what we heard from people testifying here. Do you think that is too long?

Secretary GRANHOLM. Yes.

Senator BARRASSO. Will you support efforts to streamline the permitting process to open new mines?

Secretary GRANHOLM. Yes.

Senator BARRASSO. Thank you.

And then, finally—and I want to get to Senator King—we import the majority of our electrical transformers from China today. If we are to meet President Biden's goal of a carbon-free power sector that you talked about, utilities are going to need to deploy these technologies in huge numbers. What steps is the Department taking to address the resiliency? Because you talked specifically about the resiliency of these components to cyberattacks and Chinese intrusion.

Secretary GRANHOLM. Yes, fortunately the Bipartisan Infrastructure Law provides $5 billion the purpose of making our electric grid resilient. We did the supply chain analysis that identified the transformers as being a huge problem. We should be making them in the United States. That is part of the resiliency effort, but also making the grid itself resilient through technology or undergrounding or other ways that we can make sure that it is either resilient from cyber or from extreme weather events.

Senator BARRASSO. Senator King.

Senator KING. Thank you. A couple of specific questions.

Storage is incredibly important, as you have testified. That is the only real path to a renewable energy future because without storage, it is intermittent, and so we need to solve that problem. I know that you are putting in a lot of research money. We have put a lot of research money into storage. I hope that you will also emphasize non-battery storage as alternatives.

Secretary GRANHOLM. Non-lithium.

Senator KING. Non-battery. I am talking about pumped storage.

Secretary GRANHOLM. Oh, I see what you are saying.

Senator KING. And molten salt and all the other possible—flywheels—all the other possible technologies because I think, in the long-term, batteries do have issues, and particularly if you are talking grid-scale in terms of availability of minerals, cost, and all those things. So, I just, I do not want the storage research, which I think is one of the most important things that you are doing, to focus entirely on batteries.

Secretary GRANHOLM. Correct. It is the suite of storage.

Senator KING. Great.

Second, and this is not exactly in your field, although CESER is within your office. I am very worried about the cybersecurity of pipelines. FERC has jurisdiction over the grid, but not pipelines. TSA has jurisdiction over cybersecurity of pipelines. I think it is, I am just not—I am not denigrating TSA, but I am just not—I have this almost intuitive concern about the cybersecurity of pipelines because pipelines have become part of the electric grid. In New England, 60 percent of our electricity comes from gas, all of which comes from through pipelines, and if the pipelines are compromised, our grid is down.

So I really hope that CESER and you will work in an interagency way to address this problem. My concern is that it will fall between the spaces between agencies, and we learned from the Colonial Pipeline what a fairly minor cyberattack did to the southeast supply of gasoline. So——

Secretary GRANHOLM. Right.

Senator KING [continuing]. Please put pipeline cybersecurity on your list of priorities.

Secretary GRANHOLM. It is, sir. And the interagency working with TSA and CESER has been very important. I think what we have done on the electric side has been sort of a model for what could happen on the pipeline side.

Senator KING. Exactly. Thank you.

Thank you, Mr. Chairman.

Senator BARRASSO. Well, thank you, Senator King.

We do have a number of statements for the record and submissions. You stated repeatedly the Administration is doing nothing to discourage American oil and gas production. So I would like to enter and ask unanimous consent to enter into the record, letters and statements written by oil and gas industry associations, asserting that the Biden Administration is, in fact, discouraging energy production. These letters and statements offer recommendations on steps the Administration can take today to increase American energy production.

So without objection, those will be introduced.

[Letters and statements for the record from oil and gas associations follow:]

AXPC AMERICAN EXPLORATION & PRODUCTION COUNCIL

Policy Recommendations to Support Energy Security for Americans and our Allies

The US has an abundant supply of oil and natural gas to meet our economic, climate, and geopolitical goals. US oil and natural gas is produced under some of the most stringent safety and environmental regulations in the world. And oil and natural gas underpin every aspect of modern life, holding the flexibility to be easily transported and exported, while also acting as reliable sources of energy that balance non-exportable, intermittent renewable energy sources. As both Democrats and Republicans alike have long supported energy security as a fundamental component of national security, the Biden Administration should support made-in-America oil and natural gas by taking the following steps:

1. **Clearly and Unequivocally Signal Support for American Oil and Natural Gas**
   Inconsistent and, at times, hostile messages from the Biden Administration about domestic oil and gas production creates needless uncertainty among investors and global allies about America's ability to meet growing energy demand.

2. **Restart Regular Leasing on Federal Lands and End DC Review of Routine Permitting Decisions**
   Our ability to support our allies begins with policy makers' support for oil and natural gas production here at home. Regularly scheduled lease sales and predictable permitting processes give companies the certainty needed to make long-term business decisions to safely develop our vast natural resources in an environmentally protective way.

3. **Quickly Approve Pending LNG Export Applications**
   The US Department of Energy should immediately approve the US LNG export applications pending before the Energy Department, so that natural gas can be exported from the US to our allies. There should be an urgent focus on applications that have already been approved by the Federal Energy Regulatory Commission (FERC), or those which do not need FERC approval. **Approval of these applications could increase US LNG exports by <u>20 percent.</u>**[i]

4. **Support Buildout of New Pipeline Capacity**
   In order to support our allies and reduce reliance on energy from Russia and other rogue regimes, the US needs to invest in its energy infrastructure. The inability to move energy within the US forces consumers to use foreign natural gas during high demand periods. The Administration must call on FERC to reverse its new pipeline permitting policy that will dramatically hinder the ability to build the energy infrastructure needed to access US resources and will make energy more expensive for American families. FERC's decision to overhaul the certification process could also impede the permitting of new LNG facilities – which creates economic dislocations and impedes environmental progress because US LNG can reduce emissions around the world, while providing our allies with energy security.

5. **Support International Financing for Energy Projects Abroad**
   - **Rescind or Revise the US Department of States' "Interim Guidance for International Energy Engagements"** to facilitate the building of new infrastructure abroad to support our allies in meeting their energy needs. The December 2021 guidance creates uncertainty and additional hurdles for US support of international projects, such as new LNG import terminals.

   - **International Infrastructure**. Directing the US International Finance Development Corporation (DFC) to immediately release the $300 million in funding that the US committed in 2020 to the "Three Seas Initiative Investment Fund" to build critical natural gas and other infrastructure along the North-South corridor in Central and Eastern Europe.

[i] Cheniere's Sabine Pass (LA), Cheniere's Corpus Christi (Texas), Golden Pass (Texas), Magnolia (LA), Sempra's Energia Costa Azul, Sempra's Vista Pacifico

American Petroleum Institute

Mike Sommers
President and CEO
API
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The Honorable Jennifer Granholm
Secretary of Energy
US Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Secretary Granholm,

For decades, administrations of both political parties have recognized and promoted the strategic imperative of reducing our nation's dependence on foreign sources of energy. Recent developments illustrate the importance of the government working collaboratively with industry to ensure US energy and economic security, as well as that of our allies in Europe and around the world.

Due to America's energy resurgence over the past fifteen years, the United States is well-positioned to alleviate the growing energy crisis in Europe. The United States is now the world's leading producer of oil and natural gas and exporter of liquefied natural gas (LNG). In fact, for a period last month, US LNG exports to Europe actually exceeded Russian pipeline deliveries—a remarkable feat that would have been impossible just a few short years ago. And our nation has the capacity to do even more.

The oil and natural gas industry commends the administration for its focus on addressing the risks of climate change and we are working together to accelerate progress on this important issue. Our industry is committed to meeting the challenge of ushering in a lower-carbon future while simultaneously meeting the world's growing need for energy. We share the goal of reducing emissions across the economy, but we cannot let that objective detract from the clear and present need for continued responsible investment in oil and natural gas development.

Now more than ever, the administration should speak clearly and without equivocation that the United States will be a reliable producer and supplier of oil and natural gas to our allies around the world both now and in the future. Instead, in recent weeks, decisions across the administration, including at the Department of Energy (DOE), the Federal Energy Regulatory Commission (FERC), the Department of the Interior (DOI), Environmental Protection Agency (EPA), and other agencies, have introduced significant uncertainty that will negatively impact American energy investments.

In addition, over the past several months, the administration has offered a series of false solutions that fail to recognize the significant value of America's abundant oil and natural gas as a strategic asset to strengthen energy security, economic growth, and environmental progress. Instead, the administration has called on the Organization of the Petroleum Exporting Countries (OPEC) to increase supply, encouraged the Federal Trade Commission to investigate energy markets, and even discussed with lawmakers a federal gas tax holiday. These are short-term, and even counterproductive, policy measures that will have little meaningful or enduring impact.

We urge the administration to take the more prudent steps to establish durable policies that promote America's energy production and leadership and send a clear signal to the world that our nation will develop and utilize our abundant energy resources.

We offer the following policies that the administration should immediately implement to ensure long-term American energy leadership and security:

- The administration should clearly commit to the continued export of crude oil, natural gas, and refined petroleum products.
- The DOE, along with FERC, should swiftly approve all LNG applications and establish clear and consistent timelines to approve future applications.
- The DOI should issue a final notice of lease sale (NOS) under the current five-year offshore oil and gas leasing program by March 2, 2022. This will provide sufficient time to hold the lease sale prior to the expiration of the current program on June 30, 2022.
- The DOI should complete the new five-year program with regularly scheduled Gulf of Mexico lease sales to minimize the unprecedented gap in offshore lease sales.
- The DOI should schedule, and complete, quarterly onshore leasing sales as required under the Minerals Leasing Act, with sufficient acreage and equitable terms.
- The administration should work with FERC, US Army Corps of Engineers, and other relevant agencies to ensure NEPA, CWA Sec. 401, the FERC policy statement, and other permitting processes for oil and natural gas infrastructure are designed and implemented in a manner that ensures consistency, transparency, and timeliness in their application.
- The administration should work through the Commerce Department and our US allies to encourage investment in the full range of energy projects around the world and especially in Eastern Europe.

The policies that the Biden administration establishes will send important signals about the United States' willingness to support responsible oil and natural gas investments needed to meet the energy needs of American consumers and the world.

In closing, our industry is committed to working with the Biden administration to make progress on addressing the risks of climate change and to promote access to oil and natural gas resource development on federal lands, advance energy infrastructure projects and promote effective development of America's plentiful oil and natural gas resources.

Sincerely,

Mike Sommers
President and CEO

cc: US Secretary of State Antony Blinken
US Secretary of the Interior Deb Haaland
US Secretary of Commerce Gina Raimondo
White House Chief of Staff Ron Klain
US EPA Administrator Michael Regan
Chairman of the Federal Energy Regulatory Commission Richard Glick
General of the US Army Corps of Engineers Lt. Gen. Scott Spellmon

American Petroleum Institute

Mike Sommers
President and CEO
API
202-682-8500
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February 24, 2022

The Honorable Deb Haaland
Secretary of the Interior
Department of the Interior
1849 C Street, NW
Washington, DC 20240

Dear Secretary Haaland,

The American Petroleum Institute is writing to request clarification on the Department of the Interior's (DOI) response to the recent court order in *Louisiana v. Biden* (W.D. La., Feb. 11, 2022) regarding the interim estimates for the Social Cost of Greenhouse Gases (SC-GHG). In response to the recent preliminary injunction, the DOI remarked that "delays are expected in permitting and leasing of oil and gas programs"[1]. Additionally, in a recent Motion for Stay Pending Appeal, the Department of Justice noted, "...work surrounding public-facing rules, grants, leases, permits, and other projects has been delayed or stopped altogether so that agencies can assess whether and how to proceed."[2]

In a time of tight markets for oil and natural gas and geopolitical unrest, American energy serves as a strategic asset and stabilizing force for global energy security. Unwarranted delays in federal "permitting and leasing" of American energy is exactly the wrong policy for DOI to follow. American energy producers need clarity as they strive to provide reliable and affordable energy for the United States and the world. We respectfully ask that DOI describe what specific actions and decisions are delayed and for how long.

Receiving additional information on the following items would be beneficial to enable safe and responsible development of abundant American natural gas and oil resources:

1. In the Declaration of Dominic Mancini accompanying the Federal Government's request for a stay (Declaration), DOI had identified "several" lease sales that would need revised NEPA analysis before they could be finalized. Can you identify the leases sales that need to be revised?[3]

2. In the Declaration, DOI identified 18 Applications for Permits to Drill that included the now enjoined social cost of greenhouse gas emissions. Can you confirm that no other permits have been affected by the preliminary injunction?[4]

Lastly, the current guidance for use of the SC-GHG notes that the SC-GHG is not required for NEPA analysis[5], and as noted in the Declaration, no court has held that NEPA requires providing monetary impacts of emissions associated with

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[1] Friedman, Lisa. "Biden Administration Halts New Drilling in Legal Fight Over Climate Costs." New York Times, New York, February 20, 2022, https://www.nytimes.com/2022/02/20/climate/carbon-biden-drilling-climate.html
[2] Mot. For a Stay Pending Appeal, *State of Louisiana et al v. Joseph R Biden Jr et al*, No. 2:21-cv-01074-JDC-KK [2022] (U.S. Dist. W. Dist. Louisiana, LA).
[3] *Mot. For a Stay Pending Appeal, State of Louisiana et al v. Joseph R Biden Jr et al, No. 2:21-cv-01074-JDC-KK [2022] (U.S. Dist. W. Dist. Louisiana, LA).* Exhibit 1: Declaration of Dominic J. Mancini. P.13
[4] *State of Louisiana et al v. Joseph R Biden Jr et al*, [2022] (U.S. District Court Western District of Louisiana). Exhibit 1: Declaration of Dominic J. Mancini. P.14
[5] Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effect of Climate Change in National Environmental Policy Act Reviews, August 1, 2016, p. 32

American Petroleum Institute

federal actions.[6] API believes that the SC-GHG should be limited to the development of regulatory impact analyses (RIA) for significant regulatory actions involving GHG emissions. The initial Social Cost of Carbon (SCC), published in 2010, was developed specifically for use in regulatory analysis. The methodology for the Interim SC-GHG estimates published in 2021 has not deviated from the methodology of the initial SCC and therefore retains the initial intent. The SC-GHG estimates are generated with a broad range of variability and uncertainty, which render them inappropriate for use in any project-level or site-specific application.

Additionally, in any case where there is only partial monetization of impacts, the inclusion of the SC-GHG, despite its inherent uncertainty and a broad range of variability, could lead to the perception that these impacts are somehow more certain than impacts that have not been monetized. API is committed to accelerating action to address the risks of climate change, as outlined in our Climate Action Framework, but we do not support the expanded use of the Interagency Working Group's SC-GHG estimates, into NEPA impact assessments for instance, beyond their intended application in regulatory cost-benefit analysis.

We understand that the preliminary injunction has caused confusion – not just for our industry, but for the Agency and across the federal government. However, we believe there are ways that DOI can analyze and communicate the effect of federal actions on climate change without monetizing the effects and without using the SC-GHG that will not burden the Agency and allow it to complete its obligations to manage the development of natural gas and oil on federal lands.

Aside from the issues raised regarding the recent court order, we urge the department to prioritize and move forward with its statutory requirements to issue quarterly lease sales for onshore energy development and issue a new five-year plan for offshore development among other departmental priorities.

We appreciate your attention to this matter. If you have any questions, please contact Frank Macchiarola of my staff at 202-682-8167 or macchiarolaf@api.org

Sincerely,

[6] Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effect of Climate Change in National Environmental Policy Act Reviews, August 1, 2016, p. 32

[6] Declaration, p 13,14

March 18, 2022

The Honorable Joseph Biden
President
The White House
1600 Pennsylvania Avenue NW
Washington DC, 20500

Dear Mr. President,

Our nation's energy security is under attack and at risk.

There simply are no words to describe the horrific aggression being waged by Vladimir Putin and his henchmen. As citizens and businesspeople of America, we support you in continuing to take strong and punishing actions against the Russian regime and its allies.

As you are well aware, this geopolitical crisis has once again brought to the forefront the need for American energy independence, through a diverse and robust deployment of all of the rich and plentiful energy sources we have in the United States. No other nation has an enormous and diverse enough fuel mix – from oil and natural gas to coal, hydropower, nuclear, wind, and solar – to respond in a comprehensive, robust manner that increases security for the free world.

We strongly believe this is a moment in time where we can, and should, come together as one nation to fortify, deepen, and expand our energy capacity and capability.

Indeed, we have heard certain parts of your administration's call for our industry to step up. In particular, we listened with great interest to the recent remarks of Secretary Granholm at CERAWeek in Houston.

To that end Mr. President, we as representatives of critically important small and midsized energy producers are committed to do what we can at this moment on behalf of the American people. We certainly understand first-hand the impacts higher costs, driven by inflation and related factors, can have on small businesses and their employees.

However, there is a key challenge standing in the way of unity: the words and actions of you and members of your administration.

In particular, it's regrettable that you and your White House team have continued to mischaracterize facts regarding our industry – often maligning our motives, and frankly, in some cases, advance complete and total falsehoods.

For example, you have said oil companies could be drilling right now because we have over 9,000 approved permits, a misleading statement at best. More about that below. Also, just last Friday, you said that companies "would rather take those profits and buy back their own stock rather than take that money and invest it in pumping new oil."

With respect, Mr. President, how do you know what motivates oil company business decisions?

Perhaps the worst mischaracterization of all by you and your administration is when you have said that you are doing nothing to hold back energy production. That is just not true.

From the first day of this administration, the very tone and tenor of your administration's attitude toward oil and gas production in the U.S. – and the people who make it happen – has been consistently and openly hostile. For example, key members of your administration have repeatedly singled out U.S. oil and gas as the primary driver in the causes of climate change – a position that just does not square with the facts, given other factors in the U.S. economy as well as the extraordinary harmful pollutants emitted by international bad actors such as Russia and China – and indicated oil and gas production must come to an end in the United States. A position the administration continues to take today.

Unfortunately, such an approach has an obvious and a demonstrable chilling effect on energy company business decisions, especially ones that involve millions of dollars in infrastructure. Surely in your over 40 years of government service, you have learned that government officials' words and deeds impact business decisions.

In addition, your personal commitment to conveying that chilling effect, and sending the clear message that energy companies, regardless of size, and their employees are no longer welcome in "President Biden's America" began early. For example, on June 4, 2019, you released your campaign's climate agenda. In it, you stated that it would be your administration's goal to have a 100% carbon-free economy by 2050. A goal you have repeatedly stated as president and have continued to actively highlight (i.e., visiting a Ford plant that is building electric vehicles) and seek to implement.

Now, should there be any doubt that your hostility toward our industry was just words, on day one of your presidency you personally cancelled the Keystone XL Pipeline. A week later, you issued an executive order enacting a moratorium on new leasing on public lands and waters. That moratorium has become a de facto ban by virtue of inaction by the Department of the Interior and litigation overturning the offshore sale which your administration has not sought to appeal. In fact, your administration then did not resume new lease and permit work until a court in Louisiana – in response to a lawsuit – forced your appointees to resume action.

There should be no confusion: since the time you first began campaigning for, and since becoming, President, you have expressed deep hostility toward the oil and natural gas business – and by extension, the thousands of very hard-working men and women – union and non – in very good paying jobs, who bring energy to the nation.

Given all we have described above, combined with the repeated distortions and half-truths that have been expressed by White House officials, we believe it's important to set the record straight and provide a bit of context on statements that have been made regarding energy production on federal lands and elsewhere.

For example, on March 3rd, White House Press Secretary Jen Psaki, in response to a question about increasing domestic oil production, attempted to shift blame to oil companies by citing "9,000 approved oil leases that the oil companies are not tapping into currently." She has since adjusted her statement to indicate she was referring to permits instead of leases.

To clarify first on the matter of the "9,000 unused leases." Language and facts matter, so it's important to draw a distinction between leases and permits.

Leases

There are about 37,496 onshore leases in effect and actually 12,068 nonproducing leases, a 66% utilization rate, which is quite high. But there are many reasons not all leases will be used.

- Many leases are held up in litigation by environmental groups. For example, Western Energy Alliance is in court defending over 2,200 leases, most of which cannot be developed while those cases are ongoing.

- Companies must put together a complete leasehold before moving forward, particularly with the long horizontal wells that can cut across multiple leases. Sometimes a new lease is needed to combine with existing leases to make a full unit. Since the leasing ban remains in effect with no onshore lease sales held since 2020, some leases are held up, waiting for new leases or for the government to combine them into a formal unit.

- Before allowing development on leases, the government conducts environmental analysis under NEPA (the National Environmental Policy Act), which often takes years to complete. Many leases can be hung up by NEPA or awaiting other government approvals.

- Finally, not all leases will be developed because, after conducting exploratory work, companies may determine there are not sufficient quantities of oil and natural gas on them.

Permits

There are 4,621 permits to drill awaiting approval by the Department of the Interior's Bureau of Land Management. ***Your appointees could approve these permits now, enabling companies to forward with development***.

So, yes Mr. President, your administration is "holding the industry back" in direct contradiction to your statements last week when you said your administration was not. The most recent example: according to published reports this week, the US Bureau of Land Management approved 95 permits to drill in January 2022, compared with 643 in April 2021 – the height of the pandemic.

If you want to truly be helpful, pick up the phone and direct Secretary Haaland to approve the permits immediately. We stand ready to assist in any way possible.

Now, it is true that there are also about 9,173 outstanding approved permits, but there are factors that cause companies to wait to drill those wells:

- Because of the uncertainty of operating on federal lands, companies must build up a sufficient inventory of permits before rigs can be contracted to ensure the permits stay ahead of the rigs. Companies drill wells in a matter of days and rigs are very expensive, so it's a delicate balancing act.

- The federal permit to drill is not the only government approval required. Rights of Way (ROW) can take years to acquire before companies can access their leases and put in natural gas gathering systems. With the pressure not to flare from regulators and investors, most companies cannot drill before gathering lines are in place. Timely approvals of ROWs would enable companies to develop sooner.

- Your administration has worked with anti-oil-and-gas activists to stop or slow pipeline infrastructure. Without pipelines to move the oil and natural gas produced, wells cannot be developed.

- Capital must be acquired. Activist investors, encouraged by an administration intent on expanding its financial regulatory powers, have worked to de-bank and de-capitalize the industry. Many companies, particularly the small independents who drill the majority of federal wells, are having difficulty acquiring the credit and capital necessary to develop.

By ending bureaucratic efforts to deny financing to the industry, you would be sending a powerful signal to the U.S. and world markets that investments in oil and natural gas in the U.S. are safe and new production should move forward.

However, regrettably, as we see it, your administration has – to this point – embarked on an agenda of regulatory overreach, given the extensive new regulations in the works within your administration.

The continued uncertainty of looming new bureaucratic requirements that serve no environmental or economic benefit puts a damper on incentives for new investment and development, especially on federal lands, where the excessive paperwork and seemingly pointless requirements are most extreme. Consequently, companies prioritize their nonfederal leases because there's less regulatory risk from the actions of your administration.

Further, Mr. President, your drive to decarbonize the economy at all cost approach fails to take into account that, according to the federal Energy Information Administration, transitioning power plants to natural gas has actually been the leading driver of lowering carbon emissions in the United States since 2005.

It doesn't have to be all or nothing. The United States needs all forms of energy working in coordination with new technology development to move towards an attainable lower carbon future.

In sum, we believe the best way forward is a commitment to energy independence that starts with the recognition that oil and natural gas is a strategic energy asset necessary for providing the United States and its allies with energy security now and for decades.

So, despite the challenges and concerns outlined in this letter, we believe the time is now to work together to address our energy and, indeed, national, security needs.

To that end, we hope that in the days and weeks ahead, you will return to the spirit of your inaugural address when you said: *"Let us listen to one another.... Show respect to one another.... And I pledge this to you: I will be a President for all Americans."*

We stand ready to work with you and your administration as well as reasonable voices in Congress to ensure we are united against the threat to democracy that is Valdimir Putin.

We look forward to future discussions.

Western Energy Alliance
Permian Basin Petroleum Association
US Oil and Gas Association
Independent Petroleum Association of America
National Stripper Well Association
Mid Continent Oil and Gas Association
New Mexico Oil and Gas Association
North Dakota Petroleum Council
Illinois Oil and Gas Association
Energy Workforce & Technology Council

Senator BARRASSO. Again, thank you for being with us and joining us this morning for this discussion. Members are going to have until the close of business tomorrow to submit additional questions for the record.

With that, the hearing is adjourned and the Committee stands adjourned.

[Whereupon, at 11:57 a.m., the Committee was adjourned.]

APPENDIX MATERIAL SUBMITTED

U.S. Senate Committee on Energy and Natural Resources
May 5, 2022 Hearing: *The President's Budget Request for the Department of Energy for Fiscal Year 2023*
Questions for the Record Submitted to the Honorable Jennifer Granholm

QUESTIONS FROM CHAIRMAN JOE MANCHIN III

Q1. Much of the federal funding provided for FEMP's AFFECT program has consistently been leveraged with private capital through performance contracting to significantly increase the impact of the program, in some cases getting as much as $40 of private funding for every federal dollar spent.

Q1a. What are the Department's plans to administer the funds for AFFECT from the Infrastructure Investment and Jobs Act?

A1a. Federal agency audits have identified over $7 billion in potential lifecycle cost- effective energy conversation measures [ECMs] for energy and water infrastructure needs. FEMP expects this number to increase to ~$35 billion for agencies to comply with the Biden Administration goal of 50% GHG reduction by 2032. In addition, the Energy Act of 2020 (EA 2020) requires agencies to meet 50% of lifecycle cost- effective ECMs through performance contracting.

FEMP will use AFFECT Bipartisan Infrastructure Law (BIL) funding to support Federal agency infrastructure improvements, comply with EA 2020 performance contracting requirements new project starts, kickstart performance contracting post COVID-19 and provide replicable solution sets and business models to scale technology deployment across the federal government.

Q1b. Will the Department continue leveraging federal government efficiency funding, including the funding from the infrastructure bill, with private capital, which has been the standard practice for FEMP?

A1b. Yes. FEMP will continue to leverage private sector investment as much as possible.

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QUESTIONS FROM RANKING MEMBER JOHN BARRASSO

Q1. The Department of Energy budget speaks of Carbon Dioxide Removal technologies programs, such as direct air capture and direct ocean capture with durable storage. Can you explain what "durable storage" is and how it differs from permanent or long term storage?

A1. Secure geologic storage as defined in statute and regulation applies to carbon dioxide removal projects that undertake permanent geologic storage. For CDR projects that rely on pathways other than geologic storage to sequester carbon, it is critical that they demonstrate sufficient permanence and additionality, and "durable" is meant to encompass such non-geologic pathways for sequestration. We would note that there is not a definition in statute or regulation regarding permanence and additionality for CDR solutions that utilize non-geologic sequestration pathways.

Q2. A major barrier to new carbon capture, utilization, and storage (CCUS) facilities is project financing. The two primary sources of finance are 45Q and the sale of CO2 for enhanced oil recovery (EOR). Why does the Department's budget cut funding for EOR when it is critical to funding CCUS facilities?

A2. CO2-enhanced oil recovery (EOR) in conventional oil fields is a commercial practice successfully deployed for decades in the U.S. The Department of Energy (DOE) has prioritized its carbon management research, development, and demonstration programs on technologies that have not yet been demonstrated at scale or are not yet well-established in commercial settings. This includes carbon storage in saline formations, carbon conversion technologies, carbon capture from power generation and industrial facilities, hydrogen with carbon management, and carbon dioxide removal. Technological advancements and cost reductions in these areas, funded by the DOE and cost-shared with its partners, will unlock private capital and enable the widespread commercial deployment needed to fulfill the emissions reduction potential of carbon management technologies in energy and industrial sectors. DOE recognizes the opportunity to repurpose existing oil and gas infrastructure for dedicated geologic storage, which could involve some current EOR operations and may inform the science and technical requirements to convert these assets.

Q3. The Office of Fossil Energy and Carbon Management (FECM) recently underwent a reorganization. How is the FECM upholding its statutory obligation to promote and develop fossil fuels?

A3. FECM invests in research and technology approaches that will lead to more sustainable and efficient production and use of fossil fuels. This includes continuing research on reducing the environmental impacts associated with hydraulic fracturing and offshore safety and spill prevention. FECM now has a research division focused on methane mitigation and quantification and has expanded this research across the natural gas supply chain, including alternative uses for flared and vented gas. Additionally, FECM is supporting carbon capture and storage from industry and power generation and investing in the scale up of carbon dioxide removal which will be required to counter-balance any residual emissions in a deeply decarbonized economy and remove emissions already in the atmosphere. The FECM reorganization creates better alignment between staff and their research and budget control points, creating a more efficient operating model. FECM has increased career staff hiring over the past eighteen months, adding important technical capabilities to the office, such as petroleum engineers, chemical engineers, and material scientists. FECM's research is authorized under the Energy Policy Act (EPAct).

Q4. To achieve the FECM's mission, we need experts in the office to be able to perform the congressionally-assigned tasks. As part of the Office's reorganization, career civil servants have been moved around to fit the new structure. I am hearing that programmatic expertise is being either lost or sidelined. How are you ensuring that professional experience and expertise is maximized as you undergo the reorganization?

A4. The updated FECM mission, alongside the new structure, directly aligns expertise with programmatic research. FECM is hiring career staff with the added expertise in critical and needed skill sets, e.g., chemical engineering, materials science, and petroleum engineering.

Q5. The Bipartisan Infrastructure Law includes nearly $3.5 billion in funding for large-scale carbon capture pilot projects and demonstration programs, with six cooperative agreements to capture carbon dioxide. Of those six, two are specifically to be located at coal electric generation facilities. Please describe the process the DOE will use to select these specific locations as well as the anticipated timeline for when selections will take place.

A5. The Department of Energy (DOE) will implement Sections 41004(a) and 41004(b) of the Bipartisan Infrastructure law (BIL) based on the details set forth in these BIL provisions and in accordance with DOE and Federal Government procurement policies and procedures.

Q6. In a Funding Opportunity Announcement (FOA) regarding Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Initiative (DE-FOA-0002729) released April 29, 2022, the Department of

Energy states that "projects proposing production of hydrocarbons under the potential FOA will not be of interest and will not be accepted. Additionally, projects proposing to store CO2 in dedicated storage formations where the intention is to later extract some of the CO2 for use elsewhere in enhanced oil recovery (EOR) projects will not qualify for the CarbonSAFE Initiative."

Q6a. Why would the Department exclude projects that have previously been funded by DOE and 45Q?

A6a. DOE's, Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Initiative has always focused on the development and demonstration of dedicated geologic storage of carbon dioxide at scale and not geologic storage associated with CO2 enhanced oil recovery, which is a well-established commercial practice. The Notice of Intent is maintaining consistency with these prior efforts and is seeking to expand the number and types of dedicated carbon storage projects.

Q6b. Under the IIJA and BIL for future and upcoming FOAs, does the Department of Energy plan additional projects that will not accept CO2-EOR, or projects proposing to store CO2 in dedicated storage formations where the intention is to later extract some of the CO2 for use elsewhere in EOR projects? And if so, why?

A6b. Yes. Geologic storage of CO2 in association with EOR is a well-established commercial practice. DOE supports carbon management research, development, and demonstration programs that are investing in areas where there has been less private sector investment to date and that represent a significant commercial need for industry, such as the development of large-scale dedicated geologic storage in saline and other geologic formations.

Q6c. Does the Department of Energy support enhanced oil recovery?

A6c. DOE supports helping existing EOR projects maximize reductions in net-carbon emissions by transitioning to dedicated CO2 storage. Toward that end, DOE would support efforts by integrated EOR operators to repurpose natural CO2 extraction facilities to become dedicated CO2 storage facilities in the future.

Q7. Effective on January 4, 2021, DOE updated its National Environmental Policy Act (NEPA) implementing procedures pertaining to authorizations issued under the Natural Gas Act "to improve the efficiency of the DOE decision-making process by saving time and expenses in the NEPA compliance process and eliminating unnecessary environmental documentation for these actions that DOE

determined normally do not have significant effects." Fed. Reg. Vol. 85, No 234, p 78197. The updates added to the list of actions that qualified for a categorical exclusion the following:

Approvals or disapprovals of new authorizations or amendments of existing authorizations to export natural gas under section 3 of the Natural Gas Act and any associated transportation of natural gas by marine vessel.

10 CFR Pt. 1021, Subpt. D, App. B, sec. B5.7.

In the four most recent LNG export authorizations, DOE did not use the categorical exclusion available in its regulations, but instead engaged in an environmental analysis to reach a finding of no significant impact in granting the authorizations.

Q7a. Why did the Department not use its B5.7 categorical exclusion, which would have obviated the need to perform an environmental analysis?

A7a. DOE's rationale for the approach taken to environmental review in the four most recent non-free trade agreement (FTA) orders issued is explained in the orders; but in each case, DOE "determined that it is appropriate to supplement the Federal Energy Regulatory Commission's (FERC) environmental review with DOE's environmental studies, as well as the Marine Transport Technical Support Document (Technical Support Document) prepared by DOE to consider the potential effects associated with transporting natural gas, including liquified natural gas (LNG), on marine vessels." (See p. 6 in DOE/FECM Order 3978-E, issued to Golden Pass LNG Terminal on April 27, 2022.

Q7b. Does the Department intend to use the B5.7 categorical exclusion for review of pending or future "new authorizations or amendments of existing authorizations to export natural gas under section 3 of the Natural Gas Act and any associated transportation of natural gas by marine vessel"? If not, please explain why.

A7b. While DOE cannot comment on decisions for any future or pending proceedings, for each non-FTA LNG export application receives, DOE considers the facts presented in the application to determine the appropriate review under the National Environmental Policy Act (NEPA).

Q7c. If the Department does not intend to use the B5.7 categorical exclusion for review of pending or future "new authorizations or amendments of existing authorizations to export natural gas under section 3 of the Natural Gas Act and any associated transportation of natural gas by marine vessel," explain how that is consistent the March 25, 2022, Joint Statement between the United States and the European Commission on European Energy Security, which in part states: "The United States commits to

maintaining an enabling regulatory environment with procedures to review and expeditiously act upon applications to permit any additional export LNG capacities that would be needed to meet this emergency energy security objective and support the RePowerEU goals, affirming the joint resolve to terminate EU dependence on Russian Fossil Fuels by 2027."

A7c. There are currently no pending applications before DOE for exports from domestic projects to non-FTA countries that have completed their environmental review at FERC or at the U.S. Maritime Administration. Currently, U.S. LNG exports are near operational capacity and have recently reached over 12 billion cubic feet per day (16 Bcf/d). With the current capacity under construction, U.S. LNG export capacity is set to reach over 16 Bcf/d by the middle of this decade. And there is currently over 30 Bcf/d of exports that have been approved for delivery to both free trade and non-FTA countries from LNG export projects that have not yet reached a final investment decision.

Q7d. In the explanation for adoption of the updated B5.7 categorical exclusion, the Department explained that under "the legal principle enunciated in Public Citizen and Sierra Club that potential environmental effects considered under NEPA do not include effects that the agency has no authority to prevent." [citations omitted] DOE's review of environmental effects "is properly focused on potential environmental impacts resulting . . . at or after the point of export to non-FTA countries." Fed. Reg. Vol. 85, No 234, p 78198.

Q7da. Has DOE changed its view of the scope of its authority to regulate exports of LNG to non-FTA countries?

A7da. DOE is currently evaluating whether categorical exclusion B5.7 is consistent with revisions to the Council on Environmental Quality NEPA regulations, which became effective on May 20, 2022 (87 FR 23453; April 20, 2022). In the meantime, DOE is continuing to evaluate its NEPA obligations as appropriate for each non-FTA application proceeding. DOE's position continues to be that the revised B5.7 categorical exclusion provides DOE with more flexibility than it had with the prior B5.7 (the version in effect prior to DOE's 2020 rulemaking), and that the current B5.7 does not preclude DOE from considering additional environmental analysis as appropriate under NEPA.

Q7db. If so, please explain the reasons and justifications for such changed view.

Q8. Do you think the current distinction in the Natural Gas Act between LNG exports to Free Trade Agreement (FTA) countries and non-Free Trade Agreement (non-FTA) countries unnecessarily slows down the regulatory process for LNG export approvals and is the source of increased uncertainty over

the United States' role as a global energy supplier? LNG is a commodity, but no other U.S. commodity export is treated like this. Would removing this distinction help expedite the permitting process?

A8. Given the gap between the amount of non-FTA exports that have been permitted (the current cumulative total is 48.6 Bcf/d) and the amount of LNG export capacity operating and under construction (current U.S. LNG export capacity is approximately 13 Bcf/d and is expected to grow to over 16 Bcf/d once the capacity under construction is complete), market forces are the main determinant to U.S. LNG export levels. Additionally, if the Natural Gas Act were to be changed to remove the distinction between the review of exports to FTA countries vs. non-FTA countries, it may prove a disincentive to the development of future FTA that could bring additional trade benefits to the United States.

Q9. During your testimony, you observed that fossil fuel price volatility was a key aspect of higher energy costs, and you implied that renewable technologies do not suffer from the same defect. Yet we have seen the price for critical minerals used in renewable and battery technologies, such a copper and nickel, spike in price. By 2040, the International Energy Agency sees demand for lithium soaring 4,200 percent, graphite 2,500 percent, nickel 1,900 percent, and rare earths 700 percent. Given the geographic concentration of many critical minerals and their centrality to alternative technologies, why do you believe they will not be subject price volatility, especially price spikes?

A9. Supply chain security for critical minerals, and increasing the domestic availability of critical mineral resources and processing, is one of our top priorities. Indeed, critical minerals that are used in clean energy technologies can be subject to price volatility, which is a result of factors such as, but not limited to, rapidly growing demand, source and provenance, and global market dynamics. However, critical minerals are just one cost component in the diverse set of renewable and clean energy technologies, and while price variations do impact the cost of the raw materials, that impact is somewhat moderated when we look at the total market and consumer impact – e.g., the impact of electric vehicle (EV) battery costs on the overall EV vehicle cost. We are very focused on securing more domestic sources for critical minerals from primary, unconventional and secondary sources, creating alternate materials and technologies which lessen the demand for critical minerals and materials, increasing efficient use of materials and manufacturing efficiency, promoting a circular economy, and creating robust and durable US critical minerals supply chains.

Q10. The Department's *America's Strategy to Secure the Supply Chain for a Robust Clean Energy Transition* document identified the establishment of Departmental critical materials list for vital for the Department's mission areas.

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Q10a. Please describe the process and selection criteria for material to be considered on this list.

A10a. DOE established a methodology to assess material criticality in 2010 based on two dimensions: importance to clean energy, and potential for supply risk.[1] DOE updated the approach for an internal analysis in 2019 to consider importance to energy more broadly.[2] This methodology is consistent with the statutory definition of "critical materials" provided in the Energy Act of 2020 (Sec. 7002 (a) (2)). DOE plans to leverage this methodology to determine material criticality in the short- and mid-term for energy.

Q10b. How would this list of critical materials differ from the Department of the Interior's Critical Minerals List?

A10b. While the USGS uses a supply-side method using historical data to evaluate economic vulnerability and disruption potential, DOE's list will account for future demand under varying scenarios of energy technology deployment and innovation. The DOE methodology for assessing critical materials was developed and published in 2010 and 2011[3] and updated internally in 2019.

Q10c. What benefits would placement on the Department's critical materials list convey to selected materials?

A10c. DOE's assessment of critical materials will inform priorities for funding and activities related to critical materials across the Department as well as activities in collaboration and coordination with other Federal agencies and departments.

Q10d. Do materials placed on the Department's critical materials list receive expedited or preferential permitting timeframes to ensure the Department has access to these materials for vital mission areas?

A10d. DOE does not have the regulatory authority to issue permits for critical materials activities. DOE is currently discussing opportunities with the Department of Interior to assess the potential of expediting permitting timeframes.

Q11. For the second year in a row, the Department did not request funds for the strategic uranium reserve.

[1] https://www.energy.gov/sites/prod/files/2019/06/f63/2010%20Critical%20Materials%20Strategy%20Report.pdf
[2] https://www.energy.gov/sites/default/files/2021/01/f82/DOE%20Critical%20Minerals%20and%20Materials%20Strategy_0.pdf
[3] https://www.energy.gov/eere/amo/2010-critical-materials-strategy

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Q11a. Do you believe $75 million is sufficient to stand up a viable uranium reserve to protect America's nuclear sector from a supply disruption? If not, why didn't you request additional funding for fiscal year 2023?

A11a. The current funding of $75 million is sufficient to procure initial quantities of uranium for a reserve. DOE is actively working to establish the Uranium Reserve using funds appropriated in fiscal year (FY) 2021 for the Uranium Reserve.

The Department of Energy (DOE) is developing a broader uranium strategy with plans to responsively meet immediate, near, and long-term commercial and DOE demands for low-enriched uranium (LEU) including high-assay low-enriched uranium (HALEU), which it anticipates will act as a demand signal to prompt the domestic supply chain to produce enriched uranium. The strategy will recognize the importance of a robust, domestic nuclear supply chain.

Q11b. You have stated that the Department plans to issue an FOA for the uranium reserve in June. What will be requested in this FOA and how will it support the domestic uranium supply chain?

A11b. The FY 2021 Consolidated Appropriations Act (P.L. 116-260) made $75 million available to the DOE National Nuclear Security Administration (NNSA) for the Uranium Reserve Program. On June 30, 2022, the Department issued a Request for Proposals (RFP) to purchase up to an estimated one million pounds of U_3O_8 and a notice of intent to solicit and award a sole source contract to ConverDyn, the only U.S. converter, in order to convert the procured U_3O_8 to UF_6. Support for domestic mining and conversion companies via procurements directly supports the front end of the domestic nuclear fuel supply chain.

This material could be integrated into the overall DOE uranium supply strategy which is being designed to encourage the build out of additional domestic nuclear fuel cycle capacities to provide LEU, including HALEU, for the current and future civilian nuclear reactor fleet as well as additional DOE needs such as research reactors and for medical isotope production.

Q12. The Department is developing a comprehensive plant to address all aspects of the domestic uranium supply chain. Action on the uranium reserve has been delayed for a year and a half, while we await this comprehensive plan. Now action on high-assay, low-enriched uranium (HALEU) enrichment is being held up. I have introduced bills outlining the plan for these activities. Given the urgent need to address

these issues and the known path forward, why hasn't the Department acted to establish the uranium reserve and HALEU enrichment, while working in parallel to finalize the plan for making Department of Energy stockpiles of HALEU available for the advanced reactor demonstration projects, as well as, action on uranium sanctions and availability of domestic fuel for existing reactors?

A12. The Department is acting to establish a Uranium Reserve per the FY 2021 Consolidated Appropriations Act (P.L. 116-260) and released the RFPs on June 30, 2022. Following the enactment of P.L. 116 – 260 the Department initiated a broader, separate, effort to develop a comprehensive uranium strategy to meet immediate, near, and long-term commercial and DOE demands for, low-enriched uranium (LEU) including high-assay low-enriched uranium (HALEU). Additionally, the Department is also working to identify options for making DOE material available for ARDPs while also ensuring that national defense and nonproliferation programs are not negatively impacted.

Q13. America's nuclear industry is ready to transition away from Russian uranium. America's nuclear fuel producers can increase production to meet the need. But they need market certainty. On April 21, President Biden issued a proclamation prohibiting Russian-affiliated vessels from entering U.S. ports. This proclamation included an exception for nuclear material. This exception introduced tremendous uncertainty and is the opposite of what the industry needs. Will you work with the President to eliminate this loophole?

A13. The proclamation reflects that time is needed to ensure the availability of a stable supply of enriched uranium so that the existing U.S. commercial fleet remains operational while actions are taken to replace Russian enriched uranium in the U.S. market. The Department is developing a broader uranium strategy that will support industry in filling the gap of enriched uranium supplied by Russia to enable a phaseout of Russian uranium from the U.S. market.

Q14. Nuclear utilities are receiving force majeure notices from their helium gas providers stating that the suppliers are unable to fulfill nuclear utility helium orders. Helium and other gases of extremely high purity (nuclear grade) are required for essential nuclear processes, including dry storage of used nuclear fuel on site. There is currently a shortage of helium needed for nuclear operations. Nuclear utilities are not currently given priority access to helium. What needs to be done to ensure nuclear utilities have access to helium and other critical material and critical mineral supplies?

A14. *The Helium Stewardship Act of 2013* directed closure of the federally managed helium reserve by the Bureau of Land Management. Helium is not considered a "critical mineral" by the U.S., and it was removed from the U.S. Geological Survey List of Critical Minerals in 2021. DOE does not track helium

production or availability, and the acquisition of helium for use in nuclear applications is subject to the supply and demand of commercial markets.

Q15. About half of the medical and industrial isotopes currently utilized in America can be linked to Russia. The Senate's Department of Energy Science for the Future Act provides authorization to improve the ability to produce isotopes domestically. Beyond what's included in this bill, what additional actions are needed to onshore isotope production to eliminate reliance on Russia?

A15. The DOE Isotope Program (IP) produces critical isotopes in short supply or otherwise not available domestically. The U.S. is dependent on radio and stable isotopes from Russia. Disruptions in the supply of these isotopes jeopardizes U.S. technical and scientific strengths, economic resilience, and prosperity. With currently appropriated funds for the Isotope Production and Distribution Fund, DOE IP is attempting to mitigate disruptions in critical isotope supply chains from the recent Russian invasion of Ukraine and subsequent sanctions.

DOE IP resources cannot eliminate reliance on such isotopes from Russia at this time. Additional appropriations would enable full mission readiness and preparedness of DOE facilities, provide infrastructure for reliable and effective operations, create emergency inventories of critical isotopes, and invest in production capabilities to reduce U.S. dependence on Russia and other sensitive countries for critical radio and stable isotopes.

Isotope production requires radio-chemical processing infrastructure to separate isotopes from irradiated targets (radiological and nuclear operations). To establish independence and meet growing U.S. radioisotope demand requires additional radiochemistry infrastructure through the completion of the following projects: the Radioisotope Processing Facility at Oak Ridge National Laboratory (ORNL) for reactor target processing and the Clinical Alpha Radionuclide Producer for accelerator processing at BNL. DOE IP is also re-establishing stable isotope enrichment in the U.S. not in existence since the 1990s. While currently Russia is the major commercial producer of stable isotopes world-wide, the Stable Isotope Production and Research Center (SIPRC) will provide the U.S. with large scale production capabilities of stable isotopes to rival those of Russia, as well as the new Chinese facility under construction that has recently overtaken SIPRC in terms of progress.

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Q16. What is the status of the milestone-based fusion development program? Is this a priority for the Department?

A16. As emphasized in the March 2022 White House–DOE Summit on Fusion Energy in March, fusion energy is a major priority for the Department. The Department has established a new fusion crosscutting team in the Office of the Under Secretary for Science and Innovation, led by a Lead Fusion Coordinator for the announced "bold decadal vision" for fusion. The Department conducted a workshop entitled *Fusion Energy Development via Public-Private Partnerships,* which was held in Washington, DC, June 1-3, that gathered key stakeholder input on the milestone-based fusion development program. Also, the Department is working to release a Funding Opportunity Announcement (FOA) to solicit proposals supporting a milestone-based fusion development program as soon as practically feasible, to be supported by FY 2022 appropriated funds.

Q17. American innovators are developing fusion energy systems. Several of these companies anticipate demonstrating net-energy out in the coming years. These demonstrations may come years before ITER accomplishes the same milestone.

Q17a. If American innovators are successful, shouldn't priority be placed on commercialization of these technologies over continued support for ITER? If not, why not?

A17a. We are excited and hopeful that American innovators will be successful in demonstrating net-energy out within a decade. Even with such innovation ITER will continue to be a valuable project. ITER has already accumulated an immense amount of useful knowledge and experience that will benefit all development paths to a fusion pilot plant, and the Department is working to make this information available to American researchers and the fusion industry. Also, ITER will provide valuable scientific and technical data on high gain burning plasmas. This data will be useful and needed for continued development and optimization of fusion systems beyond pilot plant and first-of-a-kind demonstrations.

Q17b. When does the Department anticipate commercial scale demonstration of fusion energy systems that could be economically connected to the electric grid?

A17b. This is a difficult question to answer given the remaining RD&D challenges to overcome. The Department is pursuing multiple approaches to the development of fusion energy at different risk levels. The approach that is focused on ITER has a high probability of leading to commercial fusion power in

the second part of this century. However, recognizing the urgency of the climate change challenge, the Department is also exploring higher-risk approaches, in partnership with the private sector. These efforts, if successful, could potentially bring fusion energy to the grid earlier. If resources are available through public-private partnerships, it may be possible—albeit challenging—to operate a fusion pilot plant in the early 2030s. This is the ambition of the "bold decadal vision" that was discussed at the White House Fusion Summit in March.

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QUESTIONS FROM SENATOR RON WYDEN

Q1. Oregon State University is currently working with DOE's Water Power Technologies Office to construct a wave energy testing facility off the coast of Newport, Oregon to help industry develop commercially-viable marine energy technology. To date, there has been strong leadership at the Water Power Technologies Office for marine energy and Oregon State's project specifically. What can ARPA-E do to help accelerate research to innovation in the marine energy field?

A1. ARPA-E closely coordinates its research programs with those of other DOE divisions, including DOE's Water Power Technologies Office (WPTO). Upon completion of the Newport testing facility, ARPA-E program leaders would be pleased to visit OSU's wave energy testing facility along with experts from WPTO –to determine how the facility might engage in ARPA-E marine energy programs/projects.

In addition, ARPA-E has three marine energy-focused programs consisting of the Macroalgae Research Inspiring Novel Energy Resources (MARINER) Program, the Aerodynamic Turbines Lighter and Afloat with Nautical Technologies and Integrated Servo-control (ATLANTIS) and Submarine Hydrokinetic And Riverine Kilo-megawatt Systems (SHARKS):

- MARINER a $52M program will develop the tools to enable the United States to become a leading producer of macroalgae, or seaweed, helping to improve U.S. energy security and economic competitiveness. Macroalgae can be utilized as a feedstock for domestic transportation fuels, chemicals and other commercial products without competing with food crops for land and water. OSU was a sub-awardee one of the MARINER projects:

https://arpa-e.energy.gov/technologies/projects/modeling-scalable-macroalgae-production

- ATLANTIS a $30M program focuses on three technology development areas to develop Floating Offshore Wind Turbines (FOWT) systems: 1) New Designs, 2) Computer Tools, and 3) Experiments. ATLANTIS projects will apply new designs that eliminate large platform structures, developing technologies that substitute platform mass for integrated control systems and maximized rotor area to maintain and increase the stability of the turbines themselves.

- SHARKS a $35M program will develop new economically competitive Hydrokinetic Turbines (HKT) designs for tidal and riverine currents. SHARKS projects address at least one of four

generation use-cases: remote riverine energy, remote tidal energy, utility scale riverine energy, and utility scale tidal energy.

ARPA-E also issues a triennial OPEN competition that accepts proposals for funding a broad variety of transformational energy technologies, including for marine energy-focused initiatives. OSU was selected for an award under the 2018 OPEN competition – that award is indirectly related to marine energy (fresh water recover, project term 5/13/18 to 5/31/22): https://arpa-e.energy.gov/technologies/projects/freshwater-recovery-system-hydraulic-fracturing-fresh-frac-using-thermally

Finally, OSU is/has been an awardee or sub-awardee on approximately one dozen ARPA-E projects, and is encouraged to submit future applications for ARPA-E funding, whether for marine energy technologies or other energy innovations.

Q2. The President's Budget continues support of the Weatherization Assistance Program and the Low-Income Home Energy Assistance Program (LIHEAP). Oregon is suffering more and more instances of extreme weather—from heat islands to ice storms—and the costly weatherization and high energy bills have hit families hard. How will Department of Energy programs help ease the financial burden for American families as they work to make their homes more energy-efficient and resilient in the face of a changing climate?

A2. Since its inception, the U.S. Department of Energy's (DOE) Weatherization Assistance Program (WAP) has weatherized more than 7 million homes and reduces energy costs for low-income households at or below 200% of Federal Poverty Guidelines by increasing the energy efficiency of their homes, while ensuring their health and safety. Through weatherization improvements and upgrades, these households save on average $283 or more every year.[4]

Weatherization returns $2.78 in non-energy health and household related benefits for every $1.00 invested in the WAP.[5] Non-energy benefits represent tremendous benefits for families whose homes receive these services.[6]

[4] Weatherization Works - Summary of Findings from the Retrospective Evaluation of the U.S. Department of Energy's Weatherization Assistance Program (ORNL/TM-2014/338)
[5] Weatherization Assistance Program Fact Sheet (Weatherization Assistance Program Fact Sheet | Department of Energy)
[6] Health and Household-Related Benefits Attributable to the Weatherization Assistance Program (ORNL/TM-2014/345)

DOE received $15 million to establish a "Weatherization Readiness Fund" (WRF) in FY 2022 to address structural or health and safety repairs needed before some low-income homes in most need of the energy efficiency benefits are eligible for weatherization assistance.

WRF will not only enable weatherization but improve resiliency by ensuring homes are air-tight and insulated to protect against extreme heat and cold, while also improving indoor air quality. This funding will allow DOE and Grantees to design programs and address a portion of the highest priority homes. DOE is requesting an additional $30 million in FY 2023 for the WRF. DOE recently released guidance on the WRF in April 2022, in the Weatherization Program Notice WPN 22-6.[7]

In addition, DOE is working with HHS and HUD, and will be extending to other federal agencies, to assist local agencies to leverage different funding streams, including Low-Income Heating Assistance Program (LIHEAP) funds, certain HUD programs, and other non-federal sources that will enable more low-income households to receive deeper and more comprehensive retrofits including newer clean energy technologies and best practices.

Q3. The President's Budget requested $818 million for the Hanford clean-up. The problems at Hanford didn't happen on your watch, but you are now responsible for cleaning up Hanford and making sure that workers and the environment are protected. Billions of dollars have been spent at Hanford on building technology to turn this highly toxic nuclear waste into solid material that can be stored safely, but not a single ounce of waste has been treated yet. The sheer cost of this technology, and its ongoing failure to work, has DOE and Congress looking at other costly solutions, like "grouting" the waste in place, or spending billions of dollars on new tanks to "temporarily" secure the waste -- these would amount to kicking the can down the road. Where are you at? How close are we to completing these decades-long efforts in environmental management at Hanford?

A3. The cleanup work at Hanford is a responsibility I take very seriously. I am pleased that this year has been historic for the Department's tank waste cleanup mission at Hanford with large scale treatment of tank waste underway for the first time through the Tank Side Cesium Removal System. Construction and startup testing of the Low-Activity Waste treatment facility needed to start immobilizing low-activity tank waste in glass has been substantially completed. In addition, a pipeline to connect and feed Hanford tank waste to the Waste Treatment Plant is finished. This work sets the stage to begin turning

[7] https://www.energy.gov/eere/wap/articles/weatherization-program-notice-22-6-weatherization-assistance-program

this waste into glass via the Direct Feed Low Activity Waste (DFLAW) program. The FY23 request will enable DOE to treat 1 million gallons of radioactive tank waste through the Tank Side Cesium Removal System, remain on track to turn tank waste to glass via the DFLAW program, continue tank waste retrievals and maintain Hanford's tanks in safe condition. The request also supports ramping up work on the Waste Treatment Plant's High-Level Waste Facility. At the same time, DOE is working with the State of Washington on options to continue to advance the tank waste retrieval and treatment mission at Hanford.

Q4. When I speak with university researchers in my state, one thing I hear from them is a challenge they call "the valley of death" in the research and development pipeline. The challenge is that there are limited funding opportunities for scientists to build on basic research to explore possible applications that could have commercial importance. This means a lot of promising discoveries are sitting on the shelf without being developed into the kind of innovations that are funded by ARPA-E. What more can ARPA-E do to help address this "valley of death" challenge in the R&D pipeline?

A4. Recognizing these issues, in 2019 ARPA-E released a Funding Opportunity Announcement (FOA) titled "Seeding Critical Advances for Leading Energy technologies with Untapped Potential (SCALEUP), which provides a vital mechanism for the support of innovative energy R&D that complements ARPA-E's primary R&D focus on early-stage transformational energy technologies that still require proof-of-concept. The goal of the program is to help ARPA-E-funded technologies, past and present, transition from proof-of-concept prototypes to commercially scalable and deployable versions of the technology and be well-positioned for investment from the private sector. ARPA-E's authorizing statute directs the Agency to develop linkages between its sponsored applied research and the marketplace. These linkages are central to realizing the public's return on technology investments.

An enduring challenge to ARPA-E's mission is that even technologies that achieve substantial technical advancement under ARPA-E support are at risk of being stranded in their development path once ARPA-E funding ends. The SCALEUP FOA builds upon ARPA-E-funded technologies to demonstrate technical performance at market relevant scales. Stranding promising ARPA-E-funded technologies in their development pathways leaves substantial intellectual property developed with American taxpayer dollars vulnerable to adoption by foreign competitors, who can and do capture it for continued development – and economic benefit – overseas. This harms national competitiveness, as U.S. industries often lose the lead on the development, scaling, and manufacturing of technologies necessary to compete

in rapidly evolving global energy markets. These scaling energy technology projects will meet ARPA-E's statutory direction to achieve the above goals by "accelerating transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty."

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QUESTIONS FROM SENATOR JAMES E. RISCH

Q1. Many advanced nuclear reactor designs will rely on advanced fuels, including High Assay Low Enriched Uranium (HALEU), which is not currently commercially available in the United States. Russia currently has a global monopoly on HALEU, and its recent invasion of Ukraine underscores the importance of establishing domestic capacity to produce HALEU for U.S. reactors.

Q1a. What are the risks associated with becoming overly reliant on Russian HALEU (or LEU, which is currently used in our current fleet) to power U.S. reactors?

A1a. There are significant risks in over-reliance on foreign supply of critical commodities. Russia's recent actions have illustrated that it cannot be relied upon as a responsible member of the global civil nuclear energy community. Alternative supplies and enhanced self-reliance are essential to meet our energy, environment, economic, and national security objectives. The Department is developing a broad uranium strategy with plans to responsively meet immediate, near, and long-term commercial and DOE demands for low-enriched uranium (LEU, including) high-assay low-enriched uranium (HALEU), which it anticipates could act as a demand signal to prompt the domestic supply chain to produce enriched uranium. The strategy will recognize the importance of a robust, domestic nuclear supply chain.

Q1b. Can you please explain how the Department's budget makes investments in establishing HALEU production capabilities in the U.S.?

A1b. The Department has requested $95M in Fiscal Year (FY) 2023 within the Office of Nuclear Energy HALEU Availability Program and $51.2M within NNSA Defense Nuclear Nonproliferation to make available small quantities of HALEU from limited DOE uranium inventories to support HALEU production in the short-term. DOE will also work with the private sector in its design and establishment of commercial U.S. HALEU production capability in the long-term. Plans include funding the Piketon Enrichment Demonstration, and related activities in deconversion, transportation, and licensing.

Q1c. What tools can Congress give the Department to help accelerate these efforts?

A1c. In order to accelerate efforts for HALEU production, Congress could fully fund the FY 2023 budget request.

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Q2. It is imperative that HALEU be available within the next 3 to 4 years for the Advanced Reactor Demonstrations while simultaneously deploying HALEU enrichment and deconversion capacity in the United States. Congress has asked the Department of Energy to provide a detailed plan for creating a domestic supply of HALEU, including specific milestones for completion and expected costs.

Q2a. Recognizing the request for information closed in February, when can we expect the plan to be released to Congress?

A2a. Over 50 comprehensive responses were received in response to a Request for Information to assist the Department in developing a HALEU availability program, as required by Section 2001 of the *Energy Act of 2020*. Russia's unprovoked actions in Ukraine highlight the need for establishing not only a domestic HALEU supply chain, but also for addressing various other strategic uranium needs essential to our energy, economic, and national security. We are actively working to finalize a strategy and DOE has briefed congressional staff on elements to consider in a comprehensive uranium strategy.

Q2b. Can you provide a briefing to my office on DOE's strategic plan regarding HALEU development?

A2b. Yes. We would be happy to brief your office once the strategy is finalized. As outlined in the President's FY 2023 Budget Request, we intend to pursue a multi-phased approach to develop HALEU supply, including operating the Piketon cascade, recovering HALEU, downblending excess sources of Highly Enriched Uranium, and initiating the critical HALEU support elements outlined in Sec. 2001 of the Energy Act of 2020.

Q3. Beyond DOE partnering with private industry to build out infrastructure required to produce HALEU, another potential source is downblending High Enriched Uranium into HALEU.

Q3a. How are you facilitating conversations between the Office of Nuclear Energy and other government entities, like NNSA and the Department of Defense, to determine if there is material available for downblending?

A3a. Within the Department, we have assembled a dedicated Office of Nuclear Energy-National Nuclear Security Administration (NE-NNSA) team that has been working on HALEU supply and the broader needs for enriched uranium products. All potential options for producing HALEU in the near-term are being considered, including downblending limited quantities of highly enriched uranium. In the longer-term it is recognized that new enrichment capacity is the only option.

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Q3b. If material is available for downblending, can it be made available to the industry in a timely manner?

A3b. The various sources of highly enriched material suitable for downblending are in different forms and locations and have various levels of impurities. The processes for converting the source material into a useable form of HALEU feedstock have different costs, schedules, equipment and staffing constraints, and levels of complexity. Although we will make every attempt to satisfy near-term needs for HALEU, imposed risks on the nuclear modernization program, infrastructure capabilities/availability, and human resources limitations will influence the overall pace.

Q4. The broader stakeholder community has recommended that DOE establish a HALEU bank to provide that long term demand signal for enrichment and deconversion and utilize cost-share awards. Even if DOE were to award a contract for HALEU today, it would still take a minimum of four years to bring capacity online. However, DOE cannot award a contract until after it issues a solicitation and makes an award. I know that you appreciate the need to move quickly and issue a solicitation as soon as possible. If this does not occur, I am concerned that HALEU enrichment and deconversion capacity won't be available until after 2027.

Q4a. Will the department be issuing the solicitation within this fiscal year?

A4a. We recognize the need for urgency and are actively working to develop a comprehensive uranium strategy and implement the funding provided for HALEU supply by Sec. 50173 of the Inflation Reduction Act of 2022.

Q5. How is DOE helping the United States better partner with our allies, many of which also have an interest in advanced nuclear reactors, to develop the market pull that could support our U.S. uranium industry?

A5. One of our top priorities is supporting industry to expand the footprint of U.S. civil nuclear technology exports. We recognize the critical role that Government plays in leveraging bilateral relationships to develop robust civil nuclear cooperation, which will underpin commercial opportunities. DOE, in coordination with State, will continue working with our allies to find mutually beneficial approaches to deploy innovative technologies, which, in turn, will support domestic nuclear fuel cycle supply chain providers.

Q6. The FY19 NDAA Section 327 titled Report on Pilot Program for Micro-Reactors, required a report related to the deployment of nuclear micro-reactors.

Q6a. Please provide that report.

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A6a. DOE has drafted the report required by Section 327 of the FY *2019 National Defense Authorization Act* (NDAA). The report is currently in the final stages of review.

Q6b If the report is not yet ready, please provide the date by which it will be ready.

A6b. The report is currently in the final stages of review and, once approved, DOE will submit the report to the appropriate Committees of Congress.

Q7. Congress has funded an advanced nuclear reactor demonstration program that DOE is managing. As you know, I have been a supporter of micro-reactors because they have the potential to provide reliable energy at remote locations like mining operations and military bases. I understand that there are several micro-reactor technologies that could come to market as soon as 2027 but might get there more quickly with some additional help from DOE.

Q7a. Are you considering a demonstration project for micro-reactors?

A7a. The Department of Energy Office of Nuclear Energy (NE) is supporting a number of activities to enable and accelerate the development and future demonstration of microreactor technologies. NE's Microreactor Research Program (MRP) supports cross-cutting research and development and maturation of innovative components to address the highest priority technical challenges hindering the demonstration of microreactor concepts. A key focus of the MRP is non-nuclear testing to demonstrate various microreactor components, as well as semi-autonomous control. Additionally, NE is working to establish the Microreactor Applications, Research, Validation and Evaluation (MARVEL) nuclear test bed. MARVEL will be a microreactor which will serve as a unique nuclear test platform to demonstrate microreactor operations and end-use applications.

To support advanced reactor vendors in developing their designs and preparing for future demonstration opportunities, NE's National Reactor Innovation Center (NRIC) is establishing test beds for testing fueled advanced reactor designs. The Demonstration and Operation of Microreactor Experiments (DOME) test bed will be capable of siting experiments to support testing and development of microreactor technologies. DOME will be sited at the former Experimental Breeder Reactor II facility at INL to support this new mission. Construction activities for DOME will be initiated in FY 2023. Several microreactor developers have expressed interest in using DOME to test their technologies.

Additionally, NE has been working with the Department of Defense (DoD) since 2018 to support development and demonstration of microreactor technologies. DoD plans to demonstrate a mobile microreactor (1-5 mega-watts) at INL by the mid-2020s. NE has provided DoD with programmatic and technical expertise (fully funded by DoD) to evaluate industry designs and coordinate synergistic activities such as development of high-assay low enriched uranium (HALEU) supply chains.

Finally, through the Advanced Reactor Demonstration Program (ARDP) Risk Reduction pathway, NE is supporting two microreactor projects aimed at reducing risk and technical uncertainty for these designs. The Westinghouse Electric Company (WEC) project will advance the design of a heat pipe-cooled microreactor, and the BWXT Advanced Technologies project will mature a commercially viable high temperature gas-cooled microreactor conceptual design. These projects will prepare the WEC and BWXT designs for future demonstration opportunities.

Q8. DOE is vigorously pursuing the development of advanced nuclear reactors. The Office of Nuclear Energy and the Idaho National Lab are playing leading roles in these efforts to demonstrate numerous advanced reactor designs by the end of the decade. That's an aggressive deadline, but the nation's energy and national security are at stake. Senator Manchin and I recently introduced the International Nuclear Energy Act, S. 4064, which would establish a whole-of-government approach for exporting U.S.-made nuclear reactors. The U.S. must provide alternatives to Russian and Chinese reactors.

Q8a. Do you think the U.S. is acting with the appropriate level of urgency to meet these goals, and can we do more to accelerate efforts?

A8a. The Department of Energy (DOE) is working aggressively to accelerate the timeline for the development and demonstration of domestic advanced reactor designs. Through the Advanced Reactor Demonstration Program (ARDP), DOE is supporting two United States (U.S.)-designed advanced reactor demonstrations that are on schedule to be licensed, built, and operated by the late 2020s. It should be noted that these projects will be managed under the new DOE Office of Clean Energy Demonstrations starting in mid-2022, where they are expected to be managed to the same schedules while maintaining the support of the Office of Nuclear Energy (NE) and gaining the benefit of additional funding certainty through the Bipartisan Infrastructure Law. In addition, several microreactor vendors are targeting demonstration of their technologies within this decade. Further, NE's ARDP Risk Reduction projects and the Advanced Reactor Concepts – 20 (ARC-20) projects are supporting activities to resolve technical, operational, and regulatory challenges to enable potential future demonstration of a

diverse set of advanced reactor designs with demonstration horizons about 5-15 years beyond the initial ARDP projects. Through the combination of these projects, the U.S. is poised to demonstrate advanced reactors on a timeline that maximizes the impact of our U.S. designs on future energy markets, both domestically and globally. However, first-of-a-kind technical, financial, and licensing risks must be overcome to enable broad commercial deployment of advanced nuclear reactors. NE can speed deployment by continuing to support research and development with universities, national laboratories, and industrial partners toward additional innovation across a myriad of reactor classes.

In addition to immediate and sustained investments in domestic research, development, demonstration, and deployment, we must continue and increase our efforts to expand our bilateral and global partnerships to advocate for U.S. nuclear technologies. NE is committed to prioritizing international engagement to build relationships with countries embarking on a nuclear power project or expanding an existing nuclear power program so U.S. innovators will have growing opportunities for exports of their technologies. This includes ensuring that DOE maintains a leading role in providing U.S. technical assistance, expertise, and infrastructure development support to partner countries to help them prepare to deploy nuclear technologies. This type of outreach is critical to compete against similar efforts by Russia and China to build partnerships with countries embarking on a nuclear power program.

The U.S. must aim to be the most attractive technology development partner for nations seeking to build or expand their nuclear energy sectors, while maintaining our commitment to nuclear nonproliferation and security goals. Team USA, a focused collaboration of DOE and partner U.S. government agencies with the goal to foster the export of U.S. nuclear technology, has made great strides, but these efforts have also demonstrated that much work remains. As we create new opportunities for U.S. exports, we must develop more flexibilities and capabilities to allow us to quickly provide the type of comprehensive support that our global customers seek. U.S. government and industry must work together to develop a strategy, which aligns strategic partnerships with market priorities. This targeted approach would maximize the use of our resources to expand U.S. nuclear energy technology's global footprint.

Q8b. What steps is the Department of Energy taking to support secure fuel supply sources for our operating nuclear fleet to eliminate the import of Russian fuel as soon as practicable?

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A8b. The Department is actively exploring options to enhance domestic fuel supply. Without expansion of domestic fuel cycle capacity, the United States cannot securely support the low enriched uranium (LEU) needs of today's domestic reactor fleet, meet long-term defense needs, or make high-assay LEU (HALEU) available for advanced reactors, research reactors, and medical isotope production. DOE is developing a strategy to reduce domestic dependence on Russian natural and enriched uranium, nuclear fuel products, and nuclear fuel services. The strategy will drive expansion of our nation's domestic nuclear fuel cycle capacity to meet our nuclear fuel supply needs.

Q9. Globally, Russia accounts for over 30 percent of nuclear conversion and over 40 percent of enrichment commercial production capabilities. The invasion of Ukraine has highlighted the need to quickly ramp down Russian nuclear fuel imports into the U.S. and invest in more domestic production capabilities. S. 4064 also aims to end Russian uranium imports and grow our domestic nuclear fuel cycle capabilities.

Q9a. Is the Department ready to expeditiously support the needed developments in new fuel supply capabilities?

A9a. Without expansion of domestic fuel cycle capacity, the United States cannot securely support the low-enriched uranium (LEU) needs of today's domestic reactor fleet, meet long-term defense needs, or make high-assay LEU (HALEU) available for advanced reactors, research reactors, and medical isotope production. DOE is developing a strategy to reduce domestic dependence on nuclear fuel services from the Russian Federation and to increase U.S. exports of those commodities and services to our allies. The strategy will drive expansion of our nation's domestic nuclear fuel cycle capacity to meet our nuclear fuel supply needs.

Q10. The Department's 1995 Settlement Agreement with Idaho establishes legally binding milestones for the removal of certain spent nuclear fuel waste streams from the state. In November 2019, DOE and Idaho signed a Supplemental Agreement that reaffirmed their commitment to removing Cold War legacy waste and other nuclear materials from Idaho. Additionally, the agreement permits certain quantities of research fuel to be brought into Idaho once the Integrated Waste Treatment Unit (IWTU) is operational and treating established quantities of high-level sodium-bearing waste. It is critical that the IWTU becomes operational this year to support the INL and its role as the nation's lead nuclear energy laboratory.

Q10a. Can you please provide a status update on IWTU, including when it will be operational?

A10a. DOE is in the final stages of commissioning this important facility that is key to addressing the remaining 900,000 gallons of radioactive sodium-bearing tank waste at the Idaho Cleanup Project.

Q10b. Given the protracted delays, which are approaching 10 years, and the corresponding impacts on the laboratory, is the Department considering other treatment options if the unit is not operational in the near-term?

A10b. As part of the most recent confirmatory run, the IWTU successfully processed 33,000 gallons of simulated radioactive liquid waste. IWTU facility testing is evaluating readiness and preparations for processing radioactive sodium-bearing waste in Idaho.

Q11. In 2015, Congress codified the Department's role as the Sector-Specific Agency for cybersecurity for the energy sector, and DOE established the Office of Cybersecurity, Energy Security, and Emergency Response (CESER) in 2018 to bolster and elevate the role of cyber at the Department. The administration has still not nominated an individual to serve as an assistant secretary for CESER despite the increasing number of threats to the electric grid. In fact, President Biden recently alerted the public that Russian cyberattacks were "coming," citing intelligence that Putin was considering using Russia's cyber arsenal against targets in the United States. The energy sector is an especially attractive target for these attacks, because disrupting the flow of energy would disrupt all of the other 15 critical infrastructure sectors that rely on power to function.

Q11a. Is it your position that the CESER Office should be run by a civil servant rather than a Senate-confirmed assistant secretary?

A11a. The Office of Cybersecurity, Energy Security, and Emergency Response (CESER) plays a vital role in the Department of Energy's (DOE) efforts to secure and protect the Nation's critical energy infrastructure from all threats and hazards. As the office responsible for executing DOE's risk management, preparedness, and emergency response capabilities for the U.S energy sector, CESER's mission and functions should be led with consistent, nonpartisan, experienced senior executive leaders. To ensure the long-term success of the office, DOE is committed to hiring strong career staff who have both the subject matter expertise and relationships with the sector that can span multiple Administrations.

CESER has strengthened its leadership team with a new senior career energy and cybersecurity expert in Director Puesh Kumar. Director Kumar has public and private sector energy experience and is a recognized expert in the industry. With this background, Mr. Kumar brings unique expertise to DOE and is exhibiting his strengths in advising DOE leadership on energy and cyber security and guiding the Department in tackling the evolving risks and threats facing the energy sector. When it comes to

responding to threats to our nation's energy systems, the need for continuity and consistent leadership is absolutely critical.

Q11b. Do you agree that the cyber risks to the energy sector are increasing?

A11b. The energy infrastructure of the United States faces continuously evolving and increasing threats that require updated approaches and seamless collaboration between government and the private sector to enable near-real time situational awareness, rapid analysis, and coordinated mitigation of threats and vulnerabilities impacting, or potentially impacting, the energy sector. Recent cyber incidents, like the Colonial Pipeline attack, have demonstrated how a cyber incident impacting our Nation's critical energy infrastructure can quickly disrupt our energy supplies, economy, and everyday lives. Cybersecurity in the energy sector is one of the Nation's most important and complex national security challenges, and it has become a top priority of the Biden administration in protecting and hardening America's critical infrastructure.

Q11c. Do you agree that the Department should require engineering cybersecurity in DOE energy infrastructure as it works to implement the Bipartisan Infrastructure Law?

A11c. Cybersecurity is of the utmost importance in all work we do here at the Department, including the once-in-a-generation infrastructure research, development, and deployment work we will be doing under the Infrastructure Investment and Jobs Act (IIJA). Indeed, all program offices take the ever growing and rapidly emerging cybersecurity threats very seriously, and they coordinate with our Office of Cybersecurity, Energy Security, and Emergency Response (CESER) to ensure that cybersecurity is built into the design of the work we do.

Pursuant to the IIJA, we will be requiring recipients of funding from certain provisions of the bill to provide a cybersecurity plan that establishes a roadmap for measures the recipient is taking to address cyber threats and how they will incorporate cybersecurity considerations into the execution of the funding. Our program offices will collaborate with CESER to ensure the plans are taking into account, and are integrated with, existing Department research, development, and demonstration programs.

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Q12. The Idaho National Lab is involved in a DOE-CESER program called "CyberStrike," which was established in the aftermath of Russia's cyberattack on Ukraine's power grid in 2015-2016. The program aims to teach U.S. utility operators how to protect against a Russian-style cyberattack on their systems.

Q12a. What is the Department doing to help NATO states bordering Ukraine, such as Poland, to secure their energy infrastructure from possible Russian cyber-attacks?

A12a. The U.S. Department of Energy (DOE) is involved in a whole-of-government response to Russia's unjustified, unprovoked, and unconscionable war against Ukraine, and its ongoing destructive military campaign. DOE has a long-standing relationship with the energy sector in Ukraine, including work with Ukrainian utilities to help enhance their cybersecurity posture. In the leadup to Russia's invasion of Ukraine, DOE, leveraging the expertise of our National Labs, worked with utilities to focus on potential near-term cybersecurity enhancements, while also continuing our work on long-term resilience efforts. This work is helping to maintain the stability of the Ukrainian grid, while bringing its cybersecurity up to European standards. These are key steps toward Ukraine's further integration with Europe's electrical grid (ENTSO-E), which the Department is actively working on with support from Congress.

As part of DOE's efforts to reduce the consequences of cyber-physical attacks, for both the U.S. and our allies, CESER developed the CyberStrike training program. The program's intent is to enhance the ability of energy sector owners and operators to prepare for a cyber incident impacting operational technology. The training is used to familiarize organizations with a better understanding of the nexus between critical infrastructure and connectivity to the internet. Outcomes of the training provide a heightened awareness to the vulnerabilities exposed by sophisticated tactics, techniques, and procedures by advanced persistent threats. To date, the DOE CyberStrike workshop has been conducted in Ukraine, Poland (multiple years), Estonia, Lithuania, Croatia, and Latvia since 2018.

Q12b. Do U.S. utilities have a clear understanding on how they should respond when they first learn of, or at least suspect, a cyber-attack against their networks?

A12b. The U.S. energy sector is regularly addressing cyber threats against their networks and sharing information with the energy sector Information Sharing and Analysis Centers and federal partners. In general, most energy sector entities know that if they are experiencing a significant and/or sophisticated cyberattack against their systems, they should reach out to their local Federal Bureau of Investigation

(FBI) field office, as well as the Department of Energy (DOE) and/or the Department of Homeland Security (DHS). There is an established process to provide notification about potential energy sector cyber incidents across DOE, DHS, and FBI so that a call to one agency, is a call to all. The Electricity Subsector Coordinating Council (ESCC) playbook also includes contact information for DOE, DHS, and the FBI. DOE has also worked closely with entities designated under Section 9 of Executive Order 13636 to develop a checklist and playbook related to government support during a cyber incident and work with DHS to develop a standing Request for Technical Assistance for energy sector Section 9 entities, which can be activated as needed. Additionally, for the electricity sector, DOE has long established reporting requirements, through the DOE-417 *Electric Emergency Incident and Disturbance Report*, which includes criteria related to cyber incidents. If an entity does not have an established relationship with their local FBI field office, or needs additional support, DOE is always ready to provide connections to DHS, the FBI, or other interagency partners for resources, as needed and appropriate.

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QUESTIONS FROM SENATOR STEVE DAINES

Q1. Secretary Granholm, over the last two years congress has authorized and appropriated funds for multiple carbon capture programs within the Department. Please list the grants, grant opportunities, and projects DOE has funded in FY2021 and FY2020?

A1. (DOE) has issued Funding Opportunity Announcements (FOA) for the following Carbon Capture Program activities in FY2021 and FY2020:

FY2021:

- DE-FOA-0002515: Carbon Capture Research and Development For Natural Gas and Industrial Point Sources, and Front End Engineering Design Studies for Carbon Capture Systems at Industrial Facilities and Natural Gas Plants. Awards announcement: https://www.energy.gov/articles/doe-invests-45-million-decarbonize-natural-gas-power-and-industrial-sectors-using-carbon.
- DE-FOA-0002400: Fossil Energy Based Production, Storage, Transport and Utilization of Hydrogen Approaching Net-Zero or Net-Negative Carbon Emissions. Awards announcement: https://www.energy.gov/fecm/articles/us-department-energy-selects-12-projects-improve-fossil-based-hydrogen-production.
- DE-FOA-0002402: Bench Scale Testing of Direct Air Capture Components (TRL 3) and Initial Engineering Design for Carbon Capture, Utilization and Storage Systems From Air (TRL 6). Awards Announcements: https://www.energy.gov/articles/doe-announces-12-million-direct-air-capture-technology and https://www.energy.gov/fecm/articles/us-department-energy-announces-additional-6-million-funding-four-direct-air-capture.

FY2020:

- DE-FOA-0002187: Carbon Capture Research and Development (R&D): Engineering Scale Testing From Coal- and Natural Gas-based Flue Gas and Initial Engineering Design for Industrial Sources, Awards announcement: https://www.energy.gov/articles/department-energy-invests-72-million-carbon-capture-technologies.

- DE-FOA-0002188: Novel Research and Development for the Direct Capture of Carbon Dioxide from the Atmosphere, Awards announcement: https://www.energy.gov/articles/department-energy-invests-72-million-carbon-capture-technologies.

Q2. Secretary Granholm, what CCUS grant opportunities have been announce or will be announced in FY2022?

A2. DOE has listed the following carbon management (FOAs) in FY2022:

- Direct Air Capture Combined with Dedicated Long-Term Carbon Storage, Coupled to Existing Low-Carbon Energy, Released on 10/26/2021.
- Carbon Utilization Technology: Improving Efficient Systems for Algae, Released on 2/10/2022 as a joint FOA with the Bioenergy Technology Office.
- Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Phase II – Storage Complex Feasibility, Released on 5/2/2022.
- Carbon Management, Released on 5/5/2022.

Future FOAs can be found at the following website: https://netl.doe.gov/business/solicitations.

Q3. Secretary Granholm, what CCUS grant or funding opportunities were requested as part of DOE's FY2023 Budget?

A3. The FY2023 Budget Request for Carbon Management Technologies supports the following subprograms:

- Point Source Carbon Capture: Provides funding for pre- and post-combustion capture research, development, demonstration, and deployment (RDD&D) on transformational gas separation technologies capable of deep decarbonization (at least 95% capture of CO2).
- Carbon Transport and Storage: Provides funding for RDD&D activities to improve: (1) storage and operational efficiency; (2) understanding of overall cost; and (3) de-risking strategies.
- Hydrogen with Carbon Management: Provides funding for RDD&D activities for hydrogen-fueled turbines, fuel cells, CCUS-relevant technologies, and production of clean hydrogen through waste/biomass gasification.

- Carbon Dioxide Removal: Provides funding for activities on lab- and bench-scale development, pilot-scale tests, front-end engineering design studies, and life cycle analysis) and techno-economic analysis studies of direct air capture (direct ocean capture), biomass with carbon removal and storage, and mineralization approaches
- Carbon Dioxide Conversion: Provides support for laboratory and bench-scale technologies to convert CO2 into valuable products such as chemicals, fuels, bioproducts and building materials; increased field-scale testing of technologies to pilot scale, and standardized benchmarking for catalytic conversion systems.

Future FOAs can be found at the following website: https://netl.doe.gov/business/solicitations.

Q4. Secretary Granholm, the U.S. needs to move away from imports from China and Russia and increase domestic production of critical minerals. What is the Department doing to support domestic critical mineral production?

A4. DOE's Critical Materials Strategy is based on 3 pillars: (1) Diversify Supply, (2) Develop Substitutes, and (3) Reuse, Recycle, and More Efficient Use; of critical materials.[8] The U.S. lacks midstream supply chain capabilities for material refinement for multiple critical minerals. This limits both upstream mineral production and downstream value-add manufacturing. DOE is advancing research, development, and demonstration to address this supply chain vulnerability.

To support critical mineral production directly, ARPA-E established the Mining Innovations for Negative Emissions Resources (MINER) program to increase domestic sources of copper, nickel, lithium, and rare earth elements.[9] This is complemented by ARPA-E's Biotechnologies to Ensure a Robust Supply of Critical Materials for Clean Energy.[10] The Office of Fossil Energy and Carbon Management (FECM) is also advancing resource characterization technologies through the Carbon Ore, Rare Earth and Critical Minerals (CORE-CM) Initiative and advancing critical minerals processing from unconventional sources (coal ash, lignite, acid mine drainage) at four small-scale pilot facilities. DOE's Critical Materials Institute, an Energy Innovation Hub led by Ames Laboratory and managed by the

[8] https://www.energy.gov/sites/default/files/2021/01/f82/DOE%20Critical%20Minerals%20and%20Materials%20Strategy_0.pdf
[9] https://arpa-e.energy.gov/technologies/programs/miner
[10] https://arpa-e.energy.gov/technologies/exploratory-topics/biomining

Advanced Manufacturing Office (AMO), is advancing research and development that supports improved efficiency of primary production after mining and improved material recovery from hard rock mining waste, smelting waste, geothermal brines, manufacturing waste, and electronic waste. The Office of Science (SC) supports foundational theoretical and experimental science related to rare-earth elements and substitution for platinum group element catalysts, among other critical materials, to reduce, eliminate, or find substitutes for critical materials in energy-relevant technologies. SC also advances geoscience and separation science to enhance the extraction and chemical processing of critical elements. Additionally, the BIL-funded Battery Materials Processing Grants Program and the REE Demo Facility are moving forward to enable the buildout or demonstration or commercial scale facilities that will be in the midstream of future domestic supply chains.

Q5. Secretary Granholm, how does the FY2023 Department Budget prioritize the expansion of nuclear energy?

A5. The FY23 budget request makes significant investments in nuclear energy. The budget would fund: implementation of a program to provide HALEU for NE research, demonstration and commercial use through the HALEU Availability Program (Advanced Nuclear Fuel Availability); the Advanced Reactor Demonstration Program to support risk reduction for 5 advanced reactor designs that may be available for commercial deployment in the mid-term; opportunities for potentially interested communities to learn more about consent-based siting, nuclear waste management, and siting considerations, funded within Fuel Cycle R&D; and a new program line "Directed R&D and University Programs" that consolidates many related subprograms.

Q6. Secretary Granholm, Congress had funded an advanced reactor demonstration program that that your department is managing. I understand that the emerging micro reactor technology could come to market as soon as 2027 but might get there more quickly with some additional help from the Department. Can you provide the Committee with details of the Department's plans for micro reactors, including a demonstration project for this promising technology?

A6. The Department of Energy (DOE) Office of Nuclear Energy (NE) is supporting many activities to enable the development and demonstration of microreactor technologies. NE's Microreactor Research Program (MRP) supports cross-cutting research and development and maturation of innovative components to address the highest priority technical and regulatory challenges hindering the

demonstration of microreactor concepts. A key focus of the MRP is non-nuclear testing to demonstrate various microreactor components as well as semi-autonomous control. Additionally, NE is working to establish the Microreactor Applications, Research, Validation and Evaluation (MARVEL) nuclear test bed. MARVEL will be a microreactor that will serve as a unique nuclear test platform to demonstrate microreactor operations and end-use applications.

Also, to support advanced reactor vendors in developing their designs and preparing for future demonstration opportunities, NE's National Reactor Innovation Center (NRIC) is establishing test beds for testing fueled advanced reactor designs. The Demonstration and Operation of Microreactor Experiments (DOME) test bed will be capable of siting experiments to support testing and development of microreactor technologies. DOME will be sited at the former Experimental Breeder Reactor II facility at INL to support this new mission. Construction activities for DOME will be initiated in FY 2023 . Several microreactor developers have expressed interest in using DOME to test their technologies.

Additionally, NE has been working with the Department of Defense (DoD) since 2018 to support development and demonstration of microreactor technologies. DoD plans to demonstrate a mobile microreactor (1-5 mega-watts) at INL by the mid-2020s. NE has provided DoD with programmatic and technical expertise (fully funded by DoD) to evaluate industry designs and coordinate on synergistic activities such as development of high-assay low enriched uranium (HALEU) supply chains.

Finally, through the Advanced Reactor Demonstration Program (ARDP) Risk Reduction pathway, NE is supporting two microreactor projects aimed at reducing risk and technical uncertainty for these designs. The Westinghouse Electric Company (WEC) project will advance the design of a heat pipe-cooled microreactor, and the BWXT Advanced Technologies project will mature a commercially viable high temperature gas-cooled microreactor conceptual design. These projects will prepare the WEC and BWXT designs for future demonstration opportunities.

Q7. Secretary Granholm, how will the funding to the Office of Cybersecurity, Energy Security, and Emergency Response be allocated to shore up our domestic energy security and grid reliability?

A7. The Office of Cybersecurity, Energy Security, and Emergency Response's (CESER) FY 2023 budget will allow the office to grow to meet the needs of the Department of Energy (DOE) and the energy sector, strengthening the office's critical mission of protecting the grid from cyber intrusion and

organizing emergency response operations both for cyber incidents and for the communities hit hardest by natural disasters. The FY 2023 budget will enhance and improve CESER activities by allocating:

- $28 million for CESER's Information Sharing, Partnerships, and Exercises programs (performed under the Preparedness, Policy, and Risk Analysis division) to help bolster energy sector security and resilience through enhanced coordination with government and industry partners. This includes DOE support for state, local, tribal, and territorial communities, and the energy industry in preparing for, mitigating, and recovering from all threats and hazards facing the energy sector; new workforce- and supply chain-related activities; as well as training and exercises to develop the next generation energy workforce.

- $125 million for CESER's Risk Management Tools and Technologies (RMT) division to develop tools and technologies to address cyber, physical, natural hazard, and other threats to the U.S. energy sector. RMT will establish the Energy Cyber Sense program comprising several supply chain security efforts, including the Cyber Testing for Resilient Industrial Control Systems (CyTRICS) initiative, the development of a framework for energy sector software bill of materials (SBOMs) and hardware bill of materials (HBOMs), and other efforts. RMT will also develop and maintain the Environment for Analysis of Geo-Located Energy Information (EAGLE) situational awareness monitoring program, address geomagnetic disturbances (GMD) and electromagnetic pulse (EMP) threats, and develop of tools and technologies to mitigate risks the sector faces from increasing hurricanes, wildfires, flooding, and other natural hazards.

- $24 million for CESER's Response and Restoration (R&R) division to continue to coordinate the national effort to ensure that the sector can respond to and recover from all hazards, including natural hazards, cyber-attacks, and physical attacks. The budget bolsters CESER's efforts to execute DOE's responsibilities as lead agency for Emergency Support Function #12 (Energy), or ESF #12, under the National Response Framework, Sector Risk Management agency (SRMA) for the energy sector, and the Sector Specific Agency (SSA) for the energy sector. This includes support for CESER's work with partners in the energy sector to assess the impacts of disasters on local and regional energy infrastructure; provide situational awareness updates to Federal, state,

and private sector partners; facilitate legal and regulatory waivers to accelerate restoration of damaged energy systems; and provide technical expertise. Further, additional staff provided through the increase in program direction funding will strengthen CESER's cyber emergency response capabilities.

- $25 million for Program Direction for additional full-time equivalents (FTEs) to support CESER's mission critical work. This includes Federal staff to provide oversight for a wide range of energy security, cybersecurity, and emergency response functions and programs. This budget will help CESER address increased needs in area of cyber preparedness and incident response. The cybersecurity field is in high demand across both public and private sectors and Federal government salaries in this field are significantly lower than the industry standard. The budget request will help address this challenge by enabling CESER to continue to work closely with DOE's Office of the Chief Information Officer, the Office of the Chief Human Capital Officer, and other DOE program offices to provide cyber pay incentives similar to those already implemented at the Cybersecurity and Infrastructure Security Agency (CISA) in order to retain and recruit highly-skilled cyber talent. The budget also includes support for Federal staff that support critical crosscutting functions, including budget, procurement, contracts, and human resources.

Q8. Secretary Granholm, how many of barrels of oil is the Department projecting on purchasing with the $214 million request for the Strategic Petroleum Reserve?

A8. The FY 2023 Budget Request of $214 million for the Strategic Petroleum Reserve (SPR) Account is for the facilities operations as well as management of the SPR. Costs for purchases for the SPR are from the SPR Petroleum Account, a different Account from the SPR account. The FY 2023 Budget request for the SPR Petroleum Account provides $8 million for costs incurred with executing Congressionally mandated SPR sales in FY 2023. Funding for purchases related to the replenishment of the SPR following the emergency sales in 2022 will come from the revenue generated from the emergency sales. Currently, the Department is tentatively planning on obligating funds for 60 million barrels in the first half of FY 2023 for barrels to be delivered in FY 2024 or later. This is just an initial step towards replenishing the SPR.

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Q9. Secretary Granholm, does the Department plan to buy domestic or Canadian crude as part of the recent buy back announcement for the Strategic Petroleum Reserve?

A9. The Department will replenish the SPR within the given crude oil specifications needed for the SPR based on the product's specific chemical characteristics. This will likely include both domestic production and foreign production, including Canadian production, as long as it meets the required specifications.

Q10. Secretary Granholm, will you commit to prohibiting the buying of any Russian, Iranian, or Venezuelan crude as part of the recent buy back announcement for the Strategic Petroleum Reserve?

A10. The SPR will adhere to all laws, international obligations, and regulations related to the crude oil bought to help replenish the SPR.

Q11. Secretary Granholm, how does the Department define an "underrepresented group" when allocating funding to increase their participation in scientific research?

A11. The Department considers "underrepresented" a relative term and depends on knowing an appropriate baseline for comparison relative to the particular focus or goal of a program's efforts. Individuals from particular demographic groups may be underrepresented in physics at the undergraduate level but not underrepresented in biology. Likewise, individuals from a particular demographic group (e.g., gender, race, ethnicity, disability status) may not be underrepresented at the undergraduate level in a particular field but are underrepresented when you look at their presence among faculty in that field at academic institutions across the U.S. or in management positions at the DOE National Laboratories or in industry. Similarly, some academic institutions may be classified as a Minority Serving Institution (MSI) because they meet the institutional requirements as accredited, degree granting institutions of higher education with an undergraduate enrollment level above a certain threshold for a particular demographic group but may be among the top U.S. institutions that receive DOE or Federal R&D funding. In addition to MSIs, we need to cast a broad net in our outreach and solicitations processes to ensure we are reaching other underserved institutions and communities, including those within the Established Program to Stimulate Competitive Research (EPSCoR) states. We need to be very intentional in our efforts to support those individuals and institutions historically underrepresented in the DOE R&D portfolio and use recognized baseline data, such as data sets reported by the National Center for Science and Engineering Statistics' report on *Women, Minorities, and Persons with Disabilities in STEM*, as well as DOE Program Offices'

historic application and funding data, to ensure the DOE Programs are significantly expanding opportunities for research and STEM training to those underrepresented across its portfolios.

Q12. Secretary Granholm, given the Administration's push for more electric vehicles, which will vastly increase the demands for minerals to make batteries, what is the Department doing to ensure American domestic access to and production of these minerals?

A12. There are multiple efforts underway to ensure the U.S. produces and has access to the minerals and materials necessary to supply this emerging technology. The most significant effort underway is the $6 billion in funding from the Bipartisan Infrastructure Law for FYs 2022-2026 to accelerate domestic development across the supply chain.[11] The first phase Funding Opportunity Announcements (FOAs)[12] are currently accepting applications, and selections for these projects are expected before the end of the fiscal year. In addition, DOE has emphasized the development of substitutes for critical battery materials such as cobalt, as well as recycling and materials process innovations and mineral extraction to enable greater access to battery materials. Specifically, the Federal Consortium for Advanced Batteries (FCAB) Lithium Ion Battery Strategy has goals that include an emphasis on increasing domestic access to minerals and materials.

Q13. Secretary Granholm, how does the Department plan to implement the $4.0 billion to decarbonize the American economy?

A13. FECM is implementing $2.5 billion in carbon validation and storage to support CO2 storage for mitigation and removal. FECM is supporting the Office of Clean Energy Demonstrations to implement a total of $3.5 billion in integrated carbon capture and storage demonstration projects resulting in emissions mitigation (2 each for coal and gas power, and 2 for non-power industrial applications) and large-scale pilot programs. FECM is also supporting the $8 billion provision for hydrogen hubs, including at least one using fossil fuels with carbon management.

Q14. Secretary Granholm, what is the primary need for the 131% increase in funding of the Department's Office of International Affairs, which has requested a $35.3 million?

[11] Securing America's Clean Energy Supply Chain | Department of Energy
[12] Funding Opportunities | Department of Energy

A14. The Department of Energy's (DOE) Office of International Affairs (IA) has primary responsibility for leading international energy policy and leading all bilateral and multilateral energy collaborations involving the Secretary, Deputy Secretary, and other DOE senior leadership, including connecting DOE's program offices and its 17 National Labs to partner countries. The increase in the IA budget supports international clean energy cooperation through key multilateral and bilateral forums with the objectives to transition to net zero emissions, create good paying American jobs, and enhance U.S. competitiveness. On the latter, DOE is focused on using these platforms to increase the uptake of U.S. energy goods and services abroad, which grows American jobs at home. For example, a prospective $40 billion nuclear energy project in Poland, for which DOE-IA is leading in coordination with industry partners and the Polish government, could support some 130,000 American jobs. With respect to broader programs serving this mission, the proposed increase includes funding that would support the Net Zero World Initiative (NZW). NZW provides tailored technology and investment roadmaps to help key large emitters across the globe achieve net zero emissions by 2050. The proposed increase also includes support for IA's Office of Market Development, whose mission is to advance policies that foster incentives for decarbonization of the global energy sector while bolstering U.S. jobs, enhancing our innovation edge against our key competitors, and fostering resilient, secure energy markets and supply chains.

Q15. Secretary Granholm, what steps has the Department taken to address global energy issues that have resulted from Russia's war on Ukraine?

A15. The United States is the largest global producer of oil and natural gas and a net exporter of energy, and DOE is taking actions at home and in coordination with our allies to address global energy issues that have resulted from Russia's war on Ukraine. On March 31, DOE began executing President Biden's authorization of an immediate release of one million barrels per day for six months from the SPR. In addition, we coordinated with 30 other International Energy Agency Member Countries, who agreed to collectively release an additional 60 million barrels.

And in March and April 2022, DOE took action on four non-free trade agreements (FTA) liquified natural gas (LNG) export applications that provide every LNG export project that is operating and under construction the ability to export all of their approved capacity to non-free trade agreement countries.

There are no pending LNG export applications from domestic projects ready for DOE final review; all pending non-FTA applications are still undergoing their environmental review.

DOE leadership has also been in close contact with the CEOs of U.S. and international oil and gas companies to encourage them to increase production and gather their input on bottlenecks to production including access to financing and supply and labor shortages.

Q16. Secretary Granholm, what has the Department done to work with international partners and American businesses to increase adoption and deployment of nuclear energy, specifically in Eastern Europe?

A16. The Department has leveraged existing close working relationships and developed new relationships with our international partners in Central and Eastern Europe using both bilateral and multilateral engagement. We have visited Slovenia, Czechia, Romania, and Poland within the past year, and we have provided technical assistance funding and new cooperative mechanisms that increase the countries' understanding of U.S. technologies and options for enhancing strategic partnerships. As a result of our intensified engagement, all the visits have led to expressed or confirmed expanded interest in commercial partnerships with U.S. companies. For example, we have worked to develop our relationship with Romania since 2014 which led to the successful signing of an Intergovernmental Agreement in December 2020. This strategic partnership covered the refurbishment and completion of Romani's large reactor plant and an opportunity to cooperate on small modular reactors. The Romanians have expanded their nuclear deployment plans and have announced their desire to own the first U.S. SMR in Central and Eastern Europe.

We have also leveraged our leadership in multilateral fora, to include the Partnership for Transatlantic Energy and Climate Cooperation's (PTECC) Nuclear Working Group and have convened two High Level Sessions led by Deputy Secretary Turk, to discuss partnership and determine the areas of focus to support the required resilience, supply chain restructuring, and infrastructure development needed to rebound from the impact of the egregious behavior of Russia. By working closely with U.S. industry, we have jointly planned PTECC High Level Sessions in conjunction with trade missions and workshops scheduled in Europe, so industry can be present when the opportunities for national and regional partnerships are discussed at the Ministerial level. We are working with industry as part of the PTECC Nuclear Working Group effort to finalize our areas of focus and create an action plan that supports

concrete deliverables and commercial partnerships between our Central and Eastern European allies to guide our work together to develop a comprehensive solution set for fuels, components and services previously produced by Russia.

Q17. Secretary Granholm, what specifically has the Department done to promote Eastern European natural gas imports from the United States?

A17. U.S. LNG export facilities are currently exporting at their approved capacity. In March, U.S. LNG exports averaged 12.0 billion cubic feet per day (Bcf/d), an all-time peak. Although LNG sourced in the U.S. will not be able to replace Russian gas supplies to Europe in the near term, DOE is committed to helping European countries develop the import capacity and infrastructure that they need to obtain and utilize additional LNG cargos and pipeline gas from other exporters. DOE is working with the European members of the Partnership for Transatlantic Energy and Climate Cooperation (P-TECC) to develop technical assistance activities focused on contracting for LNG imports and LNG facility development.

Q18. Secretary Granholm, how does the Department plan to implement "energy justice" as outlined in the FY2023 Budget?

A18. At DOE, we define energy justice as "the goal of achieving equity in both the social and economic participation in the energy system, while also remediating social, economic, and health burdens on those disproportionately harmed by the energy system." At its core, energy justice applies the basic principles of civil rights to the climate space.

With the FY23 budget, DOE plans to continue driving initiatives to achieve energy equity and environmental justice across the DOE complex and labs in accordance with the Biden-Harris Administration directives and priorities. These overarching initiatives include adhering to the Justice40 Initiative that aims to have 40% of the overall benefits of DOE's clean energy and climate investments flow to disadvantaged communities. To successfully do this, the Office of Economic Impact and Diversity's (ED) FY23 budget request includes $4M for third-party evaluation of DOE's Justice40 Initiative implementation for the Department's 144 covered programs.

DOE will also continue its Equity in Energy initiative to expand the inclusion and participation of minorities, women, veterans, and formerly incarcerated persons with $2.5 million supporting Technical

Assistance (TA), for Minority Business Enterprises (MBEs) and $2.25 million for TA for Minority Serving Institutions to support increasing the pipeline of minority businesses and minority students participating in the U.S. energy sector.

Additionally, ED's Office of Diversity, Equity, Inclusion, and Accessibility (ODEIA) will, in coordination with relevant stakeholders, oversee implementation of DOE's DEIA strategic plan, which currently includes 31 crosscutting departmental goals. This office will continue developing competencies for diversity and inclusion training, including unconscious bias mitigation within talent processes, building and sustaining inclusive work environments, and developing DEIA training modules specifically for SES and supervisors/managers.

Q19. Secretary Granholm, has any or will any of the Department's budget gone to the study of or advocacy for the removal of hydroelectric dams in the Columbia Snake River System?

A19. BPA, along with the U.S. Army Corps of Engineers, and U.S. Bureau of Reclamation, evaluated breaching the four lower Snake River dams in the Columbia River System Operations Environmental Impact Statement (CRSO EIS) amongst other operational and configurational alternatives. The CRSO EIS updated the last comprehensive system EIS and responded to the Opinion and Order of U.S. District Court for the District of Oregon. The alternative that included breaching the four lower Snake River dams was not selected by these agencies in their Record of Decision in September 2020. BPA recently contracted for an independent study to analyze what resources would be necessary to replace all of the hydroelectric power and grid services of the federal Columbia Snake River dams in support of educating Administration officials. BPA and DOE will use this information to inform our participation in processes that may affect these dams.

Q20. Secretary Granholm, will you commit to supporting the continued operation of hydroelectric dams on the Snake River that are a vital component of Bonneville Power Administration's energy portfolio?

A20. Hydropower is a critical part of our energy future, both as a source of clean, renewable energy and as a highly flexible resource that can help us advance other renewables like wind and solar. DOE believes the reduction of carbon emissions remains a priority, alongside supporting a strong economy and affordable power for families and businesses.

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Q21. Secretary Granholm, how is the Department working to make sure rural Montanan's have continued access to reliable electricity, especially in light of environmental extremist's efforts to remove hydroelectric dams on the Snake River?

A21. Hydropower is a critical part of our energy future, both as a source of clean, renewable energy and as a highly flexible resource that can help us support and enhance grid reliability. DOE believes that maintaining an affordable, reliable grid and energy resources is a key priority, in both Montana and across the nation.

Q22. Secretary Granholm, what type of activities will be funded to "expand interest in careers that will enable a low-carbon, modernized U.S. building stock among underrepresented groups" as outlined in the Budget Request?

A22. Our Minority Educational Institution Student Partnership Program Internship offers talented undergraduate and graduate student internships within the Department and its 17 National Labs to develop their interest and skills in careers that enable low-carbon, modernized U.S. building stock among underrepresented groups.

Q23. Secretary Granholm, how much does the Department plan to spend on lower emission lightbulbs as outlined on page 50 on the FY2023 Congressional Budget Justification: Budget in Brief?

A23. DOE estimates that within this broad category of proposed work, the budget for "lower emission lightbulbs" is approximately $2 million. There are millions of LED products in the market today that have been influenced by DOE's R&D. Many LED lamps (bulbs) have rated lifetimes of 20k hours while some last between 30-50K hours. This is ~13x longer than the average incandescent bulb (1.5k hours). These products have contributed to an estimated 185 billion kWh in annual energy savings, and $20 billion in U.S. energy cost savings per year ($710 billion in U.S. energy cost savings by 2035). DOE's Solid-State Lighting (SLL) program investment was about $475 million over 17 years.

Q24. Secretary Granholm, the FY2023 Budget Request indicates a $46 million reduction in Unconventional Fossil Energy Technologies from Petroleum - Oil Technologies funding, or a complete defunding effort. What type of activities and technology does that defunding effect?

A24. FECM is requesting funding for research related to the extraction and production of oil and natural gas under the Advanced Remediation Technologies control point, subprogram Environmentally Prudent Stewardship. This budget structure better aligns with the organizational structure of FECM and

facilitates better stewardship of funding by program staff. The Environmentally Prudent Stewardship subprogram focuses on addressing the environmental impacts from oil and natural gas development, to include unconventional development and offshore safety and spill prevention.

FECM's program pertaining to Unconventional Fossil Energy Technologies from Petroleum - Oil Technologies primarily consists of 17 Field Test Sites in producing Basins across the U.S. These Field Test Sites were designed to address challenges in production, including assessing and reducing environmental impacts, improving resource recovery rates, assessing production in emerging shale plays, and enhanced oil recovery (EOR). This work is fully funded under the FY22 appropriation.

FECM has a long history of supporting research aimed at improving the recovery of oil and gas in a sustainable manner. Research to reduce the impacts of oil and gas development will continue under the Environmentally Prudent Stewardship subprogram.

Q25. Secretary Granholm, does the Department have any vetting or safeguard in place to ensure that funding for the University Training and Research does not fund institutions or individuals engaged in intellectual property theft?

A25. Award funding to universities through FECM's University Training and Research program is done through financial assistance. In these awards, universities own the intellectual property rights for the research being conducted, and it is their responsibility to manage, monitor and safeguard such rights within their institution. However, the Department incorporates various provisions in the award to help discourage intellectual property theft, including certain data collection and vetting efforts in support of DOE research security. Included in award documents are foreign national participation and foreign talents clauses, an export control provision, and regulatory requirements. Regulatory requirements are contained in 2 CFR Part 200 as amended by 2 the Code of Federal Regulations (CFR) Part 910 (the DOE Financial Assistance Regulations) at http://wwww.eCFR.gov, and applicable program rules.

The foreign talents clause is intended to support efforts to ensure research being supported by DOE is not being utilized and provided to foreign governments.

The Export Control provision requires the recipient to comply with all applicable United States export control laws and regulations in the performance of the award and in distribution of the resulting work.

Export control law prohibits recipients and their personnel from causing or allowing unauthorized access by identified foreign individuals or entities to export-controlled items, including technology.

The CFR has several sections that provide uniform administration requirements for financial assistance awards. This includes section 200.113 Mandatory Disclosures, that requires non-Federal entities or applicants to disclose to the Federal awarding agency ". . . all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award." Awardees are also required to report ". . . certain civil, criminal, or administrative proceedings" to the Department's Federal Awardee Performance and Integrity Information System (FAPIIS). This system is used to determine if a recipient is qualified before issuance of an award. In addition, 2 CFR section 910.132, Research Misconduct, puts recipients on notice that they are responsible for maintaining the integrity of research of any kind under an award from DOE.

Along with the various provisions placed in awards, Federal Grant Specialists and Contracting Officers also perform responsibility determinations prior to award that may reveal criminal charges.

Q26. What are some of the largest accomplishments of the recently established Office of Clean Energy Demonstrations that show it needs $214,052,000 in funding?

A.26: The Office of Clean Energy Demonstrations (OCED) has worked to implement Bipartisan Infrastructure Law (BIL) provision investments in partnership with the private sector through issuance of several recent Requests for Information (RFI) and Notices of Intent (NOI); conducting stakeholder outreach activities for carbon management, hydrogen hubs, and energy storage-related BIL provisions; and by developing plans to issue competitive Funding Opportunity Announcements (FOA) this fall. Recent announcements reflecting some of the progress to date in implementing OCED BIL provisions include:

- Regional Clean Hydrogen Hubs ($8B): Issued a NOI on June 6, 2022, in advance of a funding announcement in the fall timeframe;
- Clean Energy Demonstration on Current and Former Mine Land ($500M): Released an RFI on June 29, 2022, that closes on August 15, 2022;

- Carbon Capture Demonstrations ($2.5B): Issued a NOI on July 13, 2022, in advance of a FOA to be released later in FY 2022; and
- Energy Storage and Long Duration Storage Programs ($505M): Released an RFI on May 12, 2022.

In addition, to date, OCED has made significant progress in establishing strong project management and oversight capabilities to help steward investments. For example, OCED is establishing an independent project review capability to provide annual reviews and reviews at key decision points, and is creating a Demonstration Advisory Board to advise on key program, policy, and project continuation (go/no-go) decisions. OCED is also developing its first multi-year program plan, establishing commercialization roadmaps for key technologies/sectors by building on existing DOE analyses and other resources.

The OCED FY 2023 Budget supports investments that complement the continued development of a technology-neutral portfolio of projects alongside BIL-funded work in three key areas.

First, the FY 2023 Request will continue to support the Advanced Reactor Demonstration Program (ARDP) as the oversight of the ARDP is transferred to OCED from the Office of Nuclear Energy. FY 2023 funding will enable OCED to provide additional project management and technical oversight of ARDP. While the BIL provided significant funding to support the two cost-shared awards, annual appropriations are necessary for DOE to fully fund the likely federal contribution for later phases of the two demonstration projects: the Natrium Reactor and the Xe-100 Reactor.

Second, the FY 2023 Budget Request supports a new competition for commercial-scale projects that demonstrate technologies that integrate renewable and distributed energy systems with broader energy networks. Example topics include demonstrations that de-risk technologies needed to manage variable generation, control flexible loads, or integrate energy storage electric vehicle charging and other facilities into the U.S. transmission and distribution grids; and demonstrations of innovative hybrid generation systems, among other areas. The proposed competition supports OCED's efforts to further fill a critical innovation gap alongside BIL investment.

Finally, the FY2023 Budget Request will provide sufficient funding to allow OCED to develop business practices and systems to ensure effective oversight of OCED's portfolio. As part of OCED's implementation of BIL, the Request includes funding for technical and analysis support. This funding will help ensure OCED has the proper support needed to expedite its entire portfolio of demonstration activities.

Q27. Secretary Granholm, have any Montana tribes qualified for and redeemed financial and technical assistance from the Office of Indian Energy Policy?

A27. Since 2010, the DOE Office of Indian Energy Policy and Programs (Office of Indian Energy) has awarded $5.8 million to 9 tribal energy projects. Awardees contributed $1.2 million in cost share to these projects for a total value of nearly $7.1 million.

Specifically, funds have been provided to the following Indian tribes and Tribal Colleges in Montana:

(1) Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation – 2 awards (DOE $859,283: cost share: $67,699)
(2) Blackfeet Community College (DOE $183,960; Cost share $20,441)
(3) Chippewa Cree Indians of the Rocky Boy's Reservation (DOE $63,436; Cost share $63,436)
(4) Confederated Salish and Kootenai Tribes – 3 awards (DOE $1,285,463; Cost share $195,621)
(5) Little Big Horn College (DOE $160,090; Cost share $53,363)
(6) Northern Cheyenne Tribe (DOE $3,258,514; Cost share $814,629)

The Assiniboine and Sioux Tribes used the funds to explore available geothermal resources and to install energy efficiency measures and solar photovoltaics (PV) on a new Wellness Center in Poplar. The Chippewa Cree Indians of the Rocky Boy's Reservation used the funds to install solar PV on three of the Tribe's duplex units, reducing electricity bills for those Tribal members occupying those units.

The Office of Indian Energy competitively selected applications from the Confederated Salish and Kootenai Tribes. These Tribes used the funds to study the technical and economic viability of a co-generation biomass power plant, conduct energy audits on tribal buildings, and organizational support for the Tribes acquisition of the Kerr Dam. Blackfeet Community College and Little Big Horn College used Office of Indian Energy funding to install solar panels on their campus buildings to help reduce

electricity costs. The Northern Cheyenne Tribe is using the funding for a community solar photovoltaic (PV) project.

In addition to funding, since 2012 the DOE Office of Indian Energy has completed 14 technical assistance requests from the Indian tribes in Montana including: (1) Blackfeet Tribe (3 requests); (2) Chippewa Cree Indians of the Rocky Boy's Reservation (4 requests); (3) Crow Tribe (3 requests); (4) Fort Belknap Indian Community (2 requests); and (5) Northern Cheyenne Tribe (2 requests). Subject matter experts provided technical assistance on several projects, including supporting strategic energy planning, conducting energy audits, establishing tribal utility codes, evaluating non-functioning wind turbines, conducting a prefeasibility transmission study, and conducting renewable energy resource assessments.

Q28. Secretary Granholm, given the spike in diesel fuel prices that is devastating Montana farmers, ranchers and citizens, what is the Department doing to ensure Americans have affordable access to the fuels that run the backbone of our country?

A28. The Department is exploring the use of all the tools at its disposal, including the option of using the Northeast Home Heating Oil Reserve to release up to 1 million barrels of ultra-low-sulfur diesel (ULSD) fuel should a supply emergency arise.

Q29. Secretary Granholm, electric car batteries have a short lifecycle resulting in increases of hazardous waste material. What is the Department doing to ensure potentially toxic waste from these batteries will not leach into the environment?

A29. EV batteries are designed to meet the design life of the vehicle, and most EVs on the road today are projected to exceed warranty expectations. Collection of these batteries and the domestic recycling of these batteries is a high priority for DOE, and there are multiple efforts to ensure a comprehensive end-of-life plan for EV batteries. Successful deployment of a domestic recycling infrastructure has the potential to supply a significant amount of material for next generation batteries for EVs. DOE is addressing end-of-life batteries using a comprehensive strategy to minimize the environmental impacts and costs in all areas of the end-of-life disposition supply chain. This includes more effective battery collection, safe storage and transport, extending the useful life of EV batteries through second-use applications, separation and sorting, reducing battery recycling processing costs, and accelerated

qualification of recycled material into the battery supply chain. DOE continues to work closely with EPA, DOT, and industry stakeholders to better understand how to address these gaps.

Q30. Secretary Granholm, what is the Department doing to promote the production of renewable diesel fuels?

A30. The Department's Bioenergy Technologies Office (BETO) is focused on research, development, and demonstration (RD&D) of technologies to produce drop-in biofuels for difficult-to-decarbonize modes of transportation including aviation, maritime, and heavy-duty vehicles. BETO manages a diverse portfolio of technologies covering the full spectrum of bioenergy production, from the feedstock source to final products. BETO investments from the early 2000s helped develop technologies that are being used today in commercial facilities that are producing renewable diesel from fats, oils, and greases. In FY 2021, BETO began an annual Funding Opportunity Announcement (FOA) to support the scale-up of new biofuel production pathways. Renewable diesel is one of the types of low-carbon fuels supported under this FOA, and BETO selected one project to demonstrate the production of renewable diesel from landfill gas. BETO also issued a Notice of Intent to release a scale-up FOA in FY 2022. In addition to BETO, the Department's Vehicle Technologies Office supports research, development, demonstration, and deployment on a similarly-broad range of low-carbon fuels for use in on- and off-road applications, including renewable diesel.

Q31. Secretary Granholm, how is the Department working with the department of Agriculture and local growers to develop bioenergy resources?

A31. The Department's Bioenergy Technologies Office (BETO) has several formal collaborative mechanisms that enable DOE and USDA to work together on technical areas of common interest such as the development of bioenergy resources. The Biomass R&D Board has been in place since 2000 and is directed under various statutory authorities, primarily the Food, Conservation, and Energy Act of 2008 and the Energy Policy Act of 2005. The two agencies meet biweekly and have established several feedstock production and logistics interagency working groups to share information and strategies. In FY 2021, an MOU was signed between USDA, DOE, and DOT to direct the research, development, and demonstration activities needed to support the Administration's Sustainable Aviation Fuels (SAF) Grand Challenge. A SAF-Interagency Working Group was stood up to manage the development of a roadmap that includes identifying barriers and activities around biomass feedstocks and wastes. In addition, DOE

is part of the Rural Partnership Network, established in FY 2022 to support rural development across communities identified by USDA-rural development. Information and funding opportunities will be easily available through the network for community level engagement in developing biomass resources.

Q32. Secretary Granholm, how is the Department working with Montana high schools and colleges to support science education and workforce development?

A32. The Department of Energy (DOE) has been actively working with Montana high schools and colleges to support STEM education and workforce development. Through the DOE Office of Science's Office of Workforce Development for Teachers and Scientists (WDTS), SC supports annually one of the Nation's largest science competitions, the DOE National Science Bowl® (NSB), to engage middle school and high school students in Science, Technology, Engineering, and Math (STEM) learning (https://science.osti.gov/wdts/nsb). After 31 years, over 325,000 students have participated in the NSB nationwide, providing an entry point for a new generation of scientists and engineers into STEM-related fields. Students and their coaches/teachers from middle schools and high schools in the State of Montana have actively participated in the NSB (nearly 360 students between FY 2020 and FY 2022). For example, teams from Absarokee High School, Billings Central Catholic High School, and Chester-Joplin-Inverness High School are among the regular competitors at NSB competitions year after year.

WDTS supports undergraduate internships, graduate thesis research opportunities, and visiting faculty appointments annually to provide research and technical training opportunities at all 17 DOE National Laboratories. These opportunities have attracted students and faculty from both 2-year and 4-year colleges and universities across the Nation. A significant focus of WDTS outreach and recruitment efforts is on connecting with individuals who are historically underrepresented in STEM, including those from institutions in Established Program to Stimulate Competitive Research (EPSCoR) jurisdictions, such as Montana. Undergraduate and graduate students from the Montana State University, Montana Technological University, and The University of Montana – Missoula have participated in the Science Undergraduate Laboratory Internships (SULI) and the Office of Science Graduate Student Research (SCGSR) programs.

STEM training opportunities supported by DOE's applied technology offices and the National Nuclear Security Administration (NNSA) are open to institutions across the country, and Montana institutions

successfully compete for those. For example, Montana State University has successfully competed for undergraduate scholarships through the Office of Nuclear Energy's University Nuclear Leadership Program. NNSA's Minority Serving Institutions Partnership Program (MSIPP) provides funds to support the Salish Kootenai College (SKC), a Tribal land-grant community college in Pablo, Montana. Through the MSIPP, SKC established a new Program Certification in Digital Fabrication; added 25 courses in engineering, fabrication, and computer networking to their course curriculum; provides Professional Development classes for students and faculty; and administers tuition funds for 7 students on the Flathead Reservation campus each year. In addition, SKC collaborates with tribal and public elementary, middle schools and high schools to provide outreach activities in computer programming and digital fabrication.

The largest reach DOE has in STEM education and workforce development at the college and university level occurs through the support of undergraduate and graduate students on DOE's competitive R&D awards. In FY 2021, DOE awarded approximately $5.5 million in research awards to Montana institutions of higher education, including the University of Montana, Montana State University, and Blackfeet Community College.

Q33. Secretary Granholm, what type of progress has the newly established Office of the Undersecretary for Infrastructure made in pursuit of its goal to accelerate the transition to a "clean-energy economy"?

A33. The Office of the Undersecretary for Infrastructure has made great strides implementing both the Bipartisan Infrastructure Law and the bipartisan Energy Act of 2020. As you are likely aware, Congress provided the Department with $62 billion to be invested over 5-10 years in clean energy technologies such as carbon capture and hydrogen, in strategies to reduce energy cost for families, schools, and nonprofits, and in critical upgrades to the electrical grid. We have already released or made available for application nearly $10 billion for states, communities, and the private sector to work with us to deploy in building a clean energy economy. This includes more than $3 billion from the Office of Manufacturing and Energy Supply Chains for critical mineral processing and component manufacturing as part of the advanced battery supply chain, more than $2 billion from the Office of Clean Energy Demonstrations to support commercial-scale demonstrations of advanced nuclear technology, and more than $3 billion from the Office of State and Community Energy Programs, available for states to support locally-based

programs to increase energy efficiency and lower energy bills for low-income families. In addition, the Office of Clean Energy Demonstrations, in partnership with the Hydrogen Fuel Technologies Office, as well as the Office of Fossil Energy and Carbon Management and the Office of Nuclear Energy, has engaged extensively with the public and the private sector to inform design of the hydrogen hubs program, and has just released a Notice of Intent. Further, in partnership with the Fossil Energy and Carbon Management, we have published Notices of Intent for the Carbon Storage Validation and Testing and the Direct Air Capture Hubs programs.

Q34. Secretary Granholm, according to Kelley Blue Book the average transaction price for an electric vehicle is $56,437, which is roughly $10,000 higher than the industry average price for all vehicles. You have been an outspoken proponent of shifting to an entirely electric vehicle fleet as quickly as possible, but how is the Department making that shift more affordable for average Americans?

A34. Developments in battery and charging technology, the auto industry's release of a wider range of increasingly affordable EVs, and additional support from the Administration for the EV domestic supply chain are all expected to contribute to a decrease in the upfront purchase costs of EVs. To illustrate, Kelly Blue Book notes that in contrast to recent price increases among trucks, SUVs, and vans, the price of the average EV dropped by $1,275 between March and April as more lower-priced models continue to enter the market.[13] The price difference noted is also a function of the limited number of EV models which have tended to be higher end models initially. Recent announcements from OEMs have indicated that many more models covering a broader range of the market will be for sale in the coming 2-3 years. Furthermore, according to a study by Consumer Reports, EV drivers can already save $6,000-$10,000, thanks to reduced fuel and maintenance costs, even after taking increased upfront costs into account.

Q35. Secretary Granholm, how is the Department ensuring that the U.S. is producing enough Natural Gas to assist Europe offset Russian NG?

A35. According to the May Short-Term Energy Outlook from the U.S. Energy Information Administration, U.S. crude oil production is set to average 11.91 million barrels per day (bpd), the second highest on record, and reach an average of 12.85 million bpd in 2023, which will be a historic high, if realized. For

[13] New Car Prices Back on the Rise - Kelley Blue Book (kbb.com)

natural gas, production is expected to average 96.71 billion cubic feet per day (Bcf/d) in 2022 and reach 101.71 Bcf/d in 2023, both record-setting highs.

DOE understands the need to ensure affordable, reliable oil and natural gas supplies, and though current production is at record or near record levels, any current supply constraints are not due to a lack of technology. Prior DOE research provided the technologies needed to transform the U.S. oil and gas industry, and our recent research on improving recovery from existing wells is now resulting in higher production without waiting for new wells to be drilled.

Q36. Secretary Granholm, Carbon Dioxide Enhanced Oil Recovery is a way to both capture carbon and provide much-needed energy for the American people, what is the Department doing to support CO2EOR in Montana?

A36. The Department did not request funding for CO2-EOR projects in FY 2022 and 2023. However, FY 2022 Congressional report language directed DOE to conduct EOR-related research. Consistent with the Congressional intent, DOE is investing $8M in a CO2-EOR field test site to be located in Bell Creek oil field, Montana. The project, titled "Carbon Dioxide Enhanced Oil Recovery Improvement in Conventional Fields Using Rich Gas" will test an injectant consisting of a CO2/rich gas blend and assess the potential improvement in EOR performance.

Q37. Secretary Granholm, the Administration has increased the "social cost of carbon" to $51 which affects the way the government calculates investments in energy. Would this social cost be lowered for oil recovered using the CO2EOR method given that it is an essentially net carbon neutral process?

A37. From a full life cycle-perspective, CO2 EOR as commercially practiced today is not a carbon neutral process. CO2 used in EOR is primarily sourced from natural CO2 domes, in which case there is no offset to the emissions of the oil. To a lesser extent, captured CO2 is sourced from industrial sources (e.g., natural gas processing, ethanol, coal gasification, and hydrogen production), in which case the CO2 offset can only be counted once, either to lower the carbon intensity of the oil or the production process from which CO2 was captured. In the process of CO2-EOR, it is technically possible to inject and geologically store more captured anthropogenic CO2 than would otherwise be required to produce a given amount of oil, thus further reducing the carbon intensity of the process; however, such an outcome is unlikely in the absence of policy and other incentives.

The social cost of carbon (SCC), and analogous indicators, have been developed with the intention to serve as a tool for regulatory compliance. The estimates are generated based on the potential future estimated damages from GHG emissions and are not linked to specific emission sources. It is not appropriate to adjust SCC values adjustment based on process type, such as EOR, since SCC values are independent of process.

Q38. Secretary Granholm, as investments in electric intense activities increase in rural America, how is the Department working to bolster the electrical grid in rural areas to support increased in demand?

A38. The Bipartisan Infrastructure Law appropriated $200 million per year from FY 2022 to FY 2026, or $1 billion total, for Energy Improvement in Rural or Remote Areas. In consultation with the Department of the Interior, DOE will provide financial assistance to improve the resilience, safety, reliability, and availability of energy and environmental protection from adverse impacts of energy generation in rural and remote areas. To bolster the electrical grid in rural and remote areas, the funds may be used for overall cost-effectiveness of energy generation, transmission, or distribution systems; siting or upgrading transmission and distribution lines; reducing greenhouse gas emissions from energy generation by rural or remote areas; providing or modernizing electric generation facilities; developing microgrids; and increasing energy efficiency.

In addition, the FY 2023 Budget Request provides funding for the Department to partner with the U.S. Department of Agriculture (USDA) to support rural electric utilities. The joint initiative between DOE's Grid Deployment Office and USDA's Rural Utilities Service is to provide technical assistance for rural electric utilities to support the transition to carbon-pollution-free electricity by 2035.

Q39. Secretary Granholm, the Department has been authorized $125 million in the bipartisan infrastructure package to issue grants for research and development to increase the reuse and recycling of batteries, including the recovery of critical minerals. Has the Department issued any grants for this research, and has there been any progress in recovering critical minerals from used batteries?

A39. There are multiple provisions in the BIL: 40207(e), 40207(f)(2), 40207(f)(3), 40207(f)(4), and 40208, that are set to address some of the challenges of battery recycling. There is also a solicitation currently accepting concept papers for funding for innovation in some of these areas, with awards expected before the end of the fiscal year to address RD&D and demonstration projects to reduce battery recycling costs

and to enable second use technologies through demonstration projects.[14] Outside of BIL provisions, there have been multiple announcements from industry about establishing lithium-ion battery recycling domestically, and there are efforts in the Federal Consortium for Advanced Batteries (FCAB) to better characterize what is currently being recycled commercially to create a roadmap to reach the FCAB goal of 90% recycling rate of lithium ion technology by 2030.

Q40. Secretary Granholm, in 2021 the Department published its Critical Minerals and Materials Strategy, in which it noted the United States lacks domestic production for 14 critical minerals and is more than 50 percent import-reliant for 31. Has the Department had any success since the publishing of this report in domestically producing the 14 critical minerals, or in reducing our import-reliance on the 31?

A40. Several Team Members of DOE's Critical Materials Institute (CMI), an Energy Innovation Hub led by Ames Laboratory and managed by the Advanced Manufacturing Office (AMO), have made progress to reduce import-reliance of critical minerals. Rio Tinto opened a lithium demonstration plant in April 2021 that leverages CMI-technology to recovery lithium from mine waste at Rio Tinto's Boron mine site.[15] In May 2022, Rio Tinto also started producing tellurium at its Kennecott copper operation in Utah, supplying thin film photovoltaic solar panels. Rio Tinto is continuing to partner with CMI to economically recover tellurium from copper refining waste.[16] Momentum Technologies raised $20 million in growth funding in December 2021 to build battery recycling plants, leveraging a technology developed by CMI and scaled in partnership with Momentum Technologies.[17]

DOE's public-private partnerships are also making progress in scaling technologies to process and supply critical minerals. The Office of Fossil Energy and Carbon Management (FECM) funded the construction of four small-scale pilot facilities to produce rare earth elements and other critical minerals from unconventional and secondary sources (lignite, coal ash, coal refuse, acid mine drainage), as well as funded the development of 8 feasibility studies for facilities that are designed to produce 1-3tonnes/day of mixed rare earth oxides from such unconventional and secondary sources.[18] AMO has funded two demonstration projects to produce rare earth oxide for magnets and lithium hydroxide for

[14] Financial Opportunities: Funding Opportunity Exchange (energy.gov)
[15] https://www.riotinto.com/en/news/releases/2021/Rio-Tinto-achieves-battery-grade-lithium-production-at-Boron-plant
[16] https://www.kitco.com/news/2022-05-11/Rio-Tinto-starts-production-of-critical-mineral-tellurium-at-Kennecott.html
[17] https://www.bloomberg.com/press-releases/2021-12-15/freestone-announces-closing-of-growth-financing-for-momentum-technologies
[18] https://netl.doe.gov/node/10802

lithium-ion batteries.[19] Additionally, the appropriations from BIL provisions 41003(b,c,d) will accelerate the progress on technology advancement and commercialization, complemented by DOD's Defense Production Act investments.

Q41. Secretary Granholm, how does the FY2023 budget support increased mining, recycling, and processing of critical minerals?

A41. DOE's FY 2023 budget justification includes a Critical Minerals and Materials (CMM) Crosscut totaling $400 million.[20] The CMM Crosscut is coordinated across multiple Program Offices across the Department and includes objectives to diversify domestic and trusted sources of CMM in a safe, sustainable, and environmentally just way and well as to expand and improve recycling and second-life applications of CMMs. The CMM Crosscut is, in part, working to address key technology portfolio gaps in areas where the Department of Energy (DOE) has less historical focus such as: hard rock (including sedimentary and clay) critical mineral extraction and mining technologies, advanced subsurface technologies, unconventional resource extraction technologies, and robotics and autonomous operation applications in mineral extraction. DOE will also continue its long-term R&D for battery material processing and recycling in FY 2023, with a focus on areas such as scaling up recycling technologies and promising near-term approaches; the scale-up of lithium battery technologies such as no-cobalt/no-nickel cathodes, lithium anodes, and solid-state systems to reduce constraints from scarce materials; technologies that can enhance environmental sustainability; and the development of a U.S.-based circular lithium battery supply chain. In addition to the annual appropriations request, BIL funding will support the initial stages of planning and execution of technology development, demonstration, scale-up, and deployment of battery and critical mineral recycling, battery material processing, as well as address critical material innovation, efficiency and alternatives, supply chain research and rare earth elements.

[19] https://www.energy.gov/eere/amo/advanced-manufacturing-office-fy20-critical-materials-foa-selections-table
[20] https://www.energy.gov/sites/default/files/2022-05/doe-fy2023-budget-volume-2-crosscutting.pdf

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Questions for the Record Submitted to the Honorable Jennifer Granholm

QUESTIONS FROM SENATOR MAZIE K. HIRONO

Q1. As we transition to clean energy, it is extremely important that we ensure all communities benefit from this transition, especially those who have historically been left behind. In Hawaii, many communities struggle with high energy costs, lack of access to reliable energy, and the health consequences of air pollution from carbon emissions. This is especially true for our Native Hawaiian communities. How does this budget request support expanding access to clean energy in rural and lower-income communities and advance the President's goals for expanding environmental justice for vulnerable populations like Native Hawaiians?

A1. The FY 2023 Request also includes funding for DOE's Office of Energy Efficiency and Renewable Energy (EERE) to execute the Energy Transitions Initiative (ETI), a program specifically co-developing solutions to energy transition challenges specific to islands and remote communities. The ETI program will co-develop tools with communities to address energy transition challenges, including the Engage tool, which was developed in 2020 by the Hawaii State Energy Office, the University of Hawaii at Manoa, and the National Renewable Energy Laboratory. The tool enables broad sets of stakeholders access to energy system information in a highly digestible way. The ETI Partnership Program, initiated in FY19 and planned to continue in FY23, provides communities with culturally appropriate technical expertise from local, regional, and national laboratory technical partners. Current partners include the Hawaii Natural Energy Institute. The current cohort of communities includes microgrid and other community engaged projects on Oahu.

The FY23 requests will complement several provisions in the BIL that target rural communities including: $1 billion in Rural & Remote Energy Communities, $500 million in public school investments that will prioritize rural school districts, building our electric vehicle charging infrastructure in rural America, and funding to improve the resilience of the electric grid. The FY23 Request also complements the BIL investments and provides the Office of State and Community Energy Programs (SCEP) with additional resources to address high energy prices, reduce costs for families and businesses, and cut pollution through energy efficiency and other clean energy measures.

The new Grid Deployment Office is addressing some of the crucial transformational efforts required to build the next generation transmission and distribution system. The FY 2023 Request increases grid technical assistance activities, focusing on transmission, energy justice, and rural electric utilities, enabling stakeholders to make catalyzing electricity system decisions in support of Federal and state

clean energy goals. The Transmission Facilitation Program (TFP) is an innovative program established by the BIL. The TFP is a $2.5 billion revolving fund program that will provide Federal support to overcome the financial hurdles in the development of large-scale new transmission lines and upgrading existing transmission as well as the connection of microgrids in select States and U.S. territories. A project to connect an isolated microgrid to existing transmission, transportation, or telecommunications infrastructure in Hawaii to help achieve more affordable, cleaner, and reliable power could, for instance, be eligible for TFP support.

Q2. Can you provide an update on how DOE is using the funding in the Bipartisan Infrastructure Law to demonstrate innovative electric grid infrastructure and how this infrastructure can bring families and businesses in states like Hawaii more affordable, cleaner, and more reliable power?

A2. The Bipartisan Infrastructure Law (BIL), under Section 40103, provided $5 billion in Federal financial assistance to demonstrate innovative approaches to transmission, storage, and distribution infrastructure to harden resilience and reliability and to demonstrate new approaches to enhance regional grid resilience. DOE is working closely with eligible entities (States, localities, Tribes, and public utility commissions) to coordinate with electric sector owners and operators to implement this provision.

The Transmission Facilitation Program (TFP) is another innovative program established by the BIL. The TFP is a $2.5 billion revolving fund program that will provide Federal support to overcome the financial hurdles in the development of large-scale new transmission lines and upgrading existing transmission as well as the connection of microgrids in select States and U.S. territories. A project to connect an isolated microgrid to an existing transmission, transportation, or telecommunications infrastructure in Hawaii to help achieve more affordable, cleaner, and reliable power could, for instance, be eligible for TFP support.

Q3. Fusion energy could be a carbon-free source of steadily available power, but it not yet commercially viable. I understand the White House hosted a summit in March on efforts to accelerate fusion development over the next decade to realize commercialization. What is DOE doing to advance the science and commercial potential of fusion energy?

A3. The Department has appointed a Lead Fusion Coordinator in the Office of the Under Secretary for Science and Innovation, who is now coordinating efforts across the Department to pursue the vision laid out at the White House Fusion Summit. The first step was conducting a DOE workshop entitled Fusion

Energy Development via Public-Private Partnerships, which was held in Washington, DC, June 1-3, 2022. Sponsored by the DOE Office of Science and with participation from other DOE offices, DOE national laboratories, other government agencies, universities, the private sector, and non-profits, the workshop focused on refining the metrics, criteria, and structure for a milestone-based fusion development program, as well as discussing sustainable mechanisms for the public and private sectors to work together in support of implementing a bold decadal plan. This will inform DOE's plans to launch a milestone-based fusion development program as soon as practically feasible, with the use of enacted FY 2022 appropriations.

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QUESTIONS FROM SENATOR JOHN HOEVEN

Q1. The recently enacted Fiscal Year 2022 appropriations legislation includes important support for fossil energy research and development, including a direction to the Department to maintain robust efforts in enhanced oil recovery (EOR) technologies.

Advancing EOR not only enables more American energy production with better environmental stewardship, it has the potential to unlock more underground space to permanently store CO_2 emissions resulting from other sources.

Will you commit to following Congressional direction and work with us to make enhanced oil recovery commercially viable, particularly in unconventional resources like the Bakken?

A1. DOE will implement appropriated funds consistent with statute.

As directed, FECM is providing $19 million of FY 2022 funds for Unconventional Field Test Sites through Funding Opportunity Announcements (FOA), as shown below.

- Approximately $11 million will be used to complete funding requirements for the existing field test sites (8 remain that require funding, 5 of these remaining field test sites are focused on enhanced oil recovery EOR).
  - Of the 5 existing EOR field test sites, two are EOR projects in the Bakken Formation. One project is the "Field Pilot Test of Foam-Assisted Hydrocarbon Gas Injection in Bakken Formations" with a total of $8 million in DOE funding. The other is the "Bakken Rich Gas Enhanced Oil Recovery" project with a total of $5 million in DOE funding.
- The remaining $8 million will be used to fund additional Unconventional Field Test Site projects under a new FOA that is under development.

Q2. Funding for the Office of Fossil Energy and Carbon Management for the research, development, and demonstration of Solid Oxide Fuel (SOFC) systems and fossil-derived hydrogen, including from coal, is essential to utilizing our abundant domestic resources as efficiently as possible with low or near-zero carbon dioxide emissions. The FY 2023 budget proposes to significantly reduce SOFC funding to $5 million.

Given the role SOFC systems can play to support efficient power production, what is the Department's rationale for decreased funding in FY 2023?

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A2. Starting in FY 2020, DOE has prioritized Solid Oxide Electrolysis Cell (SOEC) technology for hydrogen production to complement Solid Oxide Fuel Cell (SOFC) technology for power production. While SOEC and SOFC technologies have similar materials, cell manufacturing and stack design, but function differently, developing reversible solid oxide technologies to either produce electricity (R-SOFC) or produce hydrogen (R-SOEC) depending on grid conditions would give operating flexibility to enable solid oxide technology to match temporal and regional needs for clean power generation or clean hydrogen production. FECM made awards for both SOFCs and SOECs totaling $25 million in FY2020 and $30 million in FY2021, and results of these awards will inform future FOAs.

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QUESTIONS FROM SENATOR ANGUS S. KING, JR.

Q1. I was encouraged to hear about your discussing, at an April 28th hearing in the House of Representatives, the importance of expanding and enhancing our nation's electric grid to support the transition to renewable energy resources. The Grid Deployment Office's work on planning for an interregional offshore grid is of particular interest to Maine and other states along the Atlantic seaboard which expect to deploy significant offshore wind resources in coming years.

Q1a. What are some of the benefits of building a backbone offshore grid to connect wind projects along the east coast?

A1a. The primary benefits are in cost-savings, system reliability, and reduced environmental impact. The alternative to an offshore backbone or other shared transmission topology would be a plethora of radially connected generator tie lines up and down the coast. Generally speaking, constructing these small radial lines means more construction activity, more environmental disturbance, more beach crossings, and higher cost per megawatt of capacity. Additionally, an offshore backbone would increase the reliability and north-south power transfer capabilities of the existing onshore transmission system.

Q1b. What are the impediments the Department has identified in the creation of a unified grid? What does DOE need to continue development in this area?

A1b. The transmission system along the East Coast is split over many different owners, operators, and jurisdictions. No single centralized planning body has the authority or knowledge to design a unified grid plan for the entirety of the East Coast. Allocating costs equitably over so many bodies of ratepayers within different States and Regional Transmission Organizations (RTOs) will also be a challenge.

Q1c. What does DOE need to continue development in this area?

A1c. DOE already has started significant work in this area, primarily through the Atlantic Offshore Wind Transmission Study and related stakeholder convening efforts. The FY 2023 budget request for Interregional and Offshore Transmission Planning for the Grid Deployment Office includes funding that will be essential to continue these efforts and expanding them to other regions of the United States.

Q1d. What DOE's role in the development and management of such a project?

A1d. DOE has a critical role to play in overcoming barriers and deadlocks in the project planning and siting processes. DOE is convening stakeholders across regional and State lines to engage in the planning of

such a project. We are also engaged in study and R&D work to answer the technical implementation challenges. Going forward, DOE can apply available funding and financing mechanisms to assist with development costs or designate national interest electric transmission corridors, if needed, to further the development of an offshore wind transmission solution for the Atlantic Coast.

Q1e. Would DOE be likely to be directly involved with project development?

A1e. It is unlikely that DOE would design, own, or operate an offshore backbone or other shared transmission topology off of the East Coast. It is, however, very likely that any such system would leverage DOE's research and planning recommendations. Further, DOE's ability to provide funding or financing would necessitate a high level of involvement with the project development.

Q1f. Would a Power Marketing Administrations model provide value for such an offshore grid build out?

A1f. The value of a new Congressionally authorized Federal power marketer solely for offshore wind is unclear. Assuming the concept is to market offshore wind power and/or build transmission to transmit that offshore wind to end users, a new Federal power marketer would not change the way in which power is marketed, interconnected, and transmitted in electricity markets.

Currently, offshore wind developers have the same open access to request interconnection and purchase transmission services from existing transmission providers. Offshore wind developers also may engage merchant transmission providers to explore specific point to point transmission service. Any of these transmission requests and services would be subject to established regulatory open access transmission tariff study requirements and other rules.

A federally authorized power marketer also would not change the significant challenges with permitting and constructing transmission. The current Power Marketing Administrations (PMAs) that own and operate transmission experience the same challenges as any other transmission operator or developer. In addition, any Federal power marketer's proposed project would be a Federal action subject to National Energy Policy Act (NEPA) review and other environmental and historic preservation reviews.

Finally, as is the case with any merchant power producers and the current PMAs, any offshore wind marketer also would need to have power purchase agreements with end users.

Consequently, the value of a new Federal power marketer for this purpose is unclear and potentially unnecessary, depending on further study given specific circumstances.

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QUESTIONS FROM SENATOR JAMES LANKFORD

Q1. I was pleased to see that the Department of Energy included in its fiscal year 2023 budget request a request for funding for the Title 17 loan guarantee program to support critical minerals projects. The request states that the funding will be to "support the full range of projects under Title 17." We have heard time and time again that financing is a significant challenge to overcome for critical minerals development and processing projects.

Q1a. Secretary Granholm, should funding be made available for this purpose, are you committed to working with industry to use this authority to the fullest extent possible?

A1a. The FY 2023 Budget supports the Administration's objectives by bolstering deployment of domestic clean energy projects through newly expanded authorities in the Bipartisan Infrastructure Law (BIL). This includes supporting eligible projects that bolster the domestic critical minerals supply chain. While BIL authorities expanded the types of projects that could be considered for financing, it prohibited the Loan Programs Office (LPO) from using existing loan authority to finance such projects. The FY 2023 Budget requests authority to use the existing funds to support these expanded activities by proposing, in the Department of Energy General Provisions language, to amend and contravene the BIL provisions that prohibit using existing Title 17 loan authority for projects eligible under the expanded authority.

The Department is committed to working with a range of eligible borrowers to the fullest extent possible to make use of the expanded authority under the Bipartisan Infrastructure Law, should new appropriations be made available for these purposes or should the BIL provisions that prohibit using existing Title 17 loan authority for projects eligible under the expanded authority be contravened, as requested in the FY23 Budget. In support of that effort, the FY 2023 Budget Request supports LPO outreach activities that focus on attracting quality applications into the Title 17 applicant pipeline and moving these applications through conditional commitment to financial close.

Q1b. Should the Department receive funding to support minerals projects through this program, what areas along the supply chain do you expect to be a priority for this funding?

A1b. Critical minerals, such as lithium, cobalt, and graphite, and rare earth elements are used as materials within advanced batteries for electric vehicles as well as other technologies across the energy supply chain. Through the Title 17 Innovative Energy Loan Guarantee Program, LPO may support eligible efficient end-use energy technologies, such as processing, recovery, or recycling of critical materials

projects that satisfy the requirements of Title 17. In general, to be eligible under Title 17, critical minerals projects must utilize innovative technology and avoid, reduce, utilize, or sequester greenhouse gas or air pollutant emissions, as well as meet other Title 17 criteria.

Q2. Secretary Granholm, at the Energy Committee's hearing to review the Department of Energy's budget request, we discussed a recent JP Morgan publication that projected a $720 billion capex deficit over the next ten years in the fuels sector. In light of the Energy Information Agency's projection that demand for oil and gas will continue to increase over the next 30 years, and keeping in mind the permitting timelines for renewable projects and projects that support those technologies like minerals development and transmission lines, JP Morgan's assessment is notable.

- If a fuels capex deficit materializes in the coming years, do you expect there will be consequences for energy affordability or reliability due to a supply/demand imbalance?

A2. The availability of reliable and affordable energy supplies is critical to our nation's economy and well-being. DOE has a significant role in ensuring that the current fossil fuel-based system transitions reliably and cost-effectively to a net-zero energy system, and that impacts on consumers, workers and domestic industry are minimized. The Department recognizes the need to take a comprehensive approach and that natural gas, coal, and oil are important energy sources today and will continue to serve an important role going forward as complements to renewable energy. DOE must also take care to carefully manage the greenhouse gas emissions that are subsequently produced upon the use of fossil fuels to meet our energy needs.

This includes critical decarbonization efforts that can include retrofitting gas-fired power plants with carbon capture and storage, building up supplies of carbon-neutral hydrogen, and mitigating methane emissions from oil and gas production.

Q3. The JP Morgan publication reference above suggested that the capex deficit in the fuels sector is driven in part by "an uncertain regulatory outlook for fossil fuels." While DOE is often not the primary regulatory and permitting agency for many of these projects, the Department is charged with addressing our nation's energy challenges and working with partner agencies to share expertise.

- Secretary Granholm, do you believe there are permitting and regulatory challenges associated with developing new oil and gas projects and infrastructure?
    - If yes, what is the Department doing to encourage partner agencies to address these challenges?

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A3. While the permitting process for oil and gas production takes time, State and Federal permitting regulations are designed to ensure that that oil and gas production can occur in manner that protects human health and the environment. DOE has long-standing interactions with the U.S. Department of the Interior and with States, through the Interstate Oil and Gas Compact Commission and other forums, to understand emerging and common challenges and provide research that can help inform regulations and to provide cost-effective technologies that allow operators to comply with those regulations.

Q4. The Consolidated Appropriations Act, 2022 (P.L. 117-103), included a requirement for the Department to "support research and development to advance safe and effective alternatives to SF6 [sulfur hexafluoride], including in circuit breakers, reclosers, sectionalizers, load break switches, switchgear, and gas insulated lines." Please provide an update on the status of this work.

A4. ARPA-E has initiated a dedicated topic on a "Sulfur Hexafluoride-Free Grid." On October 5, 2021, ARPA-E announced over $9 million in awards for technologies that reduce or eliminate SF_6 usage in the power system.

The Office of Electricity's Transformer Resilience and Advanced Components (TRAC) program supports SF_6 reduction. TRAC conducts basic materials research in advanced conductors for transmission cables; applied materials research to address converter component limitations for high-voltage, high-power applications; and research and development into solid state power station (SSPS) converter building blocks that can be used in power flow controllers, solid-state transformers, and solid-state circuit breakers, all of which can provide alternatives to and help reduce the need for SF_6-filled equipment. TRAC has not directly addressed SF_6 material alternatives because a dedicated activity would be too expensive to fit within the $4 million of undirected funds provided in the FY 2022 appropriation for TRAC.

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QUESTIONS FROM SENATOR BILL CASSIDY

Q1. In January, you traveled to Mexico to meet with President Obrador. As you know, President Obrador is in the midst of criminalizing U.S. investment in Mexico. The Mexican government is doing many things to disadvantage international investments from U.S. companies in order to advantage PEMEX and CFE, the federal electricity commission. The Administration has spent a lot of time raising concerns with various officials. But I don't think the Mexican government or the Mexican President cares about the U.S.' concerns so am worried that any progress made from your trip may be lost. It is clear follow-up from your trip in January along with more tangible actions is needed to confront Mexico on their energy assault and defend the interests of U.S businesses. What type of actions do you believe may be necessary in order to re-open U.S. facilities that have been wrongly closed by the Mexican government simply because they are competing with state owned enterprises?

A1. I understand and share your concerns with Mexico's recent actions in the energy sector and remain committed to ensuring fair treatment for U.S. companies, investors, and exporters. On my trip to Mexico City last January, I conveyed these concerns in both public and private meetings, which I feel contributed to the defeat by the Mexican Congress of the proposed energy constitutional amendment. Since that visit, the U.S. Embassy in Mexico City has worked to facilitate 17 meetings between companies and President Lopez Obrador, which I understand has advanced some of the particular issues raised by companies. DOE will continue to work on these issues.

Q2. How is the current situation with AMLO and his posture towards energy influencing whether you approve any LNG export licenses for U.S. operated facilities in Mexico but require the Department to issue an export license?

A2. There are currently two pending non-free trade agreement (FTA) applications for exports of U.S. natural gas from proposed liquefaction facilities in Mexico. DOE cannot comment further since these applications are still pending.

Q3. The definition of clean hydrogen in the infrastructure bill is defined as hydrogen produced with a carbon intensity equal to or less than 2 kilograms of carbon dioxide-equivalent produced at the site of production per kilogram of hydrogen produced. Key to this definition is "at the site of production" or within the fenceline in the production of hydrogen. However, the Request for Information for the Hydrogen programs contains a questions related to whether to consider outside the fenceline emissions a part of the of clean hydrogen. Do you plan to override the definition of clean hydrogen that Congress has authorized in attempting to implement the hydrogen hub program?

A3. DOE has taken careful note of the language and requirements in section 40315 and is working to define system boundaries that allow the multiple requirements stipulated in the statute to be met. DOE is

consulting with EPA as specified in the BIL. Since stakeholder feedback is required in the BIL, DOE sought comments on the details of how to implement the wording of the statute through the RFI process. DOE recognizes the key terminology in the BIL - "at the site of production" - and will be issuing a guidance document shortly in advance of the rulemaking process. DOE will be pleased to share further details when complete, which is expected in the near future.

Q4. Following the passage of the infrastructure bill last year, the Department of Energy launched an initiative called the "Clean Energy Corps" to hire new staff to help implement the programs in the infrastructure bill. As a part of this initiative, instead of utilizing the traditional USA jobs portal, DOE decided to create its own jobs portal with its own list of considerations, qualifications, and questions for hire. The website for Clean Energy Corps touts this new hiring process as a "streamlined process." However, I and my office have heard from multiple staff at DOE that this process has become an unmitigated disaster. That hiring is more difficult, that very few people have been hired, and that implementation of the infrastructure bill has been languishing because of unnecessary roadblocks the DOE has created in hiring new staff. What was behind the decision to institute a new hiring process instead of using the existing hiring infrastructure?

A4. DOE is using its direct hire authority to recruit the best and most skilled personnel available to implement the numerous provisions of this historic legislation. The Clean Energy Corps portal allows program leadership to review and assess applicant resumes, prior to the job posting in conjunction with USAJOBS. This results in a more streamlined application process which allows applicants to align their talents with their passion by indicating specific areas of interest and allow hiring managers throughout the agency to review applicant resumes simultaneously. Given the need to bring new and interconnecting skillsets to the agency, DOE has worked to give hiring managers the greatest degree of freedom to identify the most qualified candidates.

Q5. Of the proposed 1,000 new staff the Administration stated they wanted to hire as a part of the Clean Energy Corps, how many have been hired in the 6 months since the signing of the infrastructure bill?

A5. As of August 25, 2022, 266 selections have been made.

Q6. Do you worry that the lack of ability to hire new staff quickly and efficiently risks squandering the opportunity Congress provided the DOE in the infrastructure bill?

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A6. We agree that we need to fill key roles as expeditiously as possible and are grateful that Congress provided additional direct hiring authority in the Bipartisan Infrastructure Law. It is also critical that DOE hires the most skilled and suitable professionals so that this historic funding is executed in a manner that fulfils the needs of the American people to meet the Administration's goals of delivering clean affordable energy, creating quality jobs, and delivering benefits to all communities across the country, including those communities frequently left behind. These new hires with specialized capabilities will ultimately be managing large-scale demonstration and deployment programs aimed at bringing technologies to the market.

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QUESTION FROM SENATOR MARK KELLY

Q1. Please provide a written response explaining how the Department of Energy will certify that no oil service company operating in Russia is involved in the production or transportation of oil that is stored the Strategic Petroleum Reserve.

A1. The Strategic Petroleum Reserve (SPR) will adhere to all laws, international obligations, and regulations related to the crude oil bought to help replenish the SPR and the transportation of SPR crude oil. However, the SPR only controls the type of crude oil bought (i.e., its specific chemistry, such as sulfur content) for the SPR and the distribution of the SPR to our various distribution points. Once custody of the SPR crude oil is transferred to a third party, the SPR has no claims on where it goes from there.

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QUESTIONS FROM SENATOR CINDY HYDE-SMITH

Q1. What is the Department of Energy doing in its FY23 budget proposal to better support the expeditious development and production of lithium battery technology to scale up the domestic battery supply chain?

A1. The Vehicle Technologies Office's FY 2023 Budget Request supports key efforts that contribute to achieving its high-level goals in Advanced Battery R&D. This includes R&D in support of batteries for EVs and across clean energy applications, including the Energy Storage Grand Challenge, identifying new battery chemistry, and cell technologies with the potential to reduce the cost of battery cells. Activities will focus on scaling up recycling technologies and promising near-term approaches; the scale-up of lithium battery technologies such as no-cobalt/no-nickel cathodes, lithium anodes, and solid-state systems to reduce constraints from scarce materials; technologies that can enhance environmental sustainability; and the development of a U.S.-based circular lithium battery supply chain.

Q2. How is the Department providing funding for solid state lithium metal battery storage demonstration projects for energy storage projects that are U.S.-controlled, U.S.-made, and North American sourced and supplied?

A2. OE was appropriated $20 million in the Energy and Water Development and Related Agencies Appropriations Act, 2022, to support U.S.-controlled, U.S.-made, and North American sourced and supplied energy storage projects, including large-scale development and deployment of long cycle life, lithium grid-scale batteries and their components. On May 12, 2022, DOE released a Request for Information (RFI) on the Long Duration Energy Storage for Everyone, Everywhere (LD ESEE) initiative, which sought information on the Department's efforts to implement Bipartisan Infrastructure Law (BIL) section 41001 authorized appropriations.[21] As outlined in the RFI, given the similar project size (capacity and cost) required from the large-scale demonstrations specified in both BIL section 41001(a) and the 2022 Energy and Water Development appropriation, DOE intends to include this funding within the upcoming solicitation for Energy Storage Demonstration Projects (Demo Projects).

The Demo Projects will enable first-of-a-kind technologies at utility scale by mitigating technology risk in large-scale demonstrations, and the FY 2022 appropriation will support the BIL investment with an

[21] https://www.energy.gov/oe/articles/long-duration-energy-storage-everyone-everywhere-initiative-notice-intent-and-request

additional demonstration that is U.S.-controlled, U.S.-made, and North American sourced and supplied. The Department will ensure these related storage demonstration investments are coordinated and avoid duplication.

Q3. Is the Department prioritizing battery technology that is compatible with next-generation cathodes, including nickel and cobalt-free cathodes, and technologies that use no lithium? If so, how?

A3. DOE is continuing to develop next generation cathodes reducing critical materials in batteries and eliminating them altogether using economically recoverable materials for lithium-based batteries. While these technologies are still in the developmental stage, there is a strong potential for these technologies to drastically reduce next-generation EV dependance on critical materials. The Department has and continues to support development of non-lithium-based energy storage technologies that utilize abundant materials such as sodium, carbon, iron, and concrete. As part of the Long Duration Storage Shot, implemented through the Energy Storage Grand Challenge, DOE is examining many storage technologies, including electrochemical, electromechanical, and thermal technologies that can serve in long-duration applications and utilize abundant materials with secure supply chains.

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QUESTIONS FROM SENATOR JOHN W. HICKENLOOPER

Q1. Recently authorized and created, the Office of Clean Energy Demonstrations (OCED) is charged with supporting emerging clean energy technologies, demonstrating them at scale, and moving them towards commercialization. OCED will be overseeing many programs that were already authorized in the Energy Act and the Bipartisan Infrastructure Law. Can you speak to the types of technologies and projects the office will be pursuing, and how to ensure the avoidance of overlap, but rather coordination with, ongoing Energy Act and Infrastructure projects?

A1. The Office of Clean Energy Demonstrations (OCED) is a technology-neutral office that serves as a project management and oversight center of excellence, implementing key multi-billion-dollar demonstration projects funded via the Bipartisan Infrastructure Law (BIL) that will unlock follow-on investment from the private sector to deploy these technologies on a large scale. OCED supports demonstration projects that have viability at scale and an expectation of achieving cost competitiveness and bankability in the market over time. OCED investments are part of a clear progression and transition between the research, development, and laboratory and pilot-scale demonstration projects within DOE technology offices and initial commercial-scale deployments supported by the private sector or other programs, such as the Loan Programs Office. OCED funding decisions are made to support scalable outcomes that lead to commercialization and deployment.

The FY 2023 Budget supports implementation of BIL-funded demonstrations in a variety of technology areas, including the Carbon Capture Demonstration Projects Program, Carbon Capture Large-Scale Pilot Projects, Industrial Emissions Demonstration Projects, the Clean Energy Demonstration Program on Current and Former Mine Lands, Activities for Energy Improvement in Rural and Remote Areas, the Energy Storage Demonstration Pilot Grant Program, the Long-Duration Energy Storage Demonstration Initiative and Joint Program, the Regional Clean Hydrogen Hubs, the Program Upgrading Our Electric Grid and Ensuring Reliability and Resiliency, and the Advanced Reactor Demonstration Program (ARDP). OCED is coordinating with DOE's applied offices, such as the Office of Fossil Energy and Carbon Management and Office of Energy Efficiency and Renewable Energy, to ensure that overlap with ongoing Energy Act and Infrastructure projects is avoided.

The FY 2023 Budget also requests $150 million in annual appropriations for OCED to initiate a new competition that will support the continued development of a technology-neutral portfolio of projects

alongside its BIL-funded work. This new competition will support commercial-scale projects that demonstrate technologies that integrate renewable and distributed energy systems with broader energy networks. Example topics include demonstrations that de-risk technologies needed to manage variable generation, control flexible loads, or integrate energy storage electric vehicle charging and other facilities into the U.S. transmission and distribution grids; and demonstrations of innovative hybrid generation systems, among other areas. Such investments will complement, but not duplicate, the demonstration efforts supported under BIL. The proposed competition supports OCED efforts to further fill a critical innovation gap alongside BIL investment.

Finally, the FY 2023 Request will continue to support the ARDP as the oversight of this program is transferred to OCED from the Office of Nuclear Energy. FY 2023 funding will enable OCED to provide additional project management and technical oversight of ARDP. While the BIL provided significant funding to support the two cost-shared awards, annual appropriations are necessary for DOE to fully fund the likely federal contribution for later phases of two projects: the Natrium Reactor and the Xe-100 Reactor.

Q2. The DOE has committed to using our National Labs as testbeds for demonstrating how to take existing infrastructure to net zero. The Net Zero Labs Initiative proposed by the DOE includes NREL in my state, as well as national labs in Senators Manchin, Cantwell, and Risch's states, as pilot sites for this effort. This program will undoubtedly present many opportunities for these labs to become leaders in a resilient, cleaner future. Can you elaborate on this initiative and potential impact beyond the National Labs?

A2. In FY 2023, FEMP will launch the Net-Zero Labs Initiative (NZL) Pilot, with the goal of competitively selecting decarbonization projects across the National Laboratories. DOE Labs are energy-intensive research facilities with substantial 24/7 energy demands. DOE labs face challenges in all the major sectors of emissions: facilities, industry, transportation, and even agriculture. The NZL initiative will demonstrate major advancements in all sectors, and use technology innovations and partnerships, increased efficiencies, and novel approaches to demonstrate the path forward for establishing a clean energy economy. Several labs, including the National Energy Technology Lab, Idaho National Laboratory, National Renewable Energy Laboratory, and Pacific Northwest National Laboratory have already initiated in-depth analyses of how to transition to net-zero emissions while leveraging resident expertise and innovations progressing through their research and development portfolios. NZL

highlights the Department's commitment to bringing innovative decarbonization and electrification technologies into the marketplace and underscores the importance of resilient, efficient and secure infrastructure that provides the foundation for energy savings and mission assurance across the Federal government while putting a spotlight on the pathway to a clean energy economy. The Department is working to ensure private-sector partnerships are part of the program and that the program is designed to share lessons learned that can support private-sector efforts to address some of the most challenging aspects of building a fully net-zero-carbon economy.

Q3. Direct air capture is an important technology that can help remove legacy emissions, which we're going to need to do even if we stop emitting today. If we are going to get to the gigaton scale by mid century, we need to get to or near the ten megaton scale this decade. What is the Department of Energy doing to help deploy direct air capture technologies this decade, and how are different offices coordinating?

A3. The Department of Energy (DOE) is supporting a range of direct air capture (DAC) innovation efforts, including funding four megaton-scale DAC hubs this decade. DOE also funds two DAC prize programs, as well as a number of early-stage innovation efforts. DOE is coordinating DAC innovation efforts across Offices via the Carbon Negative Shot initiative launched in November that is managed by the Under Secretary for Science and Innovation. Additionally, the Office of Fossil Energy and Carbon Management (FECM) is collaborating with other DOE program offices on these following efforts:

- The Office of Clean Energy Demonstrations (OCED) on demonstrations;
- The Office of Science (SC) on early-stage innovation;
- The Advanced Research Projects Agency-Energy (ARPA-E) on breakthrough projects; and
- The Office of Energy Efficiency and Renewable Energy (EERE) and the Office of Nuclear Energy (NE) on integration of low- or zero-carbon energy sources for DAC technologies.

DOE looks forward to collaborating with Congress, private sector stakeholders, and other governments entities to provide technical support on additional proposals designed to scale DAC technologies and business models with equity, environmental protection, and high-quality job creation to meet climate goals and deliver benefits to communities across the U.S.