

**THE PRESIDENT'S BUDGET REQUEST
FOR THE U.S. DEPARTMENT OF
ENERGY FOR FISCAL YEAR 2025**

HEARING
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED EIGHTEENTH CONGRESS
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TUESDAY, APRIL 16, 2024

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

The Committee met, pursuant to notice, at 10:01 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. I would like to start by welcoming my friend, Secretary Jennifer Granholm, who is here today to discuss the President's Fiscal Year 2025 budget request for the Department of Energy. Thank you for being here today, Secretary.

As Chairman of this Committee and Senator from one of America's energy powerhouses, it has been incredible to witness how transformative the Bipartisan Infrastructure Law and the Inflation Reduction Act have been so far. We are more energy independent today than we ever have been, and we're producing more energy cleaner than ever before. In 2023, the United States produced a record 38 trillion cubic feet of gas, a record 4.7 billion barrels of crude oil, a record 238 million megawatt-hours of solar power, and a record 6.4 gigawatts of new batteries installed on the grid. That's the type of all-of-the-above energy production that we need as a country and that we aspire to have.

Now, these laws were also crafted with the goal of securing our energy supply chains and using innovation rather than elimination to reduce emissions. I fully believe that when it comes to goals or regulations, if it's not feasible, it's not reasonable, and there are a lot of technologies that have received minimal federal support in the past that could help reduce emissions that could use a boost. A great example is hydrogen, which we heavily invested in through both of those laws. Since we last had Secretary Granholm here, the Bipartisan Infrastructure Law's Hydrogen Hubs were announced, which will benefit 16 states and attract more than \$40 billion in private investments. West Virginia is proud to be part of the ARCH2 Hub, but the impact of these bills for West Virginia and America doesn't stop there.

Instead of being left out, as our energy mix evolves, traditional energy communities are going to play a major role in our energy

future and investments in new energy manufacturing facilities. This includes brand new projects like Form Energy's iron-air battery plant in the legacy steel town of Weirton, West Virginia, which is supported by the advanced manufacturing tax credits from the IRA. It also includes upgrades and improvements for existing facilities, like the Constellium plant in Ravenswood, West Virginia, which has received \$75 million from the IRA and Bipartisan Infrastructure Law to help them decarbonize.

And it's not just West Virginia. For example, the IRA has enabled DOE to guarantee a loan for the first-ever restart of a nuclear power plant, the Palisades plant in Michigan, which will provide dispatchable and clean power to meet our country's growing energy demand. The IRA has also mandated federal offshore oil and gas leasing to continue, and as a result, we have received the most bids for offshore leases since 2014 and generated more than \$600 million in revenues to help reduce our debt. And since America's offshore oil and gas production has among the lowest greenhouse gas emissions in the world, these projects will displace dirty fuels produced elsewhere. These bills created a lot of opportunity, which is why I am so frustrated about the numerous ways the Administration is trying to reinvent them to fit their political agenda in picking winners and losers, the law be damned.

Last year, we talked a lot about EV tax credits, which had been revamped in the law to secure supply chains and very quickly watered down by the Administration in an effort to bribe consumers. No sane person can compare the letter of the law and the proposed guidance and see it any other way. And unfortunately, we are already seeing the impact of these deviations from the law. Last week, Treasury announced that they have reimbursed more than \$580 million for EV tax credits so far this year, which is well beyond the \$451 million CBO projected for all of the year 2024. But we've talked a lot about how frustrated I am about that and the detrimental impact I believe it will have on our national security to have our transportation sector beholden still to China.

Let me raise an issue that has happened since the Secretary was here last year—the new unworkable requirements for the hydrogen industry to be eligible for tax credits that were invented out of thin air. These were things we never heard of. Adding on these, which are “additionality,” “hourly matching,” and “geographic proximity”—the requirements could be a death blow to this critical new sector, and you won't find those words in the law anywhere. Where you will find them is in a letter sent to the Administration by the climate groups who want to see hydrogen fail. Meanwhile, the Administration is also distorting the rules to give an extra 10 percent in tax credits to offshore wind projects located in the ocean by making the bogus argument that they are in a legacy energy community. I don't think there's any coal communities in the ocean that were supposed to get the extra 10 percent to try to reinvigorate their economy. So, on the one hand, the Administration is trying to liberalize the credits for the selected technologies that the left-wing activists want, and at the same time, they are trying to limit the credits for technologies they don't like, such as hydrogen, carbon capture, and domestic mining.

To make it worse, they are doing all of this as proposed rules—and I think we’ve spoken about proposed rules—so that they can avoid any legal action against them to rectify the situation when they put out the permanent rules. Unless they change course, we’re missing a tremendous opportunity to realize the full promise of these bills. I bring this up today because while the implementation of these tax credits is technically being done by Treasury, the Department has been working closely with Treasury and playing an important role in developing the guidance. And I implore you to please step in and fix the craziness before it’s too late.

Now, the tax credits aren’t my only concern. The Administration has put a political pause on LNG export permitting—at a time when U.S. natural gas prices are as cheap as ever—before doing any analysis on whether our growth in exports will actually outpace our reserves or how this will impact our allies abroad and our own economy. I believe that studies must be done to make sure that Americans aren’t paying a premium while companies are making a bigger profit by exporting, but making decisions to appease activists without any data to back them up is just not how our government should work. DOE has also tried to rush a transition to efficiency standards that put U.S. manufacturing at risk. But I was very glad to see that DOE backed off its original proposal for distribution transformers and move to a standard similar to that which I proposed in a bipartisan bill with Senators Brown, Cruz, and others.

But of course, we’re here today because of the President’s budget request for Fiscal Year 2025. I would be remiss if I did not register my grave concerns about our nation’s growing debt and the larger consequences if we don’t get our spending in check. The Department of Energy’s budget request has a 2.3 percent increase over the 2024 levels. So I look forward to discussing how to ensure the Department has the resources it needs to stay on the forefront of energy innovation and bolster our energy security without spending beyond our limits. Within the request, I was pleased to see funding proposed for several priorities that are important to my State of West Virginia and to a lot of other of our colleagues here on the podium. This includes \$385 million for the Weatherization Assistance Program, which I know is important in all of our states; \$900 million for DOE’s Office of Fossil Energy and Carbon Management; a \$3 million increase for the Interagency Working Group on Coal and Power Plant Communities; and continued support for the National Energy Technology Laboratory, which is NETL, located in Morgantown. These are important because they keep West Virginia on the cutting edge of innovation while ensuring no one is left behind.

Secretary Granholm, I appreciate you being here today to discuss the issues that are important to all of us. And we may not always see eye-to-eye, but we have always been friends, and we always will be. And I have so much respect for you and the work that you and your Department has always been accessible to work with. I look forward to hearing your perspective on these issues.

With that, I am going to turn to our Ranking Member, my friend Senator Barrasso, for his opening statement.

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

Senator BARRASSO. Well, thanks so much, Mr. Chairman. Thanks for holding the hearing. Secretary Granholm, welcome back to the Committee.

You know, looking at America's energy sector, there's some really good news, and there's also plenty of bad news. The good news to me is that in 2023, America pumped a record amount of oil and natural gas. A normal Administration would be cheering record production, but not this one. No, no, boasting about record production of oil and gas would offend the climate lobby in an election year, so the Administration chooses not to take credit for something. And there's another reason that President Biden has kept quiet—because he knows that we're producing a record amount of oil and natural gas despite him, not because of him. The credit belongs to the innovators, the risk takers, the roughnecks in my home state of Wyoming and elsewhere. They are the people who in 2019 made America energy independent for the first time in 70 years.

And how did Joe Biden celebrate their achievement? Well, as a candidate, he threatened to throw them out of work. As President, he's killed pipelines, he's canceled lease sales, rescinded existing leases, slow-walked permits, and blocked access to more and more of America's energy resources. Meanwhile, this President has failed to enforce sanctions on Iran and has waived sanctions on Venezuela. This is a disgrace. The reason that we had record production in 2023 has nothing to do with Joe Biden. It is because more of our energy is produced on private lands and state lands. There, the producers don't need permission from Washington to drill. You know, in 2005, about 68 percent of our oil and 62 percent of our natural gas was produced on private and state lands. Today, those numbers have increased dramatically. It's 75 percent of our oil and 90 percent of our natural gas that are produced on private and state lands. So, while oil production is at a record high, we actually should be producing even more. In 2020, the year before Joe Biden took office, the Energy Information Administration predicted that production would be 14 million barrels a day by 2023. Well, we actually produced 1.1 million barrels a day below that forecast in 2023.

When it comes to the production of oil and gas on federal lands, we're living on borrowed time. We have been able to maintain output thanks to production on leases that were issued before Joe Biden became President. In fact, the Biden Administration has offered the fewest onshore acres for lease of any Administration since the end of World War II. The outlook offshore isn't any better. In 2022, the Administration canceled three lease sales in the Gulf of Mexico and in Alaska. After Congress restored those sales, the Administration did all it could to make the leases unattractive to bidders. Then, the Administration issued a five-year offshore plan with the lowest number of sales in history. This isn't just incompetence, it's an ideological effort to choke off American energy production.

So what does it all mean? It means that Joe Biden is setting America up for a fall. It means that if we don't reverse the Presi-

dent's policies, it will be difficult to maintain American oil and natural gas production in the years ahead. But we don't have to wait years to know the effects of President Biden's decisions. American families are feeling the pain right now. This chart shows how much energy prices have increased since Joe Biden has become President, since he's taken office.

[The chart referred to follows:]

CHANGE IN ENERGY PRICES

Jan. 2017- Mar. 2020 Jan. 2021- Mar. 2024

-2% ↓	Gasoline	↑ 48%
-2% ↓	Natural Gas	↑ 27%
-3% ↓	Home Heating Oil	↑ 44%
3% ↑	Electricity	↑ 29%
0%	<u>Total Energy</u>	↑ 39%

Senator BARRASSO. It shows what happened four years ago between 2017 and 2020—March 2020—under President Trump. Gasoline prices down. Natural gas prices down. Home heating oil prices down. Electricity prices up only three percent. Total energy cost unchanged. January 2017 to March 2020, under President Trump. In every case, prices are not only worse under Biden, they are significantly worse. Gasoline up 48 percent. Natural gas up 27 percent. Home heating oil up 44 percent. Electricity up 29 percent. Total energy costs up 39 percent since Joe Biden has come into office. This is a record failure. This is why Joe Biden, for one reason or another, is called the President of high prices. Between energy costs and grocery prices, the people of this country are being hurt by this Administration and its policies.

Joe Biden needs to stop playing politics with our energy security. He needs to stop worrying about what the TikTok climate influencers think, and the ones who apparently are driving the energy policy, according to the New York Times, the reports related to how policies are being made at the White House today. The President and his Administration ought to start worrying about how American families are going to pay their bills now, as well as 10 years from now.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator.

And now we are going to turn to Senator Granholm for opening remarks—or Secretary Granholm.

Secretary GRANHOLM. Thank you so much for the promotion.

The CHAIRMAN. A lot of us would probably like to change.

**STATEMENT OF HON. JENNIFER M. GRANHOLM,
SECRETARY, U.S. DEPARTMENT OF ENERGY**

Secretary GRANHOLM. Chairman Manchin, Ranking Member Barrasso, and members of the Committee, I am honored to be with you again today to discuss President Biden's latest budget request for the Department of Energy. Three years ago, I joined this Administration believing that if America could come together around a national energy strategy that we could restore manufacturing, that we could create jobs, that we could address climate change, and we could lead the world in clean energy. And today, we are doing just that. America is back. Thanks to Congress's efforts and the President's vision, we are executing a focused, deliberate strategy that positions us to become energy independent and secure. The strategy positions our businesses to dominate, our workers to compete, and our communities to thrive. And it is already working. Since the passage of the Bipartisan Infrastructure Law, companies have announced 600 new or expanded clean energy manufacturing plants on American soil, nearly \$200 billion in planned investment for batteries, for electric vehicles, for solar, wind, nuclear, and more. Tens of thousands of jobs being created from Anchorage to Atlanta, from Louisiana to Las Vegas, from Wyoming to Weirton, West Virginia, and everywhere in between, thanks to the Bipartisan Infrastructure Law and the Inflation Reduction Act.

Sustaining such growth, though, requires us to complement that historic funding with durable, long-term investments. So we're grateful for a Fiscal 2024 year that appropriates more than \$50 bil-

lion for the Department. The President's budget request for Fiscal Year 2025 will empower us to make even greater progress. Our commercialization tools are giving American businesses the confidence that they need to capitalize on this moment while deepening our energy security. But deepening our energy security is an ongoing project and we need to fund it year over year. And that's why the budget calls for significant appropriations for our demonstration and deployment programs, including our Office of Manufacturing and Energy Supply Chains and our Grid Deployment Office. We're also making sure every community can benefit from reliable, affordable clean energy and efficiency technologies. DOE does this, for example, through, as the Chairman noted, our Weatherization Assistance Program, which Congress granted transformational funding to in the Infrastructure Law. I have seen personally, firsthand, how that program changes lives, as well as, I have seen the overwhelming need for it. The budget will bring us closer to meeting that need for 40,000 more low-income households. It also dedicates funding for our Interagency Working Group on Coal and Power Plant Communities, and I have seen firsthand how that, too, gives communities the gift of rebirth. It instills pride for the workers who defined America's energy past and will help to power our future.

It's not just energy workers—after decades of disinvestment, we are finally rebuilding our manufacturing base and developing the skilled workforce necessary to power it. We're also planning our future by doubling down on R&D with an \$8.6 billion request for basic science research and \$3 billion for applied R&D. We will make sure each new generation of energy technologies is more innovative than the last, from industrial decarbonization solutions, to geothermal, to fusion. We're also requesting nearly \$2 billion for critical and emerging technologies, like AI and quantum. Both are key to economic competitiveness and defense, and DOE is uniquely positioned to drive them forward. The budget also includes a historic \$25 billion for our National Nuclear Security Administration. Russia's continued war in Ukraine makes nuclear deterrent paramount in our national defense and for the security of our allies. The President's request would give the NNSA the means to deliver and adapt in the face of evolving threats, and it would advance the NNSA's wider priorities around arms control, non-proliferation, counter-terrorism, and the safe use of civil nuclear power.

So thanks to the bipartisan assistance we've received from Congress, America is back. We are the envy of the world, but we cannot afford to lose our momentum, and that depends on your continued support. Thank you for the opportunity to address you today. I look forward to your questions.

[The prepared statement of Secretary Granholm follows:]

Testimony of Secretary Jennifer M. Granholm

U.S. Department of Energy

Before the

Senate Committee on Energy and Natural Resources

April 16, 2024

Chairman Manchin, Ranking Member Barrasso, and Members of the Committee, it is an honor to appear before you today to discuss the President’s Fiscal Year (FY) 2025 Budget request for the Department of Energy (“the Department” or “DOE”).

I want to begin by thanking you all for your work to negotiate and pass an FY 2024 bill that provides critically important appropriations to the Department of Energy. Thanks in no small part to the leaders on this Committee, we have proved to the American people that we can deliver results in an era of fiscal restraint. I am grateful to this Committee and your colleagues throughout Congress for supporting an agency that accomplishes so much for this country.

It is the honor of a lifetime to serve the American people as the 16th Secretary of Energy. The DOE workforce, from headquarters staff to scientists and engineers at the National Labs, is made up of dedicated and driven individuals who are working hard to advance the energy, economic, and national security of the United States. Through transformative science and technological solutions, we are making significant progress to address some of our Nation’s most pressing challenges.

The Department is committed to advancing this Administration’s energy, climate, and nuclear security and nonproliferation goals. I want to thank Congress for the ongoing, bipartisan support for the Department of Energy and I look forward to working closely with the Committee as you consider the FY 2025 budget for DOE.

Budget Topline

DOE proposes \$51 billion in budget authority for FY 2025. This Budget makes historic investments that will help the country lay the foundation to build a clean energy economy, invest in the American people, and ensure the U.S. reaches net-zero emissions by 2050.

This Budget delivers results for the American people by creating jobs and investing in innovation for the energy economy; expanding cutting-edge research at National Laboratories; investing in critical and emerging technologies; advancing critical climate goals including industrial decarbonization; building the clean innovation pipeline; building, maintaining, and modernizing critical national security infrastructure; preventing adversaries from acquiring nuclear weapons; reducing health and environmental hazards for at-risk communities; and bolstering the cybersecurity and resilience of the energy sector. In addition, we have worked hard to focus our budget request on strategic investments, while maintaining our commitment to fiscal responsibility.

Making the United States the leading nation for investing in clean energy.

We are working to create a workforce for the future with the creation of high-quality, good-paying jobs. As we continue to power through this evolutionary period in our history, the Department is focusing on onshoring and reshoring supply chains and turning America back into a manufacturing powerhouse.

The Budget invests \$1.6 billion to support clean energy workforce and infrastructure projects across the Nation, including: \$385 million to weatherize and retrofit homes of low-income Americans; \$95 million to electrify Tribal homes, provide technical assistance to advance Tribal energy projects, and transition Tribal colleges and universities to renewable energy; \$113 million for the Office of Manufacturing and Energy Supply Chains to strengthen domestic clean energy supply chains, and \$102 million to support utilities and State and local governments in building a grid that is more secure, reliable, resilient, and able to integrate electricity from clean energy sources. These investments, which complement and bolster the historic funding in the Bipartisan Infrastructure Law (BIL), the CHIPS and Science Act, and the Inflation Reduction Act (IRA), create good-paying jobs while driving progress toward the Administration's climate goals,

including a 100% carbon pollution-free electricity sector by 2035. Sustaining our early success requires long-term investments in annual appropriations that complement and bolster the historic funding in BIL and IRA.

The Budget provides dedicated funding for the Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization to facilitate a whole-of-government approach to workforce training, community engagement, and identification of Federal resources to spur economic revitalization in the hard-hit energy communities that have powered the Nation for generations.

The Budget includes \$24.1 million for the Office of Technology Transitions to focus on expanding the commercial impact of the Department of Energy's research investments and \$3 million for the Foundation for Energy Security and Innovation that OTT is helping steward.

Ensuring investments provide economic and clean energy benefits in the communities that have been left behind.

We are ensuring that our economy does not neglect historically disadvantaged communities and instead works with them to guarantee an equitable transition. The Office of State and Community Energy Programs includes \$385 million for the Weatherization Assistance Program to weatherize low-income homes. Weatherization programs work with local contractors and trades to improve home performance, which boosts local employment and creates new job opportunities, while uplifting America's most vulnerable families by reducing their annual energy costs by approximately \$372 per household. Among the many benefits associated with weatherization, low-income households experience improved health, safety, and comfort, save money on their monthly energy bills, and reduce their overall impact on the environment by using fewer natural resources.

Similarly, the State Energy Program is requesting \$70 million in FY 2025 for technical assistance to states, territories, and the District of Columbia to enhance energy security, advance state-led energy initiatives, and increase the affordability of energy. This request would provide funding for the Weatherization Assistance Program to support approximately 40,000 residential energy retrofits for low-income households.

The Budget includes \$8.2 billion for the Environmental Management program, reflecting this Administration's strong commitment to clean up and protect communities that supported defense production programs and government-sponsored nuclear energy research, including \$3.1 billion to continue cleanup progress at the Hanford site in Washington. As the largest environmental cleanup program in the world, Environmental Management plays a key role in cleaning the environment, contributing to national security priorities, investing in the future and aiding community efforts to build strong economies, growing jobs, and preparing for a clean energy future. This investment will enable the Department of Energy to treat radioactive tank waste, take down contaminated buildings, ship and dispose legacy waste and clean soil and groundwater.

The Budget also includes \$205 million for the Office of Legacy Management to protect human health and the environment by providing long-term management solutions at over 100 World War II and Cold War era sites where the federal government operated, researched, produced, and tested nuclear weapons and/or conducted scientific and engineering research. The Administration will ensure the investments for the cleanup of legacy pollution and long-term stewardship of these sites align with the Justice40 Initiative to benefit disadvantaged communities.

With cutting-edge R&D, supporting industry so that each future generation of clean energy technology will be more innovative than the last.

The Budget provides an investment of \$8.6 billion for the Office of Science, advancing toward the authorized level in the CHIPS and Science Act to support cutting-edge research at DOE's 17 National Laboratories and partner universities to build and operate world-class scientific user facilities. These investments support identifying and accelerating novel technologies for clean energy solutions, improving predictability of climate trends and extremes using high performance computing, providing new computing insight through quantum information, expanding innovation in microelectronics, and positioning the United States to meet the demand for isotopes. Within funding for Science, the Budget provides over \$800 million to advance the basic research needed to solve fundamental science and technology gaps towards the

development of fusion power as a clean energy source in the U.S using diverse set of tools and strategic approaches.

The Budget provides a historic investment of \$1.9 billion in advancing critical and emerging technologies, including biotechnology and biomanufacturing, quantum information sciences, and artificial intelligence (AI) and machine learning. This investment strengthens U.S. leadership in science, technology, and innovation and plays a central role in the Department's national security mission. Included in this investment is \$455 million for supporting the advancement of AI technologies and the development of foundational models to support new applications in science, energy, and national security. DOE's AI-related activities include fundamental research and development of AI and use of AI tools to explore machine learning, while assuring the safety, security and robustness of AI systems. DOE will also apply AI technologies to the stockpile stewardship mission and to early detection of foreign nuclear proliferation activities.

The Budget provides \$5 million to fund the recently established Office of Critical and Emerging Technologies (CET) that will coordinate efforts, support AI governance, and provide oversight across the Department. CET will develop a strategic outlook for these technologies, working with and through other DOE offices, enabling DOE leadership, as well as interagency, congressional, and external partners, to maximize the impact of DOE capabilities and investments in these key areas of national importance.

Advances Critical Climate Goals

The Budget includes \$10.6 billion in DOE climate and clean energy research, development, demonstration, and deployment programs, including over \$1 billion to improve technologies to cut pollution from industrial facilities, nearly \$900 million to commercialize technologies like sustainable aviation fuel and zero-emission trucks to cut emissions from the transportation sector, and over \$2.4 billion—a majority of which is included in the Energy Efficiency and Renewable Energy (EERE) Program—to improve carbon-free electricity generation, transmission, distribution, and storage technologies for reliability, resilience, and decarbonization. Specifically, within the EERE Program, the budget includes \$502 million for Vehicle Technologies Office, \$280 million for Bioenergy Technologies Office, \$318 million for

Solar Energy Technologies Office, \$199 million for Wind Energy Technologies Office, \$179 million for Hydrogen and Fuel Cell Technologies Office, and over \$500 million for Advanced Materials/Manufacturing and Industrial Efficiency and Decarbonation Offices. In addition, the Budget invests in advancing climate modeling within the Biological and Environmental Research Program in the Office of Science. Overall, this funding advances efforts crucial for achieving the goal of a 50- to 52-percent reduction from 2005 levels of economy wide net greenhouse gas pollution in 2030 and economy wide net-zero emissions no later than 2050, while also reducing energy bills for American families.

Accelerates Industrial Decarbonization

Addressing the climate crisis requires rapid decarbonization across energy use sectors. The industrial sector contributes about a quarter of U.S. greenhouse gas emissions and is a major opportunity for significant reductions. By investing more than \$965.8 million in discretionary DOE industrial decarbonization activities, the Budget reflects the importance of supporting U.S. industrial decarbonization through innovation, targeted investment, and technical assistance. The Budget supports funding for Industrial Emissions and Technology coordination to drive adoption of industrial decarbonization solutions and expanded research and development efforts across DOE.

Makes Historical Investments to Strengthen the Nation's Nuclear Security and Protect the Nation from Weapons of Mass Destruction Terrorism

The National Nuclear Security Administration (NNSA) is doing extraordinary work to meet the challenges of today's ever-changing geopolitical landscape. NNSA helps to provide the cornerstone of our national defense by maintaining a safe, secure, reliable, and effective deterrent, while simultaneously working with key allies and partners on our shared nonproliferation goals. From powering the nuclear Navy to investing in infrastructure revitalization and modernization efforts, such as the Uranium Processing Facility at Y-12 and plutonium modernization efforts at Savannah River and Los Alamos, NNSA successfully meets a difficult and varied mission space. NNSA's efforts to reduce nuclear risks in Ukraine following Russia's further invasion over two years ago provide just one example of the essential mission NNSA is responsible for and executes with the utmost expertise and capability.

The Budget provides a historic investment of \$25 billion in the Nation's nuclear security enterprise to implement the President's National Defense Strategy and the Nuclear Posture Review (NPR), including \$19.9 billion for Weapons Activities, which represents more than an \$800 million increase over FY 2024 enacted levels. This funding will modernize the Nation's nuclear deterrent and keep the American people safe. The Budget supports a safe, secure, reliable, and effective nuclear stockpile and makes necessary investments to reduce global nuclear threats, provide safe and effective integrated nuclear propulsion systems for the U.S. Navy, and modernize the Department of Energy's Nuclear Security Enterprise, including recapitalizing essential scientific and production facilities.

The Budget provides robust support for key modernization priorities, including Plutonium Modernization efforts that will strengthen NNSA's ability to produce no fewer than 80 plutonium pits per year at Los Alamos and Savannah River as close to 2030 as possible.

The Budget enhances DOE capabilities to prevent and respond to Weapons of Mass Destruction terrorist attacks by non-state actors at home and abroad. It also supports DOE's long-standing effort to advance nuclear and radioactive material security, enhancing U.S. security, health, and economic interests. In addition, the Budget continues investments to develop the next generation of arms control technologies, including space-based monitoring and verification, and experts to help mitigate against emerging and evolving national security risks.

Stockpile Management

The Budget proposes \$5.1 billion in FY 2025 for Stockpile Management to maintain a safe, secure, reliable, and effective nuclear weapons stockpile through stockpile modernization, stockpile sustainment, weapons dismantlement and disposition, production operations, and nuclear enterprise assurance. The Budget includes \$2.8 billion for six major modernization projects that extend the lifetime of the nation's nuclear stockpile while addressing required updates, replacing aging/obsolete components to ensure continued service life, and enhancing security and safety features.

Production Modernization

The Budget includes \$5.9 billion for Production Modernization to support production capabilities for nuclear weapons components critical to weapon performance, including primaries, secondaries, radiation cases, and non-nuclear components. Included within this budget total is \$2.9 billion for plutonium modernization to fund the equipment, facilities, and personnel required to reestablish the Nation's capability to produce 80 plutonium pits per year.

Stockpile Research, Technology, and Engineering

The Budget incorporates \$3.2 billion for Stockpile Research, Technology, and Engineering to provide the scientific foundation for stockpile decisions and actions; develop the personnel required to support the current and future stockpile; and provide the capabilities, tools, and components needed to support all missions. The funding includes \$683 million for the Inertial Confinement Fusion program to support facilities such as the National Ignition Facility and the Z facility in High-Energy-Density and ignition science experimental activities. The Budget also provides \$880 million for Advanced Simulation and Computing, which is supporting NNSA's exascale high-performance computing capability.

Infrastructure and Operations

The Budget proposes \$3.3 billion for Infrastructure and Operations to maintain, operate, and modernize the NNSA infrastructure in a safe and secure manner that supports program execution while maximizes return on investment and reduces enterprise risk. The FY 2025 Request provides funding for activities to enable plutonium pit production, expand capacity at the Kansas City National Security Campus (KCNSC), and address infrastructure modernization throughout the complex. The budget also includes \$881 million in Maintenance and Repair for predictive, preventive, and corrective maintenance activities to maintain facilities, property, assets, systems, roads, and vital safety systems.

Restores American Leadership in Arms Control and Nonproliferation

The Budget includes \$2.5 billion for Defense Nuclear Nonproliferation to enhance the Nation's ability to prevent adversaries from acquiring nuclear weapons or weapons-usable materials, technology, and expertise; counter efforts to acquire such weapons or materials; and respond to

nuclear or radiological incidents and accidents domestically and abroad. By limiting the number of nuclear-capable states and preventing terrorist access to materials and technology that can threaten the U.S. and allies, NNSA plays a critical role in enhancing global stability and constrains the range of potential threats facing the nation, our allies, and partners.

Powers the Nuclear Navy

The Budget includes \$2.1 billion for DOE's Naval Nuclear Propulsion Program to ensure safe and reliable operation of reactor plants in nuclear-powered submarines and aircraft carriers. The Budget prioritizes infrastructure modernization and investments to develop, refine, and deliver new technologies to the Navy and maintain America's advantage over its adversaries. The Budget continues to support the *Columbia*-Class Reactor System Development and recapitalizing spent fuel handling and examination capabilities at the aging Expended Core Facility in Idaho.

Conclusion

I have been humbled and encouraged by our progress so far; this budget will help us accelerate developing a workforce for the future with the creation of high-quality, good-paying jobs. We are ensuring that our economy does not neglect historically disadvantaged communities and instead work with them to guarantee an equitable transition. As we continue to power through this evolutionary period in our history, the Department is focusing on onshoring and reshoring supply chains and turning America back into a manufacturing powerhouse. I want to again thank the Committee for its ongoing and bipartisan support for the DOE mission.

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

The CHAIRMAN. Thank you, Secretary.

And we're going to go now, my questions are going to be deferred to Senator Padilla, who has to go preside.

Senator PADILLA. Thank you, Mr. Chair. I appreciate the consideration, and I will be respectful of the five-minute limit.

Madam Secretary, thank you for being here. It's not news to anybody that from coast to coast extreme weather events driven by the climate crisis have increased both in frequency as well as intensity. And one of the byproducts of these storms is that power outages become more and more common, and it can be the impact of extreme heat in the summer months, freezing temperatures and ice storms in the winter. Our nation's electric grid is frequently tested. In many cases it is not able to weather the storm—pun intended. A weak grid disrupts the lives of millions of Americans, and beyond that, really costs the economy billions of dollars by not only impeding emergency services, for example, but temporarily closing schools, businesses, and other locations, and in many cases, even causing massive and dangerous wildfires. This is an issue that I have been working on since I got to the Senate, together with you. Can you discuss how the Fiscal Year 2025 budget supports a resilient grid both at the transmission at the distribution levels?

Secretary GRANHOLM. Yes, thank you so much for this question, because the grid, of course, is the foundational piece of infrastructure for all energy, and it is a grid that was built, in many cases, decades and decades ago and needs significant upgrading, in addition to expansion. That is exactly what we're working on. Thank you for the tools given in the Bipartisan Infrastructure Law for the Grid Resilience Innovation Program, for example, for the tools given in the Loan Programs Office to be able to support additional expansion and hardening of the grid. All of that is necessary.

Unfortunately, for the grid program, for example, the competitive solicitations are far oversubscribed. Even though the generosity of Congress to be able to give us \$20 billion for that was, obviously, very needed, but we need so much more going forward. The bottom line is—both on the transmission side and getting power from where it's generated to where it's used, and on the distribution side, in the local communities—both are critical. On the distribution side, I am pleased to say that we have been—and part of this budget requests additional funding for our Grid Deployment Office for microgrids, to be able to create that resiliency at the local level, in addition to what we're doing on the transmission side—both very important. We really appreciate the support this Congress has given us.

Senator PADILLA. Thank you, and I'll just plant a seed, looking forward to working with you and our Chairman on reconductoring of transmission infrastructure—

Secretary GRANHOLM. Yes.

Senator PADILLA [continuing]. Both for capacity and efficiency objectives.

One additional question I wanted to make sure to raise today is in regards to geothermal, right? As part of our shift toward cleaner sources of energy, geothermal energy is considered renewable gold. It has the potential to provide 24/7 clean, reliable, and dispatchable power to the grid, and it's vitally important in the face of a chang-

ing climate and the extreme weather events that I discussed. Now, scaling these technologies is especially urgent in places where geothermal resources are abundant, like my home state of California. Can you speak to the importance of supporting the full spectrum of technology development for geothermal technologies, everything from early stage R&D to commercialization and upscaling?

Secretary GRANHOLM. Yes, thank you so much for this. Our Geothermal Technologies Office has been working on this for a long time, but we got a big boost with the ability to use tax credits to incentivize the generation of geothermal power. We also have just launched an enhanced geothermal commercial liftoff report. And I meant to say in the last question, we, just today, are announcing a liftoff report for innovative grid technologies, which include reconductoring and grid-enhancing technologies. But on geothermal, from conception—the best technologies, the best ways of using hydraulic fracturing to be able to get at places we wouldn't otherwise be able to get at, the best strategy from a commercial liftoff point of view and the best demonstration of geothermal, like with a company called Fervo, which is using skill set and technology from the oil and gas industry to do enhanced geothermal, and is very, very promising—to deployment of more traditional geothermal, and deployment of geothermal at home, in other words, heat pumps using geothermal. That full spectrum is exactly what the Department of Energy has been working on, and with your continued support, the one big hurdle that exists from our enhanced geothermal liftoff report is the fact that the capital costs of those projects are expensive. And so, figuring out a way to support those capital costs is teed up as the next hurdle we can challenge together.

Senator PADILLA. Thank you very much. Thank you again for your consideration, Mr. Chair.

The CHAIRMAN. Absolutely, Senator.

Senator BARRASSO.

Senator BARRASSO. Thanks so much, Mr. Chairman.

Secretary Granholm, in 2023 the U.S. produced a record amount crude oil, natural gas. Good thing or bad thing for the country?

Secretary GRANHOLM. Good thing.

Senator BARRASSO. Great.

Largest exporter of liquefied natural gas in the world. Good thing or bad thing?

Secretary GRANHOLM. Good thing.

Senator BARRASSO. Our allies, more or less secure as a result of what we've been able to do?

Secretary GRANHOLM. It's a good thing.

Senator BARRASSO. So world demand for liquefied natural gas is expected to increase significantly between now and 2040. Energy needs are up. I mean, they are talking about in the next five years, U.S. energy demand may be adding a new California, just in terms of the amount of energy that's going to be needed. The New York Times had a front-page story about that. So, are America's interests better served if the world buys LNG from us or from Qatar?

Secretary GRANHOLM. We think that our LNG is produced in a cleaner fashion, and that's why one of the reasons the demand for our LNG is up to 14 billion cubic feet per day that we are exporting

currently, including the 48 billion that have been authorized, but have not yet exported—

Senator BARRASSO. Same with Russia? Better using ours than Russian?

Secretary GRANHOLM. Of course.

Senator BARRASSO. Better using ours than Iran? Great.

So the Inspector General has included a written statement in the President's budget and we have a letter to that affect. And the Inspector General explains that the President's budget will substantially inhibit her from performing the duties of her office. She said we won't be fully funded in the office in terms of the things that they need, which is the amount of money that you talked about that's going out. Is there a reason you're not willing to fund the Office of Inspector General in the budget?

Secretary GRANHOLM. The Office of Inspector General has gotten the second largest percentage increase in their budget, a 73 percent increase in her budget, to be able to correspond with the increased amount of funding that is going out the door. We support the Inspector General. We meet with her all the time, and she is getting a significant increase in funding under the 2025 budget.

Senator BARRASSO. Even with the President's budget request, the Inspector General is going to still be short about \$170 million to deal with the amount of money that the Department of Energy has gotten over this period of time in the legislation that you have outlined this morning.

Secretary GRANHOLM. We support the Inspector General, which is why we've asked for such a large increase in her budget.

Senator BARRASSO. Jigar Shah, the head of the Department's Loan Office, recently stated, "I don't think anyone is really accusing us, except rhetorically, of pushing money out the door quickly." The Inspector General said, "There is no precedent in the Department for this level and pace of financing," and she said, the Department's funds are already moving quickly and internal controls are "untested." So who is right? Mr. Shah, who says nope, or the Inspector General, who has said we have gone out really fast and the internal controls are still untested?

Secretary GRANHOLM. We are testing those internal controls thanks to the advice that she has been providing on how to create them. The reason why it seems fast is because literally no loans were set forth in the previous Administration. Currently, there are 18 loans that have either closed or provided a conditional commitment and 205 in the pipeline, which tells you that the Loan Programs Office is doing a terrific job of being open for business. But, that said, it does take time to get a loan through, and that's because of the internal controls that LPO is using.

Senator BARRASSO. Well, as we've had a previous hearing on this, I can tell you, Mr. Shah is open for business, and I think it's distressing and it's a terrible situation going on with him right now.

Different topic—last month you testified that it is possible the Administration could impose its own ban on imports of Russian uranium. You also said the legislation solidifies the ban more concretely than if just the Department had done it. So your preference is for Congress to enact a ban on imports of Russian uranium. Is that correct?

Secretary GRANHOLM. That would be my preference, yes.

Senator BARRASSO. And I agree with you, and so, I think, do American's nuclear fuel suppliers.

Another topic: so along with Russian uranium, if the Administration does impose its own ban on Russian uranium imports, will you commit to adhere to the same limits and conditions in terms as found in the legislation that has already passed the House?

Secretary GRANHOLM. We would abide by whatever Congress passes, of course.

Senator BARRASSO. Okay, and will you commit to promptly notify this Committee if the Administration does issue any waivers on the ban?

Secretary GRANHOLM. Of course.

Senator BARRASSO. Okay. Additionally, in February, Deputy Secretary Turk defended the Department's decision to stop approving LNG exports. He cited a forecast by the International Energy Agency showing a decline in the world's demand for natural gas, but the Department's own Energy Information Administration forecasts that the world's demand for natural gas is going to grow significantly. Why did he ignore the Department's own forecast for world demand for natural gas, and do you think it's appropriate to cherry-pick data to justify different policies in the Administration, like the ban on natural gas exports?

Secretary GRANHOLM. I can only assume that what he was suggesting is that there's a range of projections regarding the world's use of natural gas, which is one of the reasons why we are doing our own modeling through the National Energy Technology Lab and the Pacific Northwest National Lab while we update our analysis.

Senator BARRASSO. Well, thank you, and I agree with that assessment because unfortunately, he chose one that was not the Department modeling, and I thought the Department modeling was a better response to what actually the needs are going to be.

Mr. Chairman, thank you.

The CHAIRMAN. Thank you, Senator.

Secretary, the immediate response to the Administration's proposed guidance of the 45V tax credit on hydrogen is clear. If implemented, it's going to jeopardize the viability of the industry before it even gets a chance to get off the ground. All the hubs are in jeopardy and all of them have basically sent letters requesting a change immediately. Treasury's requirements on additionality, time matching, and regionality are just not workable. They are saying you have to have new, dedicated power located directly to support the hydrogen operation, which was never in there. We just want to make sure hydrogen gets a foothold. The industry response includes a letter from all seven DOE hydrogen hubs, who wrote in February of this year that the projects will no longer—no longer be economically viable unless the guidance is significantly revised.

So, the only thing I would ask is, are you involved or do you think that we should heed the warning of DOE's own seven hubs that you all—that you have been involved, I think, in all seven, basically, of how they've come out and how we heralded these wonderful opportunities and success? And do you have any insight to what you all are thinking and what might be changed?

Secretary GRANHOLM. Yes, thanks for the question.

Obviously, we want these hubs to succeed and we put out—we meaning the Administration, the Treasury Department—put out specific questions that they were inviting responses for as they finalize the rule. We’ve gotten over 30,000 responses, and they are working through those responses, but the bottom line is, clearly, we want the hubs to succeed.

The CHAIRMAN. They understand the concerns that the hubs have, and they are all in sync on this too. It’s not just one. When you have the California hub and the West Virginia hub in sync, you’ve got a problem. And I hope they understand that. So we’re looking forward to those changes so we can get started with our hubs.

My next question is that we’ve spent a lot of time on DOE’s critical role in our nation’s scientific research enterprise for the Endless Frontier Act, which ultimately became law as the CHIPS and Science Act. It’s clear the research facilities that the DOE stewards are imperative for scientific innovation, national security, and economic growth. The current conversation around the future of artificial intelligence (AI) is no different. America must accelerate our efforts to compete and defend against our adversaries like China on AI, and the Department of Energy has a central role. The Department and its national labs have the computing resources. We have those in our national labs. Our Majority Leader, Senator Schumer, is pushing for this to go toward the National Science Foundation, which is a duplication—in my evaluation, it is just duplicating, and we’re not going to get further ahead or as quickly as we need to get ahead if we go back and try to reinvent the wheel again.

I don’t know what your input is on this, but being over the labs, I think you might have some thoughts about this.

Secretary GRANHOLM. I appreciate you anticipating—yes, I think our national labs are obviously in the driver’s seat on both the technology—we have the tools, we have the largest exascale computers in the world, we are obviously using AI in all of the labs, but we also recognize that the National Science Foundation has a role for AI at the level of democratization of AI. Our collaboration with our Office of Science and Technology Policy at the White House has been very important. We really appreciate the fact that Congress has identified AI as a priority as well. I am very concerned, both about the bad uses of AI, but hopeful about the good uses of AI and I am concerned about the amount of energy that AI—

The CHAIRMAN. We are just very much concerned about the money, the limited amounts of money we’re going to have. It’s going to be divided up, and it has more—those resources could get better results—

Secretary GRANHOLM. Yes.

The CHAIRMAN [continuing]. If we stay with what we already have. That’s going to be the question we all have to probably get our heads around.

My final one is about our SPRO. Our Strategic Petroleum Reserve contained about 640 million barrels of crude oil. About 290 million barrels, more than 40 percent, was sold from 2021 to 2023, bringing us to its lowest level in 40 years. The majority of those

sales was the Administration's 180-million-barrel emergency release in 2022, when oil prices were high and gasoline was going to \$5. But Congress is also to blame. We ordered over 80 million barrels in sales since 2021 to offset spending in other areas. I am glad to see DOE has begun refilling the reserve. I am told there is only enough funding to bring us back to around 400 million. Do you think the 400 million is a large enough reserve? Has DOE done an analysis about the right size of the reserve that we need to face an emergency? And if it's not enough, what do we need to do to fix that?

Secretary GRANHOLM. Yes, we are—first of all, we have the largest oil reserve in the world right now. And we are—

The CHAIRMAN. Which is less than 400 million—

Secretary GRANHOLM. Yes, 365—

The CHAIRMAN. Yeah, right.

Secretary GRANHOLM. It is less than what it was, and I'm glad you recognize that the responsibility for the drawdowns occurred both, yes, the Biden Administration during the war in Ukraine, but also Congressional sales. Actually, Congressional sales have accounted for about 217 million barrels since the peak, and there's about—and we appreciate Congress's willingness to cancel the 140 million in Congressionally mandated sales that were teed up. There's about another 100 million more that will be teed up between now and 2023. We can talk about that.

But we are buying back, and we want to buy back at a rate that is good for the taxpayers. So, we—

The CHAIRMAN. You're not buying right now at the \$85 to \$90 range?

Secretary GRANHOLM. In the past few months we had because it was below \$80.

The CHAIRMAN. Okay.

Secretary GRANHOLM. And in fact, we were shooting—

The CHAIRMAN. That's your cutoff?

Secretary GRANHOLM. But in the latest round it came in above, so we canceled that one, but we still have a strategy of continuing to do this at a value for the taxpayers, noting that we sold at \$95 per-barrel and we want to buy back at a rate that saves them.

The CHAIRMAN. Okay.

Senator Cantwell.

Senator CANTWELL. Thank you, Mr. Chairman.

Secretary, thank you so much for coming to the Pacific Northwest and looking at all the transformation that's underway that our region is helping with and you are leading. We very much appreciate that.

I wanted to ask you, obviously, about the Hanford budget. We're very pleased that the request is an increase from what we secured last year. So thanks to the Administration and Senator Murray and my colleagues for that. We're proud of the work that we need to do to meet the milestones. In a couple of weeks, the U.S. Department of Energy and the State Department of Ecology and Environmental Protection will be announcing a conclusion of holistic negotiations to update the consent decree. And you know how important that Tri-Party Agreement is. This is the result of long talks to improve the removal of waste from 177 underground tanks that con-

tain the most dangerous and difficult decades of plutonium. And so, obviously, I want a commitment on the future tank negotiations to make sure they have milestones, and can you detail how you will roll out the agreement and get comments so that we know that they are taking—you, DOE—is taking that seriously?

I also, sorry to throw a lot at you, but I figure I would just throw it all out and you can help respond and if we run out of time, we can respond for the record. I do hear concerns about, also, the transformation of the Tri-Cities past these things. You know, they obviously think, and are, really, a clean energy hub for a lot of deployment. So they want to know what can happen on the transformation of acreage to a broader range of clean energy development. So I understand a vision has been shared with DOE officials, but the current DOE plan would not allow for this kind of development. So I want to make sure that we're continuing to think about how the Tri-Cities continues to play this massive leadership role on energy transformation.

You answered Senator Manchin's point about the hydrogen hubs. I just want to weigh in because I feel like this is such a critical point to get these 45V credits done correctly. I'm assuming you agree that the whole point of this is to decarbonize hard-to-decarbonize sectors like maritime and aviation, fertilizer, and things of that nature. So our goal, and my question is, should our goal really be reaching this decarbonization within these sectors? I think some people are thinking that we should go a different route. I mean, it would be like if we said at the very beginning of electric vehicles, you could only charge an electric vehicle from clean energy. And so the whole point is, what is the milestone going to give us for 45V? I'm assuming that we want to try to, by 2050, cut, in these sectors, cut the carbon by some significant amount, and that should be the goal of the 45V. So you can tell me whether you agree with that.

I am curious on fusion, whether you think 48C should be applied to fusion. We're also a hub in this particular area and want to know whether you think we should be thinking about broadening that. And then, on the transmission, to my colleague's point, we will need 56 percent more transmission by 2040. That's according to you and your estimates. And the Pacific Northwest Power and Conservation Council calculates the region will need 3,500 megawatts of new renewable energy by 2027. So what can you do to help us make sure, since most of our transition comes from EPA, how can you help us make sure transmission gets built?

Oh my gosh, I can see I am——

Secretary GRANHOLM. Can I just quickly hit them?

Senator CANTWELL [presiding]. Since I think officially I'm chairing at the moment, yes, go ahead.

Secretary GRANHOLM. Okay, so Madam Chairman.

Senator CANTWELL. Quickly, because my colleagues.

Secretary GRANHOLM. Yes, yes, just very quickly.

Hanford, yes, exciting that they are reaching conclusion. Obviously, we'll work with the community and make sure that it's transparent. Clean up to clean energy, which is one of the things you talked about. We've taken requests for proposals. We've gotten those. We're evaluating them. We're also in the process of transfer-

ring about 150, I want to say, acres to the Tri-Cities area for economic development, too. So, again, continuing to work with them very, very closely.

Hydrogen is the Swiss Army Knife, as everybody has said, of clean energy. And yes, decarbonization has to be a key component of it in addition to its other uses.

Senator CANTWELL. So you think—just on that point—you think in the next few years, if we went for some short-term goal of just driving production of the hydrogen—look, we’re a very green source, I mean, that’s why, I think, we won the hub, because we’re a green source.

Secretary GRANHOLM. Of course.

Senator CANTWELL. But the whole point is to significantly decarbonize the sector, is that correct?

Secretary GRANHOLM. That’s correct.

Senator CANTWELL. Okay. So that overall goal should be part of the calculation.

Secretary GRANHOLM. Absolutely.

Senator CANTWELL. Okay, thank you.

Secretary GRANHOLM. Absolutely.

Fusion and 48C, interesting, I hadn’t thought about that and I’d like to have further conversations about it. I know that those decisions have been made by Treasury already in the first round of 48C, and we don’t have insight into that since it’s tax information and proprietary. So I’m not even sure, unless the entities who receive the designation raise their hands.

Senator CANTWELL. But do you think if we really do, or are on the precipice of a fusion hit that the manufacturing aspect for the United States in acceleration of this would be a good idea?

Secretary GRANHOLM. Certainly, of course it would be a good idea.

Senator CANTWELL. Yes, thank you. Okay.

Secretary GRANHOLM. Yes, absolutely.

And on transmission, I just refer again, I want to just say, we have got to increase our transmission capacity. Reconductoring is one of the ways to do that. Grid-enhancing technologies, like dynamic line reading, are another way to do that. We have got to have a full suite of strategies in addition to building new transmission, but making our current transmission stronger, better, and able to have greater capacity is also a key component of it.

Senator CANTWELL. Well, I just want to thank you. I mean, we’ve had other Energy Secretaries and they’ve been part of this equation, but you are making the transformation happen. It’s not easy, and you’re able to articulate how and why it’s so critical. So thank you.

Secretary GRANHOLM. Thank you.

Senator KING [presiding]. On behalf of the Chairman, Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

Madam Secretary, good to see you. I was out in Chena, and the proprietor, Mr. Karl, sends his regards. In that vein, we had an opportunity to talk further about geothermal, and I have had the chance to talk with you about the Makushin project. It has been kind of reconfigured, if you will, and I don’t think that’s the right

word. But I do want to have further discussion with you and Deputy Secretary Turk about geothermal and how we really work to remove some of the barriers that I think we see with regards to the promise of geothermal. And I know that there are good intentions, but for some reason, we're not seeing them translate into the opportunities that we need. So that's not a question for you, but more of an ask, and just kind of an alert that I would like to follow up, specifically with regards to geothermal and the potential there.

Water energy—marine hydrokinetic energy. As you know, we've got more than our share of water around us, whether it's in our rivers, the potential for more hydro. I'm not sure why the Administration has proposed a 20 percent cut to the Water Power Program in its FY25 budget request. It looks like you've increased funding for just about every other renewable. And again, we seem to focus a lot on the favored children—wind and solar—but we have such opportunity within our marine energy opportunities. I don't know if you have proposed a target for marine energy deployment, whether we can expect something in this area. What can you tell me that's good and exciting, because I'm talking to a lot of people that are very, very excited and they feel like they are just having to do it on their own because they are kind of alone out there in trying to advance any of these technologies.

Secretary GRANHOLM. Okay—

Senator MURKOWSKI. Go ahead.

Secretary GRANHOLM. One, on the cut. The two main reasons for that cut were that one, we have funding provided in 2023 and 2024 for hydropower demonstrations and irrigation modernization and low-impact hydropower. They were already funded. And so they were pulled out because those demonstrations are already ongoing. We could come back and talk about 2026 and whether we need to re-up that again, but we're funded already in 2025. And similarly, we had a \$29 million reduction for the marine energy infrastructure support at the Marine Coastal Research Lab and PacWave. And again, in 2024, because we got that funding late, the 2024 funding provided funds needed for both sites. And so, PacWave is expected to be completed in the summer of 2024. So we didn't need that funding.

Bottom line, though—completely agree with you on kinetic hydropower, on all hydropower.

Senator MURKOWSKI. All hydro.

Secretary GRANHOLM. Hydro, I mean, dams, et cetera, we need to really lean in on this clean baseload power. And a lot of it is that it's expensive. The upfront capital is expensive for people, and that's, you know, figuring out that because there wasn't that sort of carve-out for that in the Bipartisan Infrastructure Law.

Senator MURKOWSKI. Right.

Secretary GRANHOLM. I totally would be very supportive of that.

Senator MURKOWSKI. But I think you see this looming threat with the average age of a U.S. hydropower production facility in this country right now being 64 years old.

Secretary GRANHOLM. Yes.

Senator MURKOWSKI. And so, we have to modernize. We have to upgrade. We have to make these investments again in this extraor-

dinary baseload resource. And so how we're going to move forward with that, again, I want us to be leaning in.

I want to ask, very quickly, on critical minerals. You and I have had the conversation about the need for more natural graphite. The opportunity that we have in Alaska with Graphite One, a natural graphite project, identified a graphite source, probably the most exciting in the country right now. And we've gotten minimal support from Department of Energy right now, and it hurts to kind of look at some of the support that the Administration is giving for imported critical minerals from places like Mozambique to process here in this country. But I want to ask more specific to this, because in January, when Secretary Turk was here, I asked him at the time to confirm if DOE funding programs like the LPO only consider non-mine project infrastructure investment, and are not able to assist domestic extraction projects. And he was vague on it. He said that DOE is trying to be creative, but we made very, very clear in IIJA that DOE had the authority to "support mineral production, processing, manufacturing, and recycling activities." And yet, what I hear, at least from Graphite One and from others, is that no, the Administration actually will not provide such assistance, and they've said that you have to have a pilot project operating before they are eligible, and at that point, only supporting or processing and downstream infrastructure, not the mine itself. And so it's contrary—what they are being told is contrary to what we wrote into law. So this is something that I have asked for clarification on. I don't know if you have anything further that you can add. If you can share with me that DOE will support this, then that's good news and we want to follow up with that.

Secretary GRANHOLM. I would like to come sit with you and—
Senator MURKOWSKI. Okay.

Secretary GRANHOLM [continuing]. Jigar Shah in your office to talk about this. It's my understanding, and again, I don't look under the hood of what LPO is doing while it's in process, but I believe that there may be a mine that is coming through the system. I don't know or have any further details about that and I don't know that it's anything in Alaska. But the bottom line is, we have to use all these tools to get the supply chain in the United States, and that means the supply chain for extraction, and it means extracting the critical minerals. So whatever we can do to ensure that the tools we have get us to where we need, I agree with you that we should be using them. So I want to talk with LPO and come to see you about what's possible, and also maybe about the follow-up on the Makushin project.

Senator MURKOWSKI. Let's do that. I'll look forward to that. And again, Deputy Secretary Turk was looking into this too. So, between the two of you, and Jigar—

Secretary GRANHOLM. Great.

Senator MURKOWSKI. It would be important information to us, but hopefully we can move out on that. And I also have a lot of questions for the record that I'm going to be submitting.

Secretary GRANHOLM. For sure.

Senator MURKOWSKI. Great interest in BABA. Everybody is talking about BABA in Alaska right now and whether or not there will be an opportunity for a continuation of the waiver, the tribal waiv-

er that people are really anxious about. So I look forward to more discussion.

Thank you, Mr. Chair.

Senator KING. Thank you.

On behalf of the Chair, Senator Cortez Masto.

Senator CORTEZ MASTO. Thank you.

Secretary Granholm, it's great to see you again. I have heard a lot of talk this past week about Yucca Mountain. So I just want to set the record straight here, if you're able to, with some yes or no answers to my questions.

Does the Department's Fiscal Year 2025 budget include any funding to restart the Yucca Mountain project?

Secretary GRANHOLM. No.

Senator CORTEZ MASTO. Does the Biden Administration have any intention to move forward with nuclear waste storage at the Yucca Mountain site?

Secretary GRANHOLM. No.

Senator CORTEZ MASTO. And does your Administration support consent-based siting?

Secretary GRANHOLM. Yes.

Senator CORTEZ MASTO. Thank you.

Can you please provide an update of where we are on DOE's consent-based siting efforts and what are some of the ways that the Fiscal Year 2025 budget contributes to this initiative?

Secretary GRANHOLM. Yes. The consent-based siting strategy is in three phases. We're in the first phase. The first phase was to fund 12 different consortia of entities that were exploring whether communities would be willing to raise their hands. And so those conversations are happening now. The second phase will be to identify the volunteers because, of course, communities that raise their hand, they want to know what's in it for them, what are the benefits, jobs, but also other kinds of benefits. So that will be phase two. And phase three will actually be starting operations. So we're only in phase one right now. It's still going to take, as it has in other countries that have done consent-based siting, it takes time. You have to build trust. You have to answer all the questions. So it takes a little bit of time. So, in this budget year, I don't think we have funding for consent-based siting because we're in the process of that first phase, but we will come back to you in phase two with a funding request.

Senator CORTEZ MASTO. Thank you. I appreciate that.

And then, let me associate myself with Senator Murkowski. I think she and I are both interested in ensuring that the critical minerals that we need, that the United States plays a key role, including that supply chain. And you and I have talked about this. I am so excited about Nevada right now for our battery technologies. You may have called this out—for critical mineral development, for cleaner transportation, you have been there. Thank you so much for visiting Nevada. It really is truly the center of the clean energy economy. One example is the administration's recent designation of a national regional innovation tech hub for critical minerals through the CHIPS and Science Act for the University of Nevada, Reno. We are very excited about that.

Secretary, I'd be interested in learning more about DOE's recent announcement of the METALLIC project, if you are able to, and the creation of a future critical minerals supply chain research facility. Can you talk a little bit about that?

Secretary GRANHOLM. Yes. I don't have the details on the METALLIC project, but I can tell you that we are, because of Nevada's unique position in having such an abundance of critical materials and the processing, actually, which has begun, which is, of course, something that we lack in this country, as well as the uses, like batteries, where they end up, right? So you have the full supply chain happening. So having a research component that is an anchor for both the early-stage research and development, but also the applied aspects of it, is very important, and that is why having it centered in Nevada was critical.

Senator CORTEZ MASTO. Thank you.

I also want to talk about the workforce. We've talked about this. In your written testimony you specified the Fiscal Year 2025 budget request calls for about \$1.6 billion to support our clean energy workforce projects across the country. I know the Bipartisan Infrastructure Law mandated the creation of the 21st Century Energy Workforce Advisory Board at DOE to further develop that skilled workforce. Can you talk about the progress that we have made, if any, on really developing this workforce that we need for clean energy?

Secretary GRANHOLM. Yes, let me just give you an example. We have announced, in partnership with the AFL and the UAW, a battery workforce initiative, which has—the idea is to create modules that community colleges could then plug in or that apprenticeships could plug into with all of the components necessary to be able to create a workforce for this whole new industry that we're creating in the United States. And so, I am pleased to say that we have completed that right now, the curricula is finished, and we are now taking it on the road to be able to get community colleges, especially those adjacent to a battery manufacturing factory, to be able to take on. But that's just one example of the kinds of—first of all, they have to be place-based. You have to train people for jobs that are there, right, so that then you can take advantage of the apprenticeships and the apprenticeship tax credits associated with the Inflation Reduction Act.

Senator CORTEZ MASTO. Thank you. Thank you, Secretary.

Mr. Chair.

Senator KING. On behalf of the Chair, Senator Hickenlooper.

Senator HICKENLOOPER. Thank you, Mr. Chair. And Secretary, thank you so much for all of your work and for coming to Colorado. I read in the papers you go to blue states, red states, everywhere. Energy really is the universal connector in this country.

Secretary GRANHOLM. Totally.

Senator HICKENLOOPER. So I agree with our friends here that you're doing a great job.

The Biden Administration has been clear that increasing domestic mining, and Senator Cortez Masto was kind of touching on this, that we need more mining and processing and refining to have sufficient raw materials to address the major changes we're going to make in our energy future. I support and am interested in helping

to expand DOE's Mine of the Future initiative. I thought it would be interesting to—you know, this approach to revolutionize mining technology and make sure we have socially responsible techniques in place. Can you talk a little more about that?

Secretary GRANHOLM. Yes. The Mine of the Future is a way of being able to do extraction in a sustainable way that is sort of more laparoscopic, if you will, that you really go in using a small opening and doing your exploration and extraction without disturbing the ground around you. And so, that Mine of the Future notion is something we would love to support and encourage mining companies to take on in partnership with us. We see an opportunity there for pilots. I also would be remiss if I didn't say thank you to those of you who are eager to update the Mining Law so that we can really embed the notion of sustainability into our practices, like our allies have done—like in Canada, for example. There is a way that we can lead on extraction in a sustainable way as a nation, and I applaud your interest in making that happen as well.

Senator HICKENLOOPER. Well, we're all in. And just tangential to that, the R&D around the alternative materials and, you know, battery chemistries, that research. You're pushing full speed on that as well. I really support that.

Secretary GRANHOLM. Oh, yes, we certainly are. I mean, we want to have the full spectrum, soup to nuts. So from responsible extraction to processing, and obviously, all of the battery components—the anode, the cathode, the separator material, the electrolyte, we want all of those components of the supply chain built in the United States. And we're seeing it happen, and this is what's so amazing is that policy is actually working and that we're seeing all of these battery—

Senator HICKENLOOPER. Don't sound surprised.

Secretary GRANHOLM. Well, sometimes you wonder, but this is such great news that people should take home and say, look, I mean, we have such a low unemployment rate in part because of the work that has been done here to generate investment in manufacturing across this country, and the battery place is exactly one place. Of the 600 factories that I talked about in my opening statement, 400 are in the EV or battery space, all pockets of America, and that's all of these components. So it's so exciting to see those incentives actually having an impact.

Senator HICKENLOOPER. Yes, it's been gratifying for all of us, I think.

You also said that you're obsessed with geothermal energy.

Secretary GRANHOLM. Yes.

Senator HICKENLOOPER. And I have a copy of the next generation geothermal liftoff report and I'm excited. I mean, that is, I think, one of the most—you know, for a dry, scientific study—one of the most exhilarating reads you could have right now. And I thought I'd give you a moment just to talk about that because I think, you know, you begin to read how much more widely accessible it is and the potential—pretty close to 15 percent of the new energy we're going to need and especially baseload energy. So, talk a little bit about that.

Secretary GRANHOLM. Yes, I mean, this is—as we consider the energy demand increases that we're all seeing, right, whether it's

from AI or from electrification or from all these new factories coming online, we have to identify clean, baseload solutions. And geothermal is clearly a clean baseload solution, as is hydroelectric, right, as is batteries with renewables, but I think that geothermal is such an untapped source. And the notion of us actually achieving these technology breakthroughs for enhanced geothermal that allow us to extract geothermal, not just where it's super, super hot, but even where it's not super hot, where you can almost get geothermal in ubiquity across the country. That is an amazing breakthrough in technology, and therefore can really help us to achieve the goal which we have of meeting that increased energy supply.

The big challenge, I think, Senator, and this is something I'd love to work with you all on—and there seems to be a great interest in geothermal—is this up-front capital cost. Now, some of that can be addressed through, for example, the Loan Programs Office, and we're encouraging geothermal companies to go to the Loan Programs Office, but some of it could be addressed through additional up-front capital help and support from Congress. And we should talk about that because obviously the Production Tax Credit is terrific, but we may need a little juice on the capital up-front.

Senator HICKENLOOPER. Sure.

Well, I'm reading that as a commitment to work with our staff—

Secretary GRANHOLM. Yes.

Senator HICKENLOOPER [continuing]. To find that \$4 or \$5 billion to do a demonstration project that could really make a difference, because it is wildly exciting.

I yield back to the Chair.

Senator KING. Thank you.

On behalf of the Chair, I call on myself.

[Laughter.]

Senator KING. Madam Secretary, you've covered a lot of ground today, and just to refer back to the final question from Senator Hickenlooper, one of the problems with a lot of these energy technologies is high capital cost, but they have extremely low or no operating cost.

Secretary GRANHOLM. Right.

Senator KING. And so that's why we have to develop incentives to get these in place because then, with hydro very close to zero, nuclear, geothermal—in the long run, if we can get over the capital hump, we can really make a difference in people's bills at home.

Now, let me turn to another—I take it you agree, you nodded.

Secretary GRANHOLM. I agree.

Senator KING. Thank you. Nods don't show on the record.

But let me turn to another issue—transmission, which you have discussed. Transmission, in many states now, is more expensive than generation. And it's going to get more so because of the enormous buildout of the grid that's necessary for the electrification of the country. You have mentioned several times grid-enhancing technologies, reconductoring, which I am all in favor of, very much so. The problem is, the incentives in the industry or toward building and the cost, it's a rate-based, you know, you understand how that works. So we need to have incentives for doing the cheaper things first or perhaps even mandates that say you have to dem-

onstrate that you've done the grid-enhancing technologies—that dynamic line monitoring or reconductoring—before you build the big, new transmission line, which may be obviated by the grid-enhancing technologies. Your thoughts?

Secretary GRANHOLM. Yes, it requires a different mindset, perhaps a slightly different business model—

Senator KING. Right.

Secretary GRANHOLM [continuing]. On the part of the utilities who, you know, are understandably conservative. However, you're seeing a lot of utilities—

Senator KING. But their financial incentive is to build—

Secretary GRANHOLM. Is to build, right, because they get a return on investment—

Senator KING. Right.

Secretary GRANHOLM. That corresponds. And you know, what a fantastic thing it is, and I encourage you to take a look at the liftoff report that we issued one hour ago on innovative grid technologies because if you just look at what the estimates are of the necessary expansion of the grid between now and 2033, which is according to NARUC, I think it's about 90, 91 gigawatts. The grid-enhancing technologies and reconductoring can achieve between 20 and 100 gigawatts, and they are at five percent of what the cost is of build-out.

Senator KING. I hope you'll communicate with your friends at FERC because they just issued an order that did not require the utilities to even study these grid-enhancing technologies before embarking on a transmission project. I disagree with that decision. I don't understand it, but I think that's something we need to continue to press on because it's not going to happen by us talking about it—

Secretary GRANHOLM. Right.

Senator KING [continuing]. But there have to be incentives, and it may be shared savings to the utilities, if they use these lower-cost technologies.

Let me change the subject for a minute, just to clarify. The pause in the approval of LNG terminals is indeed a pause, is it not?

Secretary GRANHOLM. Correct.

Senator KING. It's not a ban. It's not a stop.

Secretary GRANHOLM. Correct.

Senator KING. And all you're doing is using that time, a matter of months, I understand, to update the data on impacts on domestic prices and environmental impacts. Is that correct?

Secretary GRANHOLM. That's correct.

Senator KING. And the problem is, I sat in this seat seven years ago, when a representative of the gas industry said exports of LNG will never exceed nine percent of production. Well, right now, they are at 14 percent of production. As you testified, they are going to 48. And it just seems to be prudent to understand the implications of that before we approve massive new projects that may end up significantly increasing domestic prices or environmental impacts. Is that the case for the study?

Secretary GRANHOLM. Yes. Prices at home—hugely important on our manufacturers, et cetera, and also the impacts of on our allies overseas.

Senator KING. Our low domestic gas prices are a huge asymmetric advantage around the world.

Secretary GRANHOLM. Yes.

Senator KING. And I'm concerned that we will, in effect, export that advantage by not understanding the implications of going from 48 percent of production to something approaching 60 or 70 percent of production. We've got to understand that, and that's what the pause is all about, is it not?

Secretary GRANHOLM. Yes, to do the update.

Senator KING. I appreciate that.

Finally, on methane—fossil fuels are going to be part of the transition. Methane is the low-hanging fruit of climate change. I hope that you will be working—we now have space-based assets that can detect methane leaks to find out how to detect leaks, how to remedy them, and how to bring them to the attention of the manufacturer, because this is one of the places where we can really make a significant difference with a relatively low cost.

Secretary GRANHOLM. Yes, in fact, if you talk to the oil and gas industry, they'll say “we can do this, we can button this up.” It's the detection that has been slow, but now we do have, as you noted, satellite assets as well as on-the-ground assets to be able to regionally detect where these leaks are happening. It makes sense from a financial point of view and certainly it makes sense from a climate point of view.

Senator KING. Thank you very much.

Secretary GRANHOLM. Yes.

Senator KING. Thank you for your testimony and your adept answer to our questions.

Senator Manchin.

The CHAIRMAN [presiding]. Senator Daines.

Senator DAINES. Chairman, thank you.

Good to have you here, Secretary.

Secretary GRANHOLM. Nice to see you.

Senator DAINES. It has been two and a half months since President Biden paused LNG exports in order to study their impacts. We are no closer to knowing when this pause will be lifted or if it ever will be lifted. If DOE follows the facts and looks at previously published reports, this study will come back the same as all the other previous studies. U.S. LNG exports builds jobs, it strengthens the economy, and it reduces global emissions. But I fear, and I'm not alone in this—I just met with the Ambassador from Croatia, and they are just shocked around why the United States would pause LNG exports in the midst of a war on the continent of Europe where Putin has weaponized LNG, weaponized natural gas. But I look no further than the White House website, where the first quote in their press release lauds, and let me quote, “this Administration's historic efforts to meet the global commitment to phase out fossil fuels.”

Is LNG a fossil fuel?

Secretary GRANHOLM. Yes, it is.

Senator DAINES. This is followed by the second quote, which features “hashtag stop LNG.” So, Secretary Granholm, if this pause is truly about updating studies, then why do the majority of the

quotes in the President's own press release say stop LNG and phase out fossil fuels?

Secretary GRANHOLM. I haven't seen those, but I can tell you that this is a pause.

Senator DAINES. I encourage you, if you haven't seen it, we'll make sure you get it. It's right on the White House press release. You work for the President of the United States.

Secretary GRANHOLM. I have not seen that press release or that quote, but I can tell you that it is a pause to update the study because so much has happened since the last time the study was done. We were only exporting four Bcf of LNG at that time, and now we are exporting 14 with another 12 Bcf under construction and another—and 48 total authorized. This pause doesn't affect any of that.

Senator DAINES. Well, you know, we've been exporting LNG since 2016. And DOE has done numerous studies since then, including one that showed that LNG exports to Europe have the lowest life cycle emissions. So, what exactly is DOE looking for that hasn't already been published?

Secretary GRANHOLM. Well, first of all, as Senator King noted, the fact that we would be potentially exporting up to 48 billion cubic feet, when at the last study it was just four, and we use natural gas here at home. We produce about 100 billion cubic feet of natural gas at home. That would mean that we would be exporting—if, in fact, it was all built, and I'm not saying it's all going to be built—half of our production. What does that do for prices at home? Volumes of these—

Senator DAINES. When will the study be completed?

Secretary GRANHOLM. Around the end of the year.

Senator DAINES. Around the end of the year.

So, what information could DOE find during the study that would cause it to deny all future export applications?

Secretary GRANHOLM. We're not in this to deny all future exports.

Senator DAINES. But the website—I'd love to have you go see the White House press release that says "phase out fossil fuels" because I don't believe what you're saying on prima facie. I think there is an ideology here, as clearly articulated on the White House's own release that says "phase out fossil fuels" and "hashtag stop LNG." That doesn't seem to be talking about pricing. That seems to be a radical ideology now to go to zero fossil fuels.

Secretary GRANHOLM. Well, I can tell you that our instructions to the national labs who are doing the study is to follow the science and the data. And that's all it is. It's look at what the science and the data show, both on prices at home, what the global demand will be in light of all of these countries saying that they are making different pledges, what the demand will be on the part of our allies so that we can assure they are well supplied.

Senator DAINES. As we're watching Russia continue to destroy Ukraine, when our allies are pleading with us for more U.S. LNG. I was over—

Secretary GRANHOLM. Our allies are getting their LNG. I'll just be super-clear about that.

Senator DAINES. But no, Madam Secretary, with all due respect, the chilling message you send by pausing LNG permits is being heard around the world.

Secretary GRANHOLM. It is a pause.

Senator DAINES. I get that.

Secretary GRANHOLM. It is a pause for a study. You don't need to hype it out beyond what it is. It is a pause to get data.

Senator DAINES. So why couldn't you do the study in parallel here instead of putting a pause on permits? Because time is of the essence.

Secretary GRANHOLM. Because there are—

Senator DAINES. We're talking about a couple of permits. The message that sends, I will just tell you—

Secretary GRANHOLM. Well—

Senator DAINES. Maybe you're talking to different allies than I'm talking to but they are wondering what's going on.

Secretary GRANHOLM. I am sending a different message clearly than others have been sending. The message I am sending is, all of your LNG that you have under long-term contract is going to be all right because you are already exporting and it has already been authorized. We are taking several months to do a study to determine what the impacts are of additional LNG authorizations both globally and at home.

Senator DAINES. I respectfully ask you to stop this highly political pause and get back—

Secretary GRANHOLM. It is a scientific pause, sir.

Senator DAINES [continuing]. To the mission of the Department of Energy.

Secretary GRANHOLM. It is a scientific pause. We're gathering the data.

Senator DAINES. Well, I think you are yielding to the radical elements of the left who want to see—go back to the White House press release that says “stop fossil fuels, hashtag stop LNG.” That doesn't sound like a pause. That doesn't sound like cost. That sounds like an ideology that wants to keep LNG from ever being shipped anytime. That's a radical ideology. It's out of step with the American people.

Thank you, Mr. Chairman.

The CHAIRMAN. We have Senator Hirono.

Senator HIRONO. Thank you, Mr. Chairman.

Just to briefly refer to what the Secretary was just testifying to, my understanding is that there are already a lot of LNG permits out there and it's not as though we need to have more, but just to have a pause. And I mean, really, for some people on the Right to keep talking about this, and you know, a lot of them don't think that global warming is a problem either. They think global warming is a myth.

So let me get to wildfire risk. It has been over eight months since Maui experienced the deadliest wildfire in the U.S. in over a century, and this disaster demonstrates the need to invest in upgrades to the electrical grid that improve monetary and reduce the risk of wildfires and help restore power. The Infrastructure Law established the \$10.5 billion Grid Resilience and Innovation Partnerships (GRIP) program to improve the resilience of the power sys-

tem against growing threats of extreme weather and climate change. You told Senator Padilla that the grid resilience funding Congress provided in the Infrastructure Law is oversubscribed. What level of demand for grid resilience improvements is DOE seeing, and what is DOE's role in helping lower-income areas still have a reliable grid in the face of wildfire and other climate change risks?

Secretary GRANHOLM. We are grateful for the Grid Resilience Innovation Program because it did give us a significant amount to be able to address these needs but, as I mentioned, we could not possibly fund all of the requests out there, and they were good. They are all good requests. I am hopeful that we can revisit this with Congress in a future budget year because I think it is hugely in demand. We're in a second round of grid funding. There's a second round of the competition that is occurring. It is right now underway. In this second round, we are prioritizing things like grid-enhancing technologies and reconductoring to make sure that we can get the biggest bang for our buck so that the rate-basing of transmission lines is not forced upon ratepayers, that we can really encourage the cheapest form of grid-enhancing technologies.

But this is a huge issue, not just in Hawaii, and I know Hawaii won in the first round of GRIP funding for the Lahaina and Maui wildfires that HECO received. More needs to be done though.

Senator HIRONO. Did it surprise you that this program would be so oversubscribed?

Secretary GRANHOLM. Well, I wouldn't say it really surprised me given the size of the grid and when it was built because we have such massive needs and such a crickety old grid. So we're going to have to, as a nation, decide that this is a piece of the infrastructure, like the national highways, that we've got to get serious about investing in, and investing in a smart way by prioritizing the things we know we can do that are less expensive, but also building out what we need to do to get power in where it needs to be.

Senator HIRONO. I agree with you.

I want to talk about the transitioning to electric vehicles. Hawaii has the second most expensive gasoline prices in the country at \$4.74 per-gallon. And whenever global oil prices increase, we see the impact in Hawaii, the cost of gasoline. So one of the reasons I supported the Inflation Reduction Act and the Infrastructure Improvement and Jobs Act was to help people find a more American-made, affordable electric vehicle to avoid high prices at the gas pump. How is the transition to electrical vehicles going in your view, and do you know if more people are using the EV tax credits now that they are available at the time of the sale—the purchase of the car?

Secretary GRANHOLM. Yes, thank you for that question, and Treasury just put out—I think yesterday—an assessment of the uptake, which is very robust at the dealership. Last year we sold just slightly less than 10 percent of the fleet of light-duty vehicles, which were all electric, and if you added hybrid, it would get to about 17 percent. So there is great interest because of the price of gas, because people want to see more choices in terms of their transportation. We're excited about that, but we have also got to work continuously on building out the infrastructure necessary to

get people comfortable to buy electric vehicles, and that means the electric vehicle charging infrastructure.

Senator HIRONO. And, I don't want to interrupt you—

Secretary GRANHOLM. Yup.

Senator HIRONO. But my time is—and one of the goals of this Administration is to lower costs for our families, and one of the ways we can do that is to encourage them to buy or to use energy-efficient appliances. So before the attack—Iran's attack in Israel—the House was spending a lot of time trying to undo this Administration's encouraging of the use of energy-efficient appliances. Can you just explain briefly the benefits the American people will enjoy from the DOE's improved efficiency standards for appliances?

Secretary GRANHOLM. Yes, DOE has been doing efficiency standards since 1975, over 60 different products. I will just give you one example. If you bought a refrigerator in 1975 and you bought one today, your today's refrigerator would cost you half the amount that it did in 1975. It would be 20 percent larger and it would use one quarter of the electricity. Energy efficiency standards save money and they are certainly helpful in reducing greenhouse gas emissions.

Senator HIRONO. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator.

And we have Senator Cassidy.

Senator CASSIDY. Madam Secretary, I actually thoroughly accept that we need to decrease emissions, but I'm afraid that the Administration is so ideologically focused that we're doing otherwise. Tell me, in the analysis of the natural gas export, are we looking at the fact that because we are exporting less natural gas that other countries are using more coal and the greenhouse gas footprint of Germany burning more coal is obviously much worse than if they were burning clean U.S. natural gas? Is the end-user having to substitute coal for natural gas part of the life cycle analysis?

Secretary GRANHOLM. First, just to clarify, we are not stopping the export of natural gas—

Senator CASSIDY. Yes, but you're stopping the permitting, which means it's creating uncertainty, which means that there are contracts that are going elsewhere, if you will.

Secretary GRANHOLM. We have authorized 48 billion cubic feet of natural gas. That is a massive amount. All of that is still going forward, if people can get final investment decisions. Currently, we are exporting 14 billion cubic feet. Another 12 billion cubic feet are under construction. None of that is stopped. None of it.

Senator CASSIDY. Yes, but let's not be disingenuous. The fact that there is a pause means that—this regulatory pause driven by an Administration which sometimes does not look at end results—means that investment decisions are being changed.

Secretary GRANHOLM. Well—

Senator CASSIDY. But my point being—

Secretary GRANHOLM. We have spoken with our—

Senator CASSIDY. But if I might go to the point.

Secretary GRANHOLM. Yes.

Senator CASSIDY. Is the life cycle analysis looking at the fact that countries may end up using coal instead of natural gas or import

natural gas from countries which don't have our same stringent environmental standards?

Secretary GRANHOLM. Yes, fuel switching is definitely part of the analysis.

Senator CASSIDY. So it'll show, just to be clear, that China will be using more coal, and the impact on global greenhouse gas emissions, as opposed to substituting U.S. natural gas, or Germany, or whomever.

Secretary GRANHOLM. Fuel switching by any country or countries will be part of the life cycle analysis.

Senator CASSIDY. I have to admit, the fact that it is so obviously and so transparently a major contributor to greenhouse gas emissions, that we still need to do the study, again, indicates to me that there's another reason to do the study. But that's an editorial comment.

We had testimony here about a year ago, and I forget quite from where, but it was around, I think, Oklahoma, Kansas, someplace like that, and they were talking about how the regulations requiring them to go to renewables were endangering their capacity to meet surges, and you just talked about the rickety old grid. The fact that we have to bring electrons from the Panhandle of Texas all the way to Atlanta obviously makes the grid more important, whereas, if somebody is producing locally, the local grid is more easily maintained. It doesn't have to be as high wattage, et cetera. And I say that because a statement was just made that the Administration is focused on reducing energy costs. Can we hold up that chart? This is actually what has happened since the Administration has taken over. This is what the cost of energy has done. This is not holding down energy costs. There is a term used in Europe—energy poverty.

[The chart referred to appears on page 6 of this hearing document, where first introduced by Senator Barrasso.]

I remember reading an article in the New York Times—the ideological New York Times—about a family in western Massachusetts, in which the church had to pay the utility bills.

Now, I say that because I think there has to be a little bit of table setting. A lot of these things which theoretically are going to lower costs, in reality have increased costs for the average American family. Pipeline permitting becoming more difficult, for example, means that it's more difficult to get cheaper burning natural gas, and therefore, people's utility bills are going up. I think Senators King and Manchin have discussed that in the past. Any comments on all that?

Secretary GRANHOLM. Yes. Number one, there is no doubt that we are all focused on reducing costs for people, and energy, of course, being a big component of that. Natural gas prices—

Senator CASSIDY. By the way, that chart would suggest that it's not being very successful as a—

Secretary GRANHOLM. Well, that chart also starts in January 2021 in the middle of the pandemic. So let's be clear about what it actually looks like out of pandemic. Nonetheless, it is important to recognize that the price, for example, of natural gas is at very low prices right now. The price of solar, very low. What's causing the increase in energy prices? One contributing factor is the invest-

ments in the grid that are necessary, this old grid that gets rate-based among ratepayers, and it's one of the reasons why it's so important for us all in leadership to take a look at how we invest in the national electric grid so that we are not forcing ratepayers to bear that burden.

Senator CASSIDY. Now, may I say that also one thing contributing to the high cost is the inability to permit new natural gas lines? And if you can't get adequate amounts of natural gas to a utility, they are going to have to pay more for whatever source they get it from, and that's a major contributor. We can speak of power lines, but local generation is often natural gas, and that has been inhibited, that pipeline development has been inhibited by this Administration's policies.

Secretary GRANHOLM. Well, that's not under my jurisdiction, so I don't have data on that, but I know that this Administration is interested in lowering costs for people, which is why they've increased the amount of money for LIHEAP for weatherization, increased the ability for people to buy electric vehicles at the dealership by reducing those costs, increased the ability for people to do insulation in their homes so that they can reduce the cost, all of these things, all driving toward reducing the cost of energy. The cost of natural gas is not high. It is the cost of the infrastructure associated with the energy grid that is expensive.

Senator CASSIDY. Yes.

I yield. Thank you.

The CHAIRMAN. Senator Heinrich.

Senator HEINRICH. Thank you, Chairman.

Welcome, Secretary. I want to ask you about the Loan Programs Office. Projects that are financed under the LPO undergo very extensive scrutiny and due diligence before being approved. Can you just elaborate on the rigor of the approval process, what safeguards are in place that ensure taxpayer funds are protected and administered prudently? Yes, go ahead.

Secretary GRANHOLM. Yes, thanks for asking that. It's, you know, the Loan Programs Office has really shifted its structure, I'll say, since this Administration came into being. So the first thing that's important to know is that the Loan Programs Office now is not the first dollar in, but the last dollar in, to safeguard the taxpayer, and the Loan Programs Office does not take risk on technology. They are funding a business model and they are looking at the risk associated with the market. And so, as part of this, there are seven steps to be able to get a loan.

Senator HEINRICH. Basically, because banks won't take the first risk, right?

Secretary GRANHOLM. Right.

Senator HEINRICH. They need to see something get proven out in the marketplace, and then they'll come in and build number three or four, but they typically won't build one or two.

Secretary GRANHOLM. Very well said, and I should have said that in that way, but that's exactly what it is. So, we'll first do a recruitment from our Business Development Office. They have a two-stage application that they have to go through. That application includes a risk assessment of their business strategy, their leadership team, their marketing strategy, and their technology strategy.

Then there is an approval and a second part, and then it goes to due diligence, and then it goes to a conditional commitment, and then it goes to—before it goes to conditional commitment, it goes to the interagency for review—Treasury, it goes to Management and Budget, it comes back, there's a conditional commitment, there's a financial close, and then there is monitoring.

So there are all sorts of steps that—

Senator HEINRICH. And in those steps, are political appointees involved, or is that being done by professional staff?

Secretary GRANHOLM. No, other than the recruiting, which Jigar Shah does, it is all done by professional federal employees.

Senator HEINRICH. I want to ask you about industrial decarbonization. We saw some pretty incredible announcements adding up to \$6 billion in that sector. I think we're at a place now where we very much understand how to decarbonize the grid. We understand how to decarbonize transportation, which is now the leading source of pollution. The big thing that we need to make progress on is industrial decarbonization. It's cement, it's steel, it's aluminum. Talk about some of the progress that is being made there and what you're excited about within the industrial decarbonization bucket.

Secretary GRANHOLM. Yes, this is such a great story, because again, there has not been a decision on the part of the Federal Government to really invest in the technologies that decarbonize the hardest to decarbonize sectors. So, the funding that has gone out under the industrial decarbonization program went to all range of technologies, including cement, to help make green cement, steel, to help make green steel, to glass, all these glass providers, glass producers. And it is, you know, the decarbonization component of things is really a partnership with industry because they want to decarbonize as well. It saves them dollars. So we're very excited about the projects that we announced. And we will have another phase of this, but super-excited to get the enthusiasm that we saw from across the country in these projects that otherwise seem to, you know, they don't get as much attention, I think, as some of the other kinds of technologies, but these technologies are hugely important.

Senator HEINRICH. Yes, it's a shame because I think your recent announcements are probably the biggest thing to happen in this sector, ever.

Secretary GRANHOLM. Yes.

Senator HEINRICH. And you know, I don't think we were quite ripe when we did the Inflation Reduction Act for as much focus in this sector as we probably should have put in that legislation, but now, it is definitely moving quickly.

I want to ask you one last question with my remaining time. Talk to me about the home efficiency rebates and home electrification appliance rebates. What's the time frame for getting those approved? I know my state was the first state to approve—to apply for both the home efficiency rebates and the home electrification and appliance rebates. How is that coming along?

Secretary GRANHOLM. Yes, thanks for your leadership on this, by the way, because I know part of this was your baby and these states are very excited about it. There are 16 states in the pipeline.

All these states have the opportunity and all have received preliminary funding to be able to build their program. New Mexico raised their hand right away and said we want to lean in and be among the first states, which is terrific.

Once they are approved and they are submitted, it goes through a whole series of steps, but each program goes to NREL, their Golden field office, to be able to get the final thumbs-up. Once that happens, all the funding goes to the states for them to build their program. We are hoping that we can convince states to accelerate their strategies so that we have the summer of rebates, if you will, to be able to see people get these appliances in their hands, but it's up to the states. It's up to the state timeline. Some states have leaned in and some states have not, but we want to encourage all to lean in because it's all about the citizens.

Senator HEINRICH. So, just bearing out that there are a number of steps that states are going to have to take, potentially these programs could be up and running this summer?

Secretary GRANHOLM. Oh, they could be, sure, if the state were willing to go. Now, they have to get their stuff into us. We have a sample application on the website so it makes it easy. We have a sort of concierge service working with the states to encourage them to apply. A lot of states are resource-scarce. Their energy offices already applying for all these other grants feel very, you know—

Senator HEINRICH. Stretched.

Secretary GRANHOLM. Stretched. So that's why getting that initial money so they can hire up to be able to do the program is very important, and I understand that that takes time, but we're eager to encourage those who can to do the summer of rebates.

Senator HEINRICH. Chairman, I apologize for going a little bit long.

Secretary GRANHOLM. That was my fault.

Senator HEINRICH. I appreciate your discretion.

The CHAIRMAN. No problem.

Senator Hawley.

Senator HAWLEY. Thank you, Mr. Chairman.

Madam Secretary, nice to see you again. When you were here last, I talked with you about the fact that more than 130 officials in the Energy Department reported more than 2,700 trades of shares, bonds, and options in companies that ethics officers said were directly related to the agency's work. This is institutionalized corruption. And I asked you, point blank, do you own any individual stock? And you told me, "no." Let's just look at it.

[Poster of the question and answer referred to follows:]

April 20, 2023

Senator
Hawley

**“Do you own
individual stocks,
Madame Secretary?”**

“No.”

Secretary
Granholtm

Senator HAWLEY. It was not a difficult question. Do you own individual stocks, Madam Secretary? You said, “no.” In fact, you repeated it three times to me—“no, no, no.” Turns out, that was false. You did own multiple individual stocks and you neglected to report it to this Committee for months afterwards. Why did you mislead this Committee?

Secretary GRANHOLM. Oh, my goodness.

Senator HAWLEY. That was exactly my response. So why did you mislead this Committee?

Secretary GRANHOLM. Senator, I believed that I had sold all individual stocks, and I was incorrect. So I came back and told—

Senator HAWLEY. So you just don’t know your portfolio?

Secretary GRANHOLM. Pretty much.

Senator HAWLEY. It’s a big one, I guess, huh?

Secretary GRANHOLM. No, it’s extremely small.

Senator HAWLEY. Apparently not. Someone manages it for you?

Secretary GRANHOLM. So I came back as soon as I found out that, in fact, I had not sold all individual stocks.

Senator HAWLEY. Wait, wait, wait, wait, no, that’s not true either. Let’s just look at the timeline.

[Poster of the timeline referred to follows:]



Senator HAWLEY. Let's not—I will just remind you you're under oath. Madam Secretary, you testified you didn't own any individual stocks. You didn't sell the stocks for a whole other month, and after you sold the stocks, you waited another month before you informed this Committee. Why did you mislead us and what were you hiding? Why did you wait so long? Why did you hide this?

Secretary GRANHOLM. I did not hide it because I brought it forth to the Committee when I realized that we had made a mistake.

Senator HAWLEY. Really? What explains the delay? Why did you wait for a full month to explain your actions to this Committee, your false testimony?

Secretary GRANHOLM. That's less than a month, and I sent a letter explaining what had happened—

Senator HAWLEY. May 15 to June 9. Are we going to—

Secretary GRANHOLM [continuing]. That I made a mistake because I owned a Ford stock that would—

Senator HAWLEY. You mislead this Committee and you—wait, what were the stocks? What were the stocks that you owned?

Secretary GRANHOLM. It was a Ford stock that my husband had owned since he was very young and I just was not aware of it.

Senator HAWLEY. And what were the others? You've sold six stocks. What were the other five?

Secretary GRANHOLM. I sold non-conflicting stocks.

Senator HAWLEY. What were they?

Secretary GRANHOLM. Honestly, I don't even know. I do know the Ford one because that was a conflict and that's why I raised this.

Senator HAWLEY. You're here before this Committee a year later after actively misleading us, after denying and delaying and delaying and now you won't tell us. Was one of them Proterra?

Secretary GRANHOLM. No.

Senator HAWLEY. You sat on the Board of Directors of Proterra. You made millions in end reports and stock options at Proterra. Then you promoted Proterra stock and Proterra products as Energy Secretary.

Secretary GRANHOLM. Sir, sir, sir.

Senator HAWLEY. Was that one of the stocks that you sold?

Secretary GRANHOLM. This is so—I mean really? Really?

Senator HAWLEY. Was that one of the stocks that you sold? Yes, really.

Secretary GRANHOLM. No, no.

Senator HAWLEY. You were presiding over institutionalized corruption in your Energy Department. You have violated the STOCK Act nine separate times. You have been referred by the Inspector General for violations of the Hatch Act. It is institutionalized corruption that you are now the face of. And here's what I'm trying to figure out—I just want to know who really runs the Energy Department. Is it you or is the mega corporations, whose stock that you own, that you're making profits on?

Secretary GRANHOLM. Oh, my goodness.

Senator HAWLEY. Or maybe it's the foreign billionaires who fund your conferences. Let's try something else. Do you know the names of the foreign billionaires who fund the conferences you go to? Since you don't know the stocks, do you know the names of the foreign billionaires?

Secretary GRANHOLM. This is unbelievable to me, Mr. Chairman, to be accused like this.

Senator HAWLEY. Let me help you. One of them is Hansjörg Wyss, a Swiss billionaire, who has used various dark money front groups—

Secretary GRANHOLM. I do not know what you are talking about.

Senator HAWLEY [continuing]. To funnel foreign money into American politics. He has used the Berger Action Fund, \$20 million that then sent money to the Fund for a Better Future that then sent money to the Climate Power group that has funded conferences you've attended. Do you know who this is? Do you think it's a good idea to attend conferences funded by foreign billionaires?

Secretary GRANHOLM. I have no idea who that is. I have no idea what you're talking about. I have no idea what you're talking about.

Senator HAWLEY. You don't know the stocks. You don't know the billionaires. You would take no responsibility.

Secretary GRANHOLM. The Ford stock—

Senator HAWLEY. Meanwhile, your Energy Department—executives in your Energy Department are trading stocks in companies that they have direct oversight over, and you were too.

Secretary GRANHOLM. That is incorrect. Nobody in the Department of Energy, and we have a strong ethics office, trades stocks in anything that they have oversight over. People may own individual stocks—

Senator HAWLEY. That is simply not true, Madam Secretary.

Secretary GRANHOLM. Sir, this—

Senator HAWLEY. The Wall Street Journal has reported on this extensively.

Secretary GRANHOLM. The Wall Street Journal—

The CHAIRMAN. Senator, if I may? If I may, Senator? If I might just ask a question?

Is it possible that maybe we can continue this at a later time, but if you had any questions on the direct energy policies?

Senator HAWLEY. Mr. Chairman, this is directly relevant to institutionalized corruption in the Department of Energy that she oversees. You're, I think, about to say that the Wall Street Journal report is wrong.

Secretary GRANHOLM. The Wall Street Journal report did not say that people in areas that they were directly overseeing had stocks. They did not. Our Ethics Office consults with all of our employees that have a reporting requirement about their stockholdings. They do not own stocks in areas that they have any influence over, nor do I.

Senator HAWLEY. Madam Secretary, all I have to say is, this record is just deplorable. It is despicable. It is outrageous that hundreds of officers in the Energy Department are trading shares. It is outrageous that you mislead us. It is outrageous—

Secretary GRANHOLM. That's incorrect.

Senator HAWLEY [continuing]. That you are continuing to mislead us and it is outrageous you're going to conferences and events funded by foreign billionaires using dark money to try to influence our politics. This has got to change. And frankly, you should go.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator Lee.

Senator LEE. Secretary Granholm, demand for electricity is soaring. It's skyrocketing, in fact. This is happening for a number of reasons, including due to the emergence of AI, of data centers, semiconductor reshoring, clean tech manufacturing, and of course, electric vehicle use. A recent New York Times report addressed this issue and estimated that electricity demand from data centers alone without taking into account any of those other factors is going to triple by 2030, just in the next six years, using as much power as 40 million homes. Now, NERC has sounded the alarm and NERC sounded that alarm by, you know, regarding this pending reliability crisis that's coming, due specifically to the lack of electricity supply. Demand is soaring, and it's soaring at the same time when the premature retirement of coal-fired power generation units is happening, and it's happening without replacement dispatchable generation capabilities. And so, these factors have led to an overreliance on sources like wind and solar, sources that while clean, are entirely weather-dependent and can't give us a source of baseload energy supply. Grid-scale battery technology is often touted as the answer to this, but of course, grid-scale battery technology is nowhere close to being ready for deployment and use.

So, Madam Secretary, do you dispute NERC's findings on this, or is it true that we have a reliability crisis looming?

Secretary GRANHOLM. We certainly have a looming demand-for-energy crisis, and NERC, I think, put 91 gigawatts to that by 2033 that we would have to add to account for the increase in demand.

Senator LEE. Okay. Now, in the meantime, and I'd like to get a yes or a no answer out of this one, if you can. Yes or no, does the Biden Administration support a transition to net zero?

Secretary GRANHOLM. Yes.

Senator LEE. Okay. Now, look, the basic laws of supply and demand tell us that if we don't get our act together, we'll see rolling blackouts across the country. And yet, you continue to advocate for a transition, even a rapid transition, to net zero. According to a report compiled by McKinsey and Company in 2022, "Global spending on physical assets on the course to net zero would need to reach about \$275 trillion by 2050, or \$9.2 trillion per-year on average." Now, this factor, of course, doesn't consider the economic ripple effects that would stem from more expensive energy and energy being made less reliable. One also has to consider the impact of lost jobs related to those same factors. It's fair to say that a net-zero transition is going to require enormous sacrifice by American families, with low-income households being hit the hardest. This is deeply concerning to every American. It ought to be concerning to Americans of every background, of every political stripe, but more than anything, this is isn't so much about Left versus Right, Democrat versus Republican, as it is rich versus poor. Rich folks can handle significant increases in the price of energy. Poor folks can't, especially when they find that increases in the price of energy spill over into literally everything they buy, into everything that they do. And when you're living at the margins like that, you're not going to be able to handle that.

So, Madam Secretary, if the United States, consistent with your ambitions, with your plans, with the ambitions of the Biden Ad-

ministration, if it completely transitions over to get to net zero, exactly how many degrees will global temperatures decrease as a result of moving to net zero?

Secretary GRANHOLM. Well, we want to keep global temperatures from rising more than one and a half to two degrees. Net zero is by 2050. So there is time to be able to get there. If we see temperatures rising greater than that, of course, the costs for poor people and for people overall, because of these extreme weather events, will be catastrophic.

Senator LEE. Okay, but let's get back to my question. If we get to net zero—when we get to net zero, should we get there at some point—if we get there, what impact will that have on global temperatures?

Secretary GRANHOLM. As I say, the striving to net zero is to prevent the temperatures from rising more than one and a half to two degrees.

Senator LEE. Yes, still not the answer to the question. The question is what impact is that going to have? We just talked about the fact that it's going to cost \$275 trillion to get there and we talked about the fact that it's going to cost the global economy, you know, \$9 or \$10 trillion a year in order to get there. So what does that buy us? What does that do?

Now, you're saying yes, we're trying to not have temperatures increase more than the defined amount that you just described, but what impact does this have? What does it do for global temperatures if we get to net zero?

Secretary GRANHOLM. Perhaps I'm not understanding your question. I think I have answered that, and the whole point is to prevent these extreme and accelerating weather events we have had—year after year of record heat. We've had year after year of increased extreme weather events, just in this country.

Senator LEE. Look, I understand the Biden Administration's affinity for blaming everything, including bad weather on Republicans and on climate change, which they always associate together. And I fail to understand how you can definitively say that a complete transition to net zero is necessary when you don't even know the impact that it would have on global temperatures. You can't tell me, sitting here today, what it's going to do. You tell me what you fear might happen if we don't do that. You tell me that you think temperatures will increase less if we do this than if we don't. I don't get this, especially when, if what you're talking about is, you know, a large number, it would seem fanciful and not backed up. If it's a smaller number, it could be dismissed as a rounding error.

And meanwhile, you're talking about completely changing the global economy. And given the way the United States tends to honor its legal obligations and its commitments more than other countries do, we can rest assured that it is going to cost the United States a lot more money than it is going to in a lot of places, meaning poor and middle-class Americans will suffer by far more than anyone and everyone else. I find this completely unacceptable. This is reverse Robin Hood. It's talking about stealing from the poor to give to the rich. Nobody supports that. And we can't endure it.

America's poor and middle class certainly shouldn't have to shoulder this burden.

The CHAIRMAN. Senator Hoeven.

Senator HOEVEN. Thank you, Mr. Chairman.

Thank you, Secretary, for being here today.

One of the things that, as you know very well from visiting the Energy and Environmental Research Center (EERC), is that we're working very hard to develop these new technologies so that we can keep our baseload energy in place, whether that's our coal-fired electric plants, but also the work that we do in oil and gas. You know, we have the best stewardship in the nation—in the world. Our country has the best stewardship in the world, and it's because we are leading the way in all these technologies, which, obviously, you saw at the EERC, and DOE needs to help us with that. One of them that we talked to you about is the Plains CO₂ Reduction Partnership, PCOR. So we work on that with the EERC at the University of North Dakota. Senator Barrasso works on it in Wyoming with the University of Wyoming. Senator Murkowski, in Alaska, the University of Alaska at Fairbanks, as well as our esteemed Chairman, Senator Manchin, works with these regional partnerships in West Virginia. So they are very important and really cover the country. And so we, through the appropriations process, secured funding for those partnerships. There are four of them that pretty much cover the whole country. And we directed that Congress move ahead with multi-year funding to competitively select, you know, these partnerships to go ahead and provide, again, this work on how we can safely sequester CO₂. And as you know, that's done both for sequestering as well as enhanced oil recovery.

So my question is, we need to get going on that, and in the past, there's been disagreement between Congress, in terms of funding these things, and then the DOE coming in and how they have approached it. And so my question to you is, will you commit to promptly issue a funding opportunity announcement for the RCSP program that's consistent—this is the important part—consistent with the language that we included for 2024? Because we have been doing this for a number of years. These folks, these universities have done a good job across the country, and then DOE came in and tried to—and did change how it's being handled. So we put language in this year to make sure that we move forward with this funding and that it's done as we've done it in the past, which has been very successful.

Secretary GRANHOLM. The answer is yes—short answer. I was pleased to see that the Liberty Carbon Management Hub at the University of North Dakota received funding from the previous funding opportunity announcement. We are using that same language to go into this next funding opportunity announcement.

Senator HOEVEN. Okay. And it's very important—another project, you're aware of it, that we've talked about, is Dakota Gasification Company.

Secretary GRANHOLM. Yes.

Senator HOEVEN. Which takes lignite coal and converts it to natural gas. Fifty percent of the CO₂ stream goes for EOR, enhanced oil recovery. And now they are capturing another 35 percent, which takes it up to 85 percent for geologic storage. Same thing though,

EERC, University of North Dakota, they measure, so you've got an independent entity measuring to make sure that the CO₂ is captured, is put down a hole, it's sequestered, and then it's safe for the long term. You know, we've put a lot of programs in place in North Dakota. We're one of two states in the country that can do it right now, North Dakota and Wyoming. Same thing—you're working with them to fund that monitoring project. The first round, I think, was \$1.4 million, but now there's additional follow-on funding as this project is ramped up. Again, the largest carbon capture project in the country. Again, I want to know, will you commit to promptly approving the necessary funding that you participate in with them as a partner in what I think is an incredible, you know, incredible project that's really leading the way forward?

Secretary GRANHOLM. Of course.

Senator HOEVEN. Okay. So both of those, I think, incredibly important.

The last thing I do want to bring up, and I know you've been asked about it. I haven't been here for the whole hearing, but I was about a year ago in both South Korea and Taiwan. They need LNG from us. We don't want them to be dependent on Russia or somebody else. So, again, in terms of this moratorium on siting LNG facilities, it's just paramount that we move forward. And it's not just getting it in places the market signals that we send. You yourself just mentioned the cost of LNG is low now. So we need the facilities to provide it to customers.

What can you do to help advance this process so that we get back to permitting LNG facilities?

Secretary GRANHOLM. Yes, I mean, as we said, this update process, which is done with our national labs, will be completed around the end of the year and the data will show what the data shows, but the important part is that it takes into account what our allies need, what we expect the global demand will be, what the impacts on the ground here are in terms of jobs and community, and what the life cycle issue is with respect to LNG. And so all of those, and the cost, of course, very importantly, the cost at home of exporting a large amount of LNG for our own manufacturers, for example, our own consumers of natural gas. So all of that is happening right now, and this will soon be in the rear-view mirror.

Senator HOEVEN. Yes, it is really important that we get that squared away, not only for our own national security, but also working with our allies.

Secretary GRANHOLM. But just to remember that everybody who is currently exporting, this does not affect. Everybody who is under construction, this does not affect. Everybody who is authorized, this does not affect.

Senator HOEVEN. Well, we both understand the issue, and your attention to it is very important, and so I thank you for that.

Secretary GRANHOLM. Great.

Senator HOEVEN. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator.

Secretary Granholm, let me just say you and your husband Dan and I have known each other for probably 20 years or more, and Gayle and I, we have had a great relationship. And I want to thank you for your service. No one has ever questioned that and your

dedication and commitment to not only the State of Michigan, but to the United States of America. And I appreciate, more than you know, and I know that sometimes politics gets a little rough here, and I want to apologize for that. And if you wanted to make any statement whatsoever.

Secretary GRANHOLM. Yes, I just want to say, Mr. Chairman—

The CHAIRMAN. Sure.

Secretary GRANHOLM. Thank you for the opportunity—the previous statements made by a member of the Committee—

The CHAIRMAN. You and I talked about this, too, afterwards and we went through all this.

Secretary GRANHOLM. Exactly. About the transparency of my personal finances, everything is online, everything is publicly available. So I just want to make sure everybody knows that.

The CHAIRMAN. Let me just say one thing, living in Michigan, if your husband had not bought Ford stock, he would not be a good Michigander.

Secretary GRANHOLM. Exactly, especially since his dad worked for Ford.

[Laughter.]

Secretary GRANHOLM. But anyway—

The CHAIRMAN. Anyway, the bottom line is that we know the honorable service you have given and your commitment to this country and we just want to make sure you're able to continue that in the best way possible. We're here to support. We're here to work out our differences and talk about how we make things better for all and I think that's the spirit with which we should be approaching this, but we've got to get back on track, get this politics back on track to where the government—country comes first, it's not our politics.

I want to thank the witness for joining us today and bringing your expertise.

The members are going to have until the close of business tomorrow to submit any additional questions for the record.

And with that, the Committee is adjourned.

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

APPENDIX MATERIAL SUBMITTED

**U.S. Senate Committee on Energy and Natural Resources
April 16, 2024 Hearing: *The President's Budget Request
for the U.S. Department of Energy for Fiscal Year 2025*
Questions for the Record Submitted to the Honorable Jennifer M. Granholm**

QUESTIONS FROM RANKING MEMBER JOHN BARRASSO

The responses to the QFRs were written with the information available to DOE at the time of the hearing “Oversight of the Biden Administration’s Pause on Liquefied Natural Gas Exports”, which occurred prior to the preliminary injunction issued on July 1, 2024 by the U.S. District Court for the Western District of Louisiana in [Louisiana v. Biden](#).

On July 1, 2024, in [Louisiana v. Biden](#), the U.S. District Court for the Western District of Louisiana granted a Motion for Preliminary Injunction and enjoined DOE and other defendants “from halting and/or pausing the approval process for pending and future applications for LNG exports of liquified natural gas to non-FTA countries, effective immediately, to remain in effect pending the final resolution of this case, or until further orders from this Court, the United States Court of Appeal, or the Supreme Court of the United States.” DOE is complying with the Court’s order and is reviewing pending non-FTA applications.

Separately, DOE is continuing to update its economic and environmental analyses that will inform its public interest decisions on non-FTA applications under section 3(a) of the Natural Gas Act. Once the analyses are completed, DOE will publish a notice of availability of the new analyses in the *Federal Register* for public comment.

- Q1. Your testimony before the Committee regarding the Biden Administration’s “pause” on liquefied natural gas (LNG) exports repeatedly referenced the amount of export capacity that is 1) currently operating, 2) under construction, and 3) approved but not under construction.

You have continually pointed to the 48 billion cubic feet per day (bcf/d) of total approved LNG export capacity to justify your Department’s review of the impacts of future export approvals and the halt on processing existing applications.

You do so despite the fact, which you referenced multiple times in the hearing, that a number of previously approved export facilities are unlikely to reach a final investment decision (FID) before their export authorization expires, and thus will never be constructed.

Finally, you declined to dispute Deputy Secretary Turk’s assertion at a February hearing before the Committee that future demand for natural gas is likely to decline. Instead, you responded that “I can only assume that what he was suggesting is that there’s a range of projections regarding the world’s use of natural gas.”

The Institute of Energy Economics, Japan (IEEJ) is a highly reputed energy modeler. Last month, IEEJ Chairman Tatsuya Terazawa issued a special Chairman’s Message titled “Pause on Pending Approvals of LNG Exports: Problems that need to be addressed.” In the message, he notes the following:

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The current global LNG supply capacity is expected to decline, due to natural depletion, to 280 Mt as of 2040. If we add the 180 Mt of LNG projects that reached FID, including the 80 Mt of U.S. projects, the total world supply capacity of LNG in 2040 will be 460 Mt.

IEEJ, my institute, projects in its Energy Outlook's Reference scenario that the global demand of LNG could reach 600 Mt annually in 2040. Even under its Advanced Technology scenario, which incorporates a massive introduction of clean and efficient technologies, the demand is projected to reach as much as 500 Mt in 2040.

In both scenarios, we expect a very robust demand coming particularly from Asia because it must support its strong economic growth while transiting from coal to gas to reduce CO₂ emission. According to those scenarios, the shortage of supply capacity would range from 40 Mt to 140 Mt annually in 2040. To make matters worse, this prospect assumes that 25 Mt of capacity of Russian LNG continue to be operational.

- Q1A. IEEJ's model relies on current operating capacity plus projects that have reached FID in evaluating future capacity. The U.S. Energy Information Administration projects that future domestic export capacity will be 24.3 bcf/d based on that metric. Do you agree that this is a more appropriate measure of future capacity than the 48 bcf/d of approved projects that you continue to reference?
- A1. To clarify, DOE has authorized cumulative LNG exports of 48 Bcf/d to non-FTA countries. As DOE has noted, not all authorized exports reach final investment decision (FID), and 48 Bcf/d does not necessarily represent future export capacity. DOE's view of projected domestic LNG export capacity is the cumulative capacity of all projects that have non-free trade agreement export authority and are either operating (approximately 14 Bcf/d) or under construction (approximately 12 Bcf/d). That total is 26.2 Bcf/d, which is inclusive of a project under construction in Mexico that plans to export U.S.-sourced natural gas as LNG.¹ This capacity number could increase if more projects with non-FTA authorizations reach a final investment decision and commence construction, as several projects have done since the beginning of 2023, including Port Arthur (Phase 1) and Rio Grande (Phase 1).

¹ See "North American Large-Scale LNG Export Projects with Non-FTA Authority from DOE", the sum of "Under Construction" and "Operating" at <https://www.energy.gov/sites/default/files/2024-02/The%20Temporary%20Pause%20on%20Review%20of%20Pending%20Applications%20to%20Export%20Liquified%20Natural%20Gas.pdf>.

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- Q1B. The IEEJ model anticipates a shortage of natural gas supply capacity of between 40 Mt (or million metric tonnes) and 140 Mt annually in 2040, based on projects that are currently operating or have reached an FID. Would it be better for the environment if the natural gas supply that will be necessary to fill that gap is developed in the United States or in Russia, Iran, and Qatar?
- A1B. Based on the amounts shown above that includes a near doubling of U.S. LNG export capacity, the U.S. is expected to be the global leader in LNG exports for the foreseeable future, where U.S. LNG export capacity is set to exceed the export capacity of any other country, including the second largest LNG exporting country, Qatar, by approximately 40 percent once all announced global liquefaction additions have been completed.² Iran does not currently have the capability of exporting LNG.
- Q1C. The IEEJ model assumes that 25 Mt of Russian LNG will continue to be operational by 2040. Would it be better for the environment if your Department approved new LNG exports from the United States to displace the Russian LNG, or to allow a large quantity of Russian LNG to remain on the market?
- A1C. While the market ultimately determines the global balance of LNG suppliers and consumers, the U.S. and EU have both sanctioned Russian LNG projects and exports, sending a clear signal on the stance toward Russian LNG exports.
- Q1D. Would it be better for our allies if they were able to rely on a new supply of LNG exports from the United States to displace that Russian gas, or to continue to source their gas from Russia?
- A1D. As stated above, the U.S. is already the largest global supplier of LNG, and U.S. LNG exports are set to more than double based on capacity currently under construction that will make the U.S. the largest global exporter by a much larger margin than it is today, even taking into account capacity expansions in Qatar, the second largest global exporter of LNG. Russia is currently the fourth largest global exporter of LNG, and U.S. and EU

² See <https://perma.cc/523A-ZH47> stating that Qatar will expand to 142 metric tonnes per annum or MTPA, equivalent to approximately 18.65 Bcf/d, as compared to the expected 26.2 Bcf/d of U.S. export capacity.

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sanctions against Russian LNG and Russian LNG projects will likely prevent Russia from increasing its market share.³

- Q1E. Do you dispute IEEJ's modeling showing an increase in global demand for LNG by 2040, and if so, based on what model?
- A1E. There is a wide range of scenarios for global demand for natural gas and LNG, particularly given many countries' commitments to reducing greenhouse gas emissions. DOE's update to its analyses that supports the natural gas export regulatory program will include an independent assessment of domestic and international supply and demand across multiple scenarios.
- Q2. Earlier this month, the Prime Minister of Japan visited Washington, D.C. In a joint statement with Prime Minister Kishida, the White House said that: "The United States remains unwavering in its commitment to support the energy security of Japan and other allies, including its ability to predictably supply LNG..." This statement is directly contradicted by your Department's "pause" on approvals for new liquefied natural gas exports.
- Q2A. Do you agree that we should remain "unwavering" in our commitment to "predictably supply LNG" to Japan and our other allies?
- A2A. DOE's update to the analyses used to inform whether pending applications for LNG exports are in the public interest under section 3(a) of the Natural Gas Act and does not affect current or near-to-medium-term planned supply. The update does not affect previous approvals that have already made the U.S. the top global exporter of LNG and have resulted in the near doubling of U.S. LNG export capacity already underway, capacity that could grow further based on prior approvals that are well in excess of both operating and under construction capacity.
- Q2B. As noted in Question 1, Japan's Institute of Energy Economics projects a global natural gas supply shortage of between 40 Mt and 140 Mt annually by 2040. Much of this projected shortage is based on "a very robust demand coming particularly from Asia..." How do you reconcile your Department's "pause," and the global natural gas shortage it

³ See <https://www.eia.gov/todayinenergy/detail.php?id=61683>

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will prevent U.S. companies from filling, with the White House's commitment to "predictably" supply LNG to Japan and other allies?

- A2b. Again, DOE's update to the analyses does not affect previous approvals that already make the U.S. the top global exporter of LNG. U.S. LNG export capacity is set to grow from the current level of 14 Bcf/d to over 26 Bcf/d by the end of this decade, a near doubling of U.S. LNG export capacity. Additionally, U.S. LNG export capacity that could grow further based on prior approvals that are well in excess of both operating and under construction capacity.
- Q3. On April 8, 2013, the Department was petitioned to halt LNG exports. On July 18, 2023, the Department rejected this petition stating, "DOE has [considered economic and environmental impacts of exporting LNG] through studies (and study updates) issued through extensive public proceedings." Further, it stated, "Insofar as Petitioners are asking DOE to halt approval of pending applications to export LNG to non-FTA countries until DOE 'complete[s] a final revision of its policy guidelines,' we find there is no factual or legal basis for such action at this time." On January 26, 2024, the Department announced it would "pause" review of LNG export applications to non-free trade agreement countries while it "works to update the economic and environmental analyses that inform DOE's determination whether" to approve applications.

What changed between July 18, 2023, when the Department said there was "no factual or legal basis" to stop approving applications to export LNG to non-FTA countries, and January 26, 2024, when it announced it would stop approving applications to export LNG to non-FTA countries until it updated its environmental and economic analyses?

- A3. DOE's announcement is consistent with the position DOE took in its July 2023 order denying a petition for rulemaking to promulgate new regulations or guidance defining the process by which DOE will consider non-FTA export applications. That order concludes "Precisely because the U.S. LNG market and related issues—including climate change considerations and global energy security—are dynamic, the LNG export program is best served by continuing to update the economic and environmental studies, analytical approaches, and public interest factors that DOE considers in an iterative fashion, based

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on developing facts and circumstances.⁴ Accordingly, DOE denies the Rulemaking Petition.”

DOE’s current update of its economic and environmental analyses is allowing the program to stay up to date with the current market dynamic and state of science with regard to understanding the environmental impacts of U.S. LNG exports.

- Q4. On March 20, 2024, you testified before the House Appropriations Subcommittee on Energy & Water Development and Related Agencies on the Department’s budget request. At that hearing, you said that it is possible the administration may impose *its own* ban on imports of Russian uranium. If the administration imposes its own ban, will you commit to:
- a) Adhere to the same limits, conditions, and terms found in H.R. 1042, the Prohibiting Russian Uranium Imports Act, which was passed by the House of Representatives in December 2023; and
 - b) Promptly notify the Senate Energy & Natural Resources Committee if the administration issues any waivers of its own ban on Russian uranium imports?
- A4. President Biden signed H.R. 1042 into law as P.L. 118-62 on May 13, 2024. Therefore the Administration will not be issuing any ban of its own at this time as H.R. 1042 takes precedence.

⁴ Available at <https://www.energy.gov/sites/default/files/2023-07/DOE%20Response%20to%20Sierra%20Club%27s%20Petition%20for%20Rulemaking%207.18.2023%20%2802%29.pdf>

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QUESTIONS FROM SENATOR MARIA CANTWELL

- Q1. Thank you for your support during the hearing to engage closely with the community and ensure that it is a transparent process regarding Hanford clean-up funding and the Tri-Party Agreement. I want to follow-up with a couple questions:
- Can you commit to supporting robust funding now and in the future to meet tank waste mission milestones?
- A1. I appreciate the significant investment Congress has made, and continues to make, in the Hanford tank waste mission. After nearly four years of negotiations with the EPA and the State of Washington, we have agreement on a plan that proposes a safe, realistic, achievable course for cleanup of millions of gallons of radioactive and chemical tank waste at Hanford. The FY25 budget request is consistent with this agreement, and I will continue to support robust funding to meet tank waste mission milestones.
- Q1B. Consulting the Tri-Cities community on this agreement is critical. Can you detail how you will roll out the Tri-Party Agreement details and support public comment on the agreement?
- A1B. Like you, I believe that communicating with the local Tri-Cities and tribal communities is critical. Proposed changes to the Tri-Party Agreement and Consent Decree will go out for a 60-day public comment period starting on May 30, 2024. During the comment period, DOE the EPA and the Washington State Department of Ecology will hold regional public meetings in Washington and Oregon. Changes to milestones and deadlines are not final until the public comment period is complete, a response to comments is issued, the federal district court accepts the proposed amendments to the consent decree, and the agencies implement the proposed revisions.
- Q2. Thank you for also understanding the importance of working closely with the Tri-Cities community on the Cleanup to Clean Energy initiative at Hanford. You stated during the hearing that DOE is in the process of transferring about 150 acres, however I understand the community is looking for additional clean energy development uses for a much larger swath of land that is currently under consideration.

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Can you commit to work with the local community and my staff to take another look at reaching a mutually agreeable proposal for all the Hanford lands being considered?

- A2. Consistent with the Hanford Comprehensive Land Use Plan, DOE will continue working with the Tri-Cities community, Tribes, Congress and stakeholders on shaping future lands uses at the Hanford Site to support a variety of potential beneficial reuse opportunities.
- Q3. I appreciate your comments during the hearing on hydrogen and the prioritization of its deployment in hard to decarbonize sectors.
- Q3A. Are you concerned that the if the Administration doesn't adjust the draft 45V guidance to be more flexible and meet Congressional intent that many of the Hydrogen Hubs will fail?
- A3. DOE cannot speak to how the proposed regulations will affect any particular project or taxpayer, however we continue to work closely with the Department of Treasury to review the roughly 30,000 stakeholder comments submitted in response to the proposed rulemaking, including comments from many of the Hydrogen Hub participants. We will continue to provide technical expertise and recommendations to Treasury and IRS as they work towards issuing final regulations. DOE is currently in negotiations with the Hydrogen Hubs and while we understand that some project scope details may be affected by the 45V final rules, we remain committed to their success and to the important role they can play in catalyzing a domestic clean hydrogen economy.
- Q3B. Do you share my concern, and that of Chairman Manchin, Chairman Carper, and many other key Senators that the proposed 45V guidance is too complicated? That the resulting business uncertainty will keep billions of clean energy investment on the sidelines? And that the current guidance will likely be stuck or even overturned in court, or by Congress?
- A3B. DOE is aware of the concerns that some stakeholders have raised about the proposed rule and the challenges it may pose to developers seeking to qualify for the credit. We are working closely with Treasury and IRS as they review stakeholder feedback and work towards issuing final regulations. The 45V tax credit is a key piece of the broader interagency effort to develop a clean hydrogen economy, notably including the \$7 billion in DOE funding for the Hydrogen Hubs and up to \$1 billion to support clean hydrogen demand.

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- Q3C. Do you agree it is a big problem if the Administration's draft guidance on the 45V hydrogen tax credit would add an estimated 45% to 300% more cost to Hub projects? And a big problem if the guidance will also lead to significant delays in the transmission queue that is already overburdened?
- A3C. DOE is currently in negotiations with the Hydrogen Hubs and will receive more information about estimated costs for the projects in the near future. All hydrogen production via electrolysis requires electricity, so any growth in electrolysis under 45V will require additional electricity generation, which in turn may drive the need for new transmission. DOE and FERC are working to facilitate new transmission development in several ways: FERC released Order 2023 in November 2023, which addresses interconnection queue backlogs; on May 13, FERC issued Order 1920 on regional transmission planning and cost allocation; and DOE has many activities to support new generation and transmission, including resolving interconnection roadblocks via the Interconnection Innovation e-Xchange.
- Q4. As private sector fusion energy companies scale-up from building scientific machines to commercial power plants, they will require significant growth in manufacturing capacity. The Inflation Reduction Act put \$10 billion in tax credits for the 48C Clean Energy Manufacturing program and DOE supports the selection process.
- Q4A. Do you agree that clean fusion energy, which is 100% carbon free, should be eligible for 48C credits and other DOE programs to encourage the commercialization of fusion?
- A4A. The Qualifying Advanced Energy Project Credit, or 48C, provides a 30% Investment Tax Credit for qualifying advanced energy projects as defined by § 613(e)(2) that re-equips, expands, or establishes an industrial or manufacturing facility for the production or recycling of property designed to be used to produce energy from a variety of clean and renewable resources. According to the guidance provided by the Internal Revenue Service, examples of eligible advanced energy property include specialized components and equipment for nuclear power reactors or their fuels (e.g., including components and equipment for fabrication of fuels, and manufacturing of equipment for conversion, enrichment, and deconversion), and equipment used to reduce the emissions of industrial facilities, such as heat and process emissions. Accordingly, the manufacturing of fusion energy components or materials may be considered an eligible project under 48C.

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Q4B: The current DOE fusion program within the Office of Science focuses predominantly on research and development, without a specific mandate to facilitate the commercialization of fusion technology. DOE's FY25 fusion energy budget request appears focused on basic fundamental research.

What is DOE doing to accelerate the commercialization of fusion energy, beyond R&D?

A4B. While fundamental research is an important part of the Fusion Energy Sciences (FES) mission serving as the engine of innovation, the FY 2025 budget request includes strong support to facilitate the commercialization of fusion energy consistent with the authorization in the Energy Act of 2020 "to support the development of a competitive fusion power industry in the United States." It includes continued support for the Innovation Network for Fusion Energy program which enables private fusion companies to access and leverage the world-class expertise and capabilities in fusion science available at the DOE national laboratories and U.S. universities, the Milestone-Based Fusion Development Program which supports private fusion companies to develop preconceptual designs for Fusion Pilot Plants and technology roadmaps, and the Fusion Innovation Research Engine (FIRE) Collaboratives were launched in FY 2024. These aim to de-risk Fusion Materials and Technology (FM&T) gaps for the benefit of both public and private fusion ecosystems. In addition, the FES program will continue to build the necessary scientific and technology foundation for fusion as a future energy source.

Q4C. How can the DOE help build the necessary infrastructure and supply chain to enable the scaled deployment of fusion energy in alignment with the President's Bold Decadal Vision?

A4C. Supply chain issues are critical for the deployment of fusion energy. The Fusion Energy Sciences (FES) program is working with the private sector to assess supply chain challenges. In addition, FES is working with like-minded nations such as the United Kingdom and Japan, to identify and support the development of resilient supply chains that will be necessary for commercial fusion deployment. Many of the challenges to make commercial fusion energy a reality involve foundational questions around sustaining a fusion plasma, harnessing fusion power, and engineering for extreme

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conditions. FES will continue to work with the private sector to address this issue as well as utilize its existing research program to find solutions.

- Q5. I was proud to have authored and championed two of the three subprograms that make up the Department's Grid Resilience and Innovation Partnerships (GRIP) program and glad to see they have all been very popular. In fact, it appears that they are so popular that they have been greatly oversubscribed by worthy applications during each round of funding opportunity.
- Q5A. Could you please describe the cumulative interest by qualified applications for each GRIP subprogram and funding opportunity as compared to the funding available?
- A5A. The Department of Energy (DOE) has received significant demand in the GRIP program, demonstrating that the program is critical to addressing the combined effects of the aging grid infrastructure and increased threat of severe weather events.

During the first round of the GRIP program, applicants submitted 741 concept papers, which resulted in 308 full application submissions and more than \$19.5 billion in total federal funding requests. Specifically, across the GRIP funding programs, the DOE received 122 full applications under the Grid Resilience Utility and Industry grants (Topic Area 1), 134 full applications under the Smart Grid Grants (Topic Area 2), and 52 full applications under the Grid Innovation Program (Topic Area 3). In October 2023, the DOE announced up to \$3.46 billion in GRIP investments for 58 projects across 44 states to strengthen electric grid resilience and reliability across America. Of the 58 projects selected for funding, 16 were selected under Topic Area 1, 34 under Topic Area 2, and 8 under Topic Area 3.

On November 14, 2023, the DOE announced the FY 2024-2025 GRIP funding opportunity of up to \$3.9 billion and is currently reviewing eligible application submissions. The DOE anticipates making selections in the Fall of this year and can provide updated information on subscription numbers once an analysis has been completed on the second round.

- Q6. As you know well, DOE has invested hundreds of millions of dollars into silicon anodes, which increase the energy density of lithium-ion batteries and reduce the need for

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Chinese graphite. We visited a couple of these new facilities being built in my state together in February. These anodes are made by processing graphite with silicon to make a silicon-graphite composite. This composite is a “constituent material” that can help automakers qualify their vehicles for the 30D tax credit. To support the growing domestic silicon anode industry, it is important that this composite is also subject to Foreign Entity of Concern (FEOC) rules. The Administration's proposed FEOC rules state that constituent materials must be FEOC compliant.

- a. As DOE prepares to finalize its Foreign Entity of Concern (FEOC) rule, will you include silicon-graphite composite as a specific example of an important constituent material that must be FEOC compliant, in order to ensure certainty for investment decisions today?
 - b. Will you also encourage your colleagues at the Treasury Department to include silicon-graphite composite as an important example of a constituent material that must be FEOC compliant?
- A6. DOE's final interpretive guidance on the statutory definition of “foreign entities of concern” was released on May 3, 2024. This guidance provides DOE's interpretation of the definition of the term “foreign entity of concern” (FEOC) found within BIL 40207(a)(5). The extent to which different segments of the battery supply chain are subject to FEOC restrictions is outside the scope of DOE's guidance. For the BIL 40207(b) battery materials processing and BIL 40207(c) battery manufacturing and recycling grant programs, the review of FEOC compliance will apply to all applications and projects under the grant program, regardless of where they fall within the battery supply chain.

For the 30D tax credit, the Treasury Department (Treasury or UST) and IRS outlined the applicable segments of the battery supply chain that were subject to both the value calculations and non-FEOC sourcing requirements for 30D compliance. DOE advised UST on technical matters for the 30D tax credit, as part of an ongoing interagency agreement to support an array of IRA tax credits. In UST's final rulemaking for both 30D

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and 25E, released on May 3, 2024, UST highlighted the following relevant pieces subject to FEOC compliance review under 30D:

- All constituent materials that contain applicable critical minerals are subject to non-FEOC sourcing requirements for their extraction, processing, or recycling. The list of applicable critical minerals, which was identified in statute in IRA 45X, includes some high purity forms of graphite but does not include any forms of silicon. Therefore, the graphite material in a silicon-anode blend is subject to non-FEOC sourcing requirements.
- The manufacturing and assembly of all battery components that contain constituent materials is subject to non-FEOC sourcing requirements under 30D. This means that the manufacturing of electrodes or cells that contain graphite and other materials, such as silicon, is subject to non-FEOC sourcing requirements.

Q7. The advanced nuclear energy community, including TerraPower based in my home state, are waiting for the Department of Energy to move forward on its plan to establish a domestic uranium enrichment supply chain right here in the United States. As you know, high-assay, low-enriched uranium, or HALEU, is set to power the future fleet of advanced reactors.

Q7A. What steps is the Department taking to fully implement the HALEU availability program, as well as the provisions of the Nuclear Fuel Security Act, which Congress passed as part of last year's NDAA, and funded at \$2.7 billion in the FY24 omnibus?

A7. The Department of Energy (DOE) agrees that developing a domestic supply chain for high-assay low enriched uranium (HALEU) is critical to ensure that advanced nuclear reactors, including microreactors, can be effectively deployed in the United States.

DOE recognizes the need to expedite the development of a domestic supply chain for HALEU and is working to address this challenge in the face of ongoing global events. As an example, last November DOE finalized an award for the operation of the Piketon Demonstration Cascade to produce 900 kg of HALEU per calendar year. In addition, DOE has issued two requests for proposals to incentivize the commercial production of HALEU in the United States, one for enrichment services for HALEU and a second for

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the deconversion of HALEU from gas to solid. These are two steps critical in building the commercial supply of HALEU for advanced reactors.

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QUESTIONS FROM SENATOR JAMES E. RISCH

- Q1. Secretary Granholm, last week the Subcommittee on Water and Power received testimony from Edison Electric Institute that the electric power sector has found great value in DOE's Energy Threat Analysis Center (ETAC). The testimony expressed that ETAC has been instrumental to developing mitigation strategies to protect critical energy infrastructure from nation-state adversaries like Volt Typhoon. I understand DOE has included \$5 million in its FY25 budget request for ETAC.
- Q1A. What do you need from Congress to build off of the success of the ETAC pilot?
- A1A. The Department of Energy (DOE) has been piloting ETAC, and it has proven to be an incredibly important operational capability to address nation-state threats such as Volt Typhoon activity attributed to the People's Republic of China. DOE looks forward to working with Congress on securing funding for ETAC as requested in the FY 2025 Budget to ensure it can be a sustained capability to address the growing cyber threats facing electricity, oil, and natural gas companies across the country through robust public-private partnerships, technical capabilities of the DOE national laboratories, such as Idaho National Laboratory, and support broader national security priorities. DOE would be happy to provide you with a briefing on the status of ETAC, including specific threats ETAC is currently tackling.
- Q2. Secretary Granholm, I understand the ETAC is meant to be complementary to other public-private information sharing mechanisms, like the Electricity Information Sharing & Analysis Center (E-ISAC) and CISA's Joint Cyber Defense Collaborative (JCDC).
- Q2A. How does DOE plan to ensure the success of each of these lines of effort and prevent duplication of effort?
- A2A. The Department of Energy (DOE) is working closely with both Cybersecurity and Infrastructure Security Agency's (CISA) Joint Cyber Defense Collaborative (JCDC) and the Electricity Information Sharing & Analysis Center (E-ISAC) on the Energy Threat Analysis Center (ETAC) pilot. While the JCDC is focused on addressing cross-sector/multi-sector risks, DOE is considered a spoke off of the JCDC that will focus on unique energy sector threats given the expertise at the Department, in the sector, and through the DOE national laboratories. The U.S. energy sector is one of the fastest

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growing sectors and is becoming increasingly digitally connected with new sources of generation, new market players, and new manufacturers owning and operating grid infrastructure. At the same time, the energy sector continues to be a target for nation-states like the People's Republic of China and Russia, along with criminal groups (e.g., hacktivists and ransomware criminals). The E-ISAC also continues to be an important partner in all ETAC pilot activities. The E-ISAC has dedicated a full-time analyst who works with ETAC representatives from energy companies, DOE subject matter experts, and DOE national laboratories to ensure that there is close coordination on threats to the sector. Further, the E-ISAC and electric utilities in the sector have contributed to developing the governance structure for the ETAC.

Q2B. How will DOE ensure it is sharing timely, actionable threat information with industry?

A2B. The Department of Energy (DOE) is committed to ensuring timely threat information sharing with the U.S. energy sector. The ETAC has already produced cyber advisories and "hunt guides" for Volt Typhoon activity, along with a number of other advisories. As we continue to build the ETAC, the Department's Office of Cybersecurity, Energy Security, and Emergency Response (CESER) is committed to enhancing its existing information-sharing platforms. A prime example is the Cybersecurity Risk Information Sharing Program (CRISP), which facilitates the real-time exchange of cyber threat data between the DOE and the energy sector. CESER plans to integrate more advanced analytics technologies into CRISP and expand the range of threat indicators shared. The objective is to provide industry partners with immediate access to vital cybersecurity information, enabling them to take quick and effective defensive actions.

CESER is actively working to strengthen its partnerships with other key government agencies and industry groups. By fortifying collaborations with the Department of Homeland Security (DHS) and its Cybersecurity and Infrastructure Security Agency (CISA), as well as with industry groups like the Electricity Information Sharing and Analysis Center (E-ISAC), CESER aims to facilitate a seamless flow of information

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across different levels and sectors. This network of partnerships ensures that all relevant parties receive the necessary information to protect their systems effectively.

Recognizing the dynamic nature of cyber threats, CESER prioritizes keeping the energy sector well-informed through regular briefings, alerts, and updates. These communications are meticulously designed to provide the latest information on cyber threats, potential vulnerabilities, and recommended protective measures. The goal is to keep the energy sector informed and prepared to respond to new and emerging threats as swiftly as they are identified.

CESER has implemented robust feedback mechanisms to ensure the effectiveness of these efforts. These mechanisms allow industry stakeholders to report on the relevance and utility of the information provided and submit their own information and observations. Such feedback helps to assess and continuously improve the quality and relevance of the threat information shared, ensuring it meets the precise needs of industry stakeholders.

- Q3. Last year, the DOE released its Critical Materials list, which includes several minerals not identified by the Department of the Interior as critical minerals. The DOE's list is more encompassing and less restrictive in its approach. Unfortunately, the differences between the DOE and DOI lists have the potential to cause confusion, and in turn, reduce the effectiveness of being on a list. As we consider geopolitical events, supply chain vulnerabilities, and changing market dynamics, wouldn't providing greater access to permitting efficiencies and funding opportunities for all minerals – not only those deemed by the federal government to be "critical" – better position the U.S. to meet the significant demand challenges the U.S. and our allies face now and into the future?
- A3. The Energy Act of 2020 defines a "critical material" as any non-fuel mineral, element, substance, or material that the Secretary of Energy determines: (i) has a high risk of supply chain disruption; and (ii) serves an essential function in one or more energy technologies, including technologies that produce, transmit, store, and conserve energy; or are "critical minerals" as defined by the Secretary of Interior, through the director of

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the U.S. Geological Survey (USGS). By definition, all critical *minerals* are critical *materials*.⁵

The USGS and DOE lists are designed to be complementary and serve separate purposes. The DOE list is based on the Department's most recent critical materials assessment, the 2023 DOE Critical Materials Assessment, and focuses on the importance and criticality of materials to energy and decarbonization technologies, with an emphasis on future criticality that accounts for changing market conditions on a global scale. USGS's list was revised in 2022 and evaluates the criticality of minerals based on domestic economic vulnerability and disruption potential.

The DOE and DOI, through the Interagency Working Group on Mining Laws, Regulations, and Permitting (IWG), released a report⁶ containing recommendations to reform and improve mining, including permitting on U.S. public lands.

- Q4. Over the past several months, there have been concerning developments relating to counterintelligence at the Department. Ranking Member Barrasso and I, along with several of our colleagues, wrote to you at the end of last year discussing this issue, namely the quiet and unexplained "reassignment" of the long-serving Director of DOE-*IN* and information relating to DOE counterintelligence concerns that were long withheld from Congress.

The response to my letter was woefully inadequate and came from the Deputy Secretary instead of you. In the meantime, this problem has only grown worse. More than 10,000 citizens of China and Russia worked with our Labs in Fiscal Year 2023. Even worse, my office was made aware through a letter written by United Against Nuclear Iran (UANI), which I submitted to the hearing record, that DOE's National Renewable Energy Laboratory recently published a paper in collaboration with a researcher at a U.S. sanctioned Iranian entity—Sharif University of Technology. This is completely unacceptable. I am a strong supporter of DOE research—especially at our National Labs—and that research must be carefully and thoughtfully safeguarded.

Secretary Granholm, I know you are aware of these deeply concerning trends in the Labs and that the counterintelligence at your agency has been sorely lacking for far too long.

⁵ SEC. 7002 of the Energy Act of 2020 (30 USC 1606)

⁶ <https://www.doi.gov/sites/doi.gov/files/mriwg-report-final-508.pdf>

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With that in mind, I am resubmitting the questions I asked in the letter for your response to record, along with the following additional questions related to this troubling issue.

- Q4A. Why was Director Black reassigned from the role he has held for 11 years?
- A4A. The Department does not discuss personnel matters. Director Black served in his prior position longer than any other head of an IC element, and we greatly value his service to the Department of Energy and the nation.
- Q4B. Did the findings outlined in the contractor study factor into your decision to reassign him?
- A4B. The Department does not discuss personnel matters.
- Q4C. In which part of the Department will he serve as “Senior Advisor”?
- A4C. Director Black initially took on an advisory role in the Office of Cybersecurity, Energy Security, and Emergency Response (CESER). He has since assumed the DOE Faculty Chair at the National Defense University, on Ft. McNair.
- Q4D. When were you made aware of the contractor study that was transmitted to DOE-IN on April 24?
- A4D. In the late summer of 2023.
- Q4E. Do you agree with the findings in the study?
- A4E. DOE is committed to evaluating and addressing the concerns identified in the study and maintaining the trust of DOE’s partners. We are in agreement that many of the findings of the report required immediate attention. Director Tilden has been leading a series of corrective actions and improvements, and DOE has already made great strides to address several findings. While some findings are simple to address, others will require longer term efforts—and in some cases additional resources—and are therefore ongoing.

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- Q4F. What are you doing to address these concerns? Are you concerned that we are giving important, fundamental, and basic research to our adversaries, who without doubt, will use it against us?
- A4F. We have developed a counterintelligence enhancement program and have addressed eight of the findings to date. A top concern in the report was inadequate resources for DOE's counterintelligence functions. Accordingly, we are also seeking additional funding in FY25 for the counterintelligence program.
- DOE has systems in place for mitigating risks associated with foreign nationals accessing our national laboratories. We have taken actions to prevent key technologies developed in the United States from being unlawfully transferred, focusing on ensuring that the technologies developed are used to benefit the U.S. economy, and to ensure that all foreign nationals seeking access to DOE laboratories are subject to some level of vetting. We are absolutely concerned about the potential risks that all adversarial foreign governments pose to our scientific and technological development ecosystem, intellectual property, and the jobs and other economic benefits to the United States that flow from these developments. DOE is continuing to build on the work the Department and the national laboratories have undertaken in recent years to mitigate these risks, and we appreciate the support and resources provided by Congress to execute this critical part of the Department's mission.
- Q5. We are at a time of nearly unprecedented success and support for developing advanced nuclear energy technologies. There are several exciting projects expected to demonstrate new breakthrough technologies in the coming years, and this is great news for nuclear. However, it is equally important that we not only get advanced reactors demonstrated, but also deployed. What is the Department doing to help these first-of-a-kind technologies get deployed and are there additional authorities or flexibilities that would be helpful for DOE to help the private sector achieve that end?
- A5. Advanced nuclear technology may assist the United States in achieving net-zero emissions, economy-wide, by no later than 2050. The Department of Energy (DOE) is working to accelerate the timeline for the domestic deployment of these technologies, to include advanced reactors. DOE currently is supporting two advanced reactor

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demonstration projects in partnership with TerraPower and X-energy, through DOE's Office of Clean Energy Demonstrations (OCED).

In addition, DOE, through its office of Nuclear Energy (NE), has partnered with industry to cost-share five projects through the Risk Reduction pathway of the Advanced Reactor Demonstration Program (ARDP) to further reduce the regulatory and technical risks for a diverse portfolio of advanced reactor designs. DOE is also supporting early-stage research and development activities at universities, national laboratories, and industrial partners, that are needed to drive efficiencies and innovation, as well as coordinating closely with the NRC and industry to address and resolve key regulatory framework issues that directly impact the timely demonstration and deployment of advanced reactors.

DOE's National Reactor Innovation Center (NRIC) is supporting a number of activities to enable and accelerate the development of advanced reactors. NRIC is establishing two test beds at Idaho National Laboratory where industry can operate and test experimental reactors to obtain the data required to support design and licensing. NRIC has also partnered with a team led by General Electric-Hitachi to develop advanced construction technologies that could significantly reduce the cost and schedule for new nuclear builds.

Finally, the Consolidated Appropriations Act of 2024 (P.L. 118-42) Section 311 made up to \$800 million of the unobligated Infrastructure Investment and Jobs Act (IIJA, Public Law 117-58) funds available for not more than two commercial utility deployment, grid scale Gen III+ small modular reactor (SMR) projects and an additional \$100 million for one or more competitive awards supporting design, licensing, supplier development, and site preparation of a grid-scale Gen III+ reactor design. With available appropriations, DOE is assessing options for focusing DOE and non-federal resources on a credible and sustainable pathway to fleet-level deployment of Generation 3+ small modular reactors (SMR), as well as continuing efforts to improve the domestic foundation to deploy new nuclear technologies. Generation 3+ SMRs build upon the technology of the existing fleet of nuclear reactors by utilizing light water for cooling on a smaller scale than the existing

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fleet, typically between 50-700 MWe. These initiatives are being undertaken with the objectives of reducing key commercialization risks to support industry's deployment of an initial orderbook for advanced nuclear reactors.

- Q6. As you know, my state is home to the Idaho National Laboratory, the nation's nuclear laboratory and a key contributor to U.S. nuclear technology development. This includes supporting advanced reactor demonstration projects and fuel facilities like those undergone by companies like TerraPower and X-Energy. These projects received significant federal commitments to a public-private partnership through the Advanced Reactor Demonstration Program (ARDP). While the Infrastructure Investment and Jobs Act partially forward-funded the program, it did not fully fund it, and the programs require additional appropriations to meet the government's cost share obligation. Despite this, the President did not request any annual appropriations for these demos, either through the ARDP program, or through the Office of Clean Energy Demonstrations (OCED). Secretary Granholm, these commercial demonstrations are critical to maintaining American nuclear technology leadership; why did the President choose not to fund them in 2025?
- A6. The Department did not request additional funds for the two large scale demonstrations under the Advanced Reactor Demonstration program as it continues to work with the awardees on rebaselining efforts that will inform future funding requests.
- Q7. Secretary Granholm, your agency has put a significant focus on clean energy support and research. I hope you and I can both agree that advanced nuclear will have to play a central role in any conversation surrounding clean energy development. With that in mind, I'm extremely concerned by your budget request relating to several items necessary for advanced nuclear development and the important work being done at the Idaho National Lab.
- Q7A. Why did you request decreased funding for the MARVEL microreactor at \$16.5 million compared to \$20 million in the FY24 enacted—a project that is a vital demonstration for all upcoming microreactor technology?
- A7A. The Department agrees that MARVEL will be a vital nuclear test platform for demonstrating microreactor technologies and end-use applications. The FY 2025 Budget will support completion of fabrication of fuel and components for the MARVEL test platform and initiate construction.
- Q7B. Why did you request decreased funding for the National Reactor Innovation Center (NRIC) at \$31 million compared to \$65 million in the FY24 enacted—endangering the

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construction of the DOME and LOTUS test beds, which will be necessary for demonstrating advanced reactor technologies?

- A7B. The FY 2025 funding level for NRIC supports completion of construction of the Demonstration of Microreactor Experiments (DOME) test bed in FY 2025 to enable DOME to be ready to accept the first test as soon as FY 2026. Reduced funding is required in FY 2025 since the majority of construction costs were provided in FY 2023 and FY 2024. The FY 2025 request also fully funds other project costs for the LOTUS project, to enable that project to remain on schedule.
- Q7C. Why did you request decreased funding for Idaho Sitewide Safeguards and Security at \$150 million compared to \$160 million in the FY24 enacted—a decrease that would endanger the ability to keep INL's assets secure?
- A7C. The Department's fiscal year 2025 request for the Idaho Sitewide Safeguards and Security Program provides sufficient funds to ensure INL maintains a safe, secure posture consistent with Departmental requirements. New for this year, the Department's budget request revises the Idaho Sitewide Safeguards and Security Program by shifting transactional, administrative security activities (such as clearance investigations and document reviews) to customers requesting the service. Historically, administrative security activities fluctuate based on program objectives, making it difficult to predict annual costs in advance and resulting in execution year trade-offs within the Idaho Sitewide Safeguards and Security Program. This revised model improves the Department's ability to adjust to changing stakeholder need for these services within the execution year without impacting physical security and cybersecurity activities, which are fixed in nature. In moving to this model, the Department's budget request places emphasis on the physical security and cybersecurity resources needed to maintain INL's security posture.

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QUESTIONS FROM SENATOR CATHERINE CORTEZ MASTO

Q1. I am concerned that the guidance (Revenue Procedure 2024-19) for the Low-income Communities Bonus Credit, jointly administered by Treasury and the Department of Energy (DOE), reduces the amount of capacity for Category 1 residential behind-the-meter projects. This reduction will negatively impact states like Nevada that have an active residential solar market, but no regulatory framework to support Category 3 or Category 4 projects. Subtracting capacity from residential solar does not reflect what is being built in the market, where the deployment ratio of residential solar to community solar was nearly 7:1 in 2023, and the former is available in all states, not just the handful of states with community solar programs.

Why did the Department choose to reduce the Category 1 allocation?

A1. The amount of Capacity Limitation for the 2024 Program year available for allocation through the application process is limited to the annual Capacity Limitation of 1.8 gigawatts of direct current capacity plus any unallocated Capacity Limitation carried over from the 2023 Program year. On May 13, 2024, the U.S. Department of the Treasury and IRS announced that approximately 324.8 megawatts of available capacity will rollover to the 2024 Program Year. The allocation of the rollover capacity across various categories has resulted in a total of 800 MW of capacity to be made available for Category 1 in the 2024 Program year, which is an increase of 100 MW compared to Program Year 2023.

Q2. For the Low-Income Communities Bonus Credit, extended gaps between program years are disruptive to project developers and deter investment in low-income communities. To the extent that reviewing applications from 2023 has delayed the opening of the 2024 program year, I encourage you to consider ways that application reviews can be expedited and made more efficient. One solution would be for the Department of Energy (DOE) and Internal Revenue Service (IRS) to conduct an automated review of Category 1 residential behind-the-meter applications and allocate capacity to them on a real-time basis, and to more thoroughly review those applications to confirm their eligibility before IRS issues an award.

Will DOE consider this option and other ways to streamline program applications?

Q2. Yes. DOE and IRS are committed to facilitating an expedient application review and allocation award process.

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Please note that application submissions for the 2023 Program Year of the Low-Income Communities Bonus Credit Program closed on February 29, 2024. On May 13, 2024, the U.S. Department of the Treasury and IRS announced that the 2024 Program Year will open on May 28, 2024. The three-month gap between the closing of the 2023 Program Year and the opening of the 2024 Program Year was necessary to complete remaining application reviews and prepare the Applicant Portal for the next program year.

- Q3. For the Low-Income Communities Bonus Credit, instead of a 30-day application period and lottery, it was my expectation that the 2024 program year would offer a rolling application process, in-line with the best practices of solar incentive programs at the state level.

Is it still the case the 2024 program year will work in this manner?

- A3. The application period opened on May 28. All applications submitted within the first 30 days, by 11:59 pm ET on June 27, will be treated as submitted on the same date and at the same time. This ensures that all applicants, regardless of size or resources, have an equal opportunity to participate. Following the initial 30-day period, DOE accepts applications on a rolling basis until the close of the 2024 program application period.
- Q4. The successful implementation of the Inflation Reduction Act (IRA), including the Advanced Manufacturing Production Tax Credit (or 45X), underpins the Department of Energy's (DOE) efforts to help secure critical mineral supply chains. The Treasury Department's recently proposed 45X guidance states that the definition of "costs incurred" would exclude extraction and materials costs. In other words, companies at the beginning of the supply chain of critical minerals will be excluded from accessing this crucial tax credit.

Does DOE believe that excluding extraction and materials costs from 45X is helpful in achieving secure supply chains for critical minerals?

- A4. DOE believes the 45X tax credit is an important incentive for developing secure and resilient U.S. critical minerals supply. As part of our technical support to Treasury, we are carefully reviewing stakeholder comments on the proposed guidance, which specifically invited public input on "whether and how extraction and other similar value-added activities in the production of raw materials used in applicable critical minerals should be

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taken into account.” We will continue to provide technical support to Treasury and the IRS as they incorporate comments on this issue and finalize the rule.

- Q5. As expressed throughout the Fiscal Year (FY) 2025 Budget Request, it is increasingly essential for our country to have a reliable supply of domestic critical minerals. That is why I secured an authorization of \$400 million for the Department of Energy (DOE) in the Infrastructure Investment and Jobs Act (IIJA) to prioritize grants that focus on strengthening every stage in our domestic critical mineral supply chain.

Will you commit to working with me and my colleagues to ensure that this program receives appropriated funds?

- A5. We are focused on strengthening our critical mineral supply chain, and we would welcome the opportunity to work with you and your staff to provide the adequate resources for this and other programs.

- Q6. All of the activity that your Department has done to implement the Bipartisan Infrastructure Law and Inflation Reduction Act programs has been a critical development for our economy. I understand the Department of Energy (DOE) is close to finalizing its portion of the Foreign Entity of Concern definition. This criteria will be vital for both on- and near-shoring U.S. technologies.

What is the status of this criteria, and how is DOE working with Treasury and other Departments to make sure there is appropriate oversight of taxpayer dollars?

- A6. On May 3, 2024, DOE and UST released finalized documents related to the 30D tax credit and the definition of foreign entity of concern. DOE finalized its interpretive guidance on the statutory definition of “foreign entity of concern” (FEOC) in Section 40207 of the Bipartisan Infrastructure Law (BIL). The FEOC interpretive guidance is designed to limit the participation of FEOCs in domestic battery supply chains and bolster the growth of domestic and friend-shored battery materials processing and manufacturing. It is finalized largely as originally proposed in December 2023, with refinement and clarifications that take into account public comments, and will aid automakers and other stakeholders in identifying FEOCs in their battery supply chains.

Additionally, the Department of the Treasury (Treasury) and the Internal Revenue Service (IRS) released their final rule implementing the Section 30D Clean Vehicle Tax Credit, as

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amended by the Inflation Reduction Act. This rule cross-references DOE's FEOC interpretive guidance. DOE worked closely with Treasury and the IRS to ensure that the FEOC interpretive guidance is administrable in the context of both the BIL Section 40207 grant program and the Section 30D Clean Vehicle Tax Credit.

BIL defines a FEOC, in part, as an entity that is "owned by, controlled by, or subject to the jurisdiction or direction of a government of a foreign country that is a covered nation." Covered nations are defined by statute as the People's Republic of China, the Russian Federation, the Islamic Republic of Iran, and the Democratic People's Republic of North Korea. Pursuant to DOE's guidance interpreting this phrase, an entity is considered a FEOC if (1) it is incorporated or domiciled in, or has its principal place of business in, a covered nation; (2) it engages in the extraction, processing, or recycling of relevant critical minerals, the manufacturing or assembly of relevant components, or the processing of relevant materials, in a covered nation; (3) 25% or more of the entity's board seats, voting rights, or equity interest, with each metric evaluated independently, are cumulatively held by that other entity, whether directly or indirectly via one or more intermediate entities; or (4) it has entered into a licensing arrangement or other contract with another FEOC that entitles that other entity to exercise effective control over the extraction, processing, recycling, manufacturing, or assembly of the critical minerals, battery components, or battery materials that would be attributed to the entity.

- Q7. Last week, this Committee's Subcommittee on Water and Power received testimony regarding the electric power sector's support for prioritizing and resourcing the most critical of U.S. energy infrastructure, including Defense Critical Electric Infrastructure (or DCEI). The Department of Energy's Fiscal Year (FY) 2025 Budget Request calls for \$2.5 million for DCEI, though I understand much of the work to identify and prioritize DCEI has already been completed.

Can you please explain how DOE would utilize these funds to further coordinate with other federal agencies and investor-owned electric companies to harden the grid?

- A7. The Department of Energy (DOE) and the U.S. government have publicly identified that foreign adversaries view the potential disruption of U.S. energy infrastructure as a way to

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disrupt U.S. defense activities – and that these adversaries are actively targeting U.S. energy infrastructure for geopolitical purposes.

With this in mind, the objective of the DOE's Defense Critical Energy Infrastructure (DCEI) program is to strengthen and secure U.S. energy infrastructure systems that support defense and national security missions and ensure their resilient operation.

The Office of Cybersecurity, Energy Security, and Emergency Response (CESER) works in close partnership with the Department of Defense (DOD) and other interagency partners to coordinate, and provide a wealth of knowledge and specialized expertise, enabling the identification of threats and hazards, evaluation, and prioritization of risk to energy sector and the development of executable strategies to strengthen DCEI.

The Department's FY25 budget request for the DCEI program would expand its ability to carry out technical assessments that will provide actionable recommendations for DCEI owners and operators, with the goal of enhancing the security and resilience of their infrastructure. These assessments are rooted in CESER's deep technical expertise on energy systems, as well as its cross-cutting work on threats and hazards to energy infrastructure.

- Q8. A key component of the incentives for decarbonization enacted by the Inflation Reduction Act (IRA) is the tax credit under section 45Q, which offers a credit for capturing carbon oxide and then either geologically sequestering it or utilizing it for a commercial process. However, the amount of credit for CO2 utilization depends upon preparation of a lifecycle analysis (or LCA) to demonstrate the tons of carbon dioxide that were displaced from being emitted through use of the process. Treasury has published regulations requiring taxpayers to have their LCAs approved by the Internal Revenue Service (IRS) and the Department of Energy (DOE) before they can claim the credit. I am hearing from Nevada stakeholders that the approval process is not working as intended, requiring burdensome and lengthy interchanges of information and taking multiple years to extract an approval, extending far beyond the tax year in which the credit is supposed to have been claimed.

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How is DOE managing the review and approval of submitted LCAs? Is the Department considering innovative approaches to attain the necessary information and streamline the approval process?

- A8. The primary focus in the lifecycle analyses (LCAs) submitted for the 45Q tax credit for carbon capture and utilization is a quantitative comparison of the taxpayer's lifecycle greenhouse gas emissions for the facility of interest to a reference process for yielding the same products. This comparison determines the amount of qualified carbon oxides that were either "captured and permanently isolated from the atmosphere" or "displaced from being emitted into the atmosphere" through use of an eligible utilization process (26 CFR 1.45Q-4(b)(1)). As described in 26 CFR 1.45Q-4(c)(6), DOE provides input to the IRS in the form of a technical review, but IRS alone maintains approval authority for the LCA and eligibility for the tax credit.

The majority of LCAs reviewed by DOE to-date have not adhered to the ISO standards (14040:2006 - Life cycle assessment, Principles and framework and 14044:2006 - Life cycle assessment, Requirements and Guidelines) nor the National Energy Technology Laboratory (NETL) template (Carbon Dioxide Utilization (CO2U) Life Cycle Analysis Guidance for the U.S. DOE Office of Fossil Energy and Carbon Management and NETL 45Q Addendum to the CO2U LCA Guidance Toolkit). For LCAs that were not in alignment with the guidance, DOE provided a review report to the IRS, which was subsequently provided to the taxpayers, that detailed inconsistencies with the guidance and recommendations for revisions. The most common issue identified as part of the critical reviews is the selection of a comparison process that is inconsistent with the NETL guidance.

DOE is leveraging technical expertise at NETL to complete the LCA reviews and that team has added staff to support this effort through dedicated funding from the IRS through an interagency fund transfer. DOE is working in close coordination with the IRS with the support of NETL to continuously improve the resources available to taxpayers to assist in preparing and submitting the LCAs submitted for the 45Q credit for carbon capture and utilization. DOE and NETL are working on approaches to streamline the

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LCA review process to prevent iterative reviews through the development of more standardized data as well as example LCA reports that are consistent with the NETL guidance. The goals of these resources include aiding taxpayers in submitting complete and accurate LCAs, facilitating timely review, and improving transparency. The careful review of a taxpayer's LCA of their utilization process is an important step in the process of claiming the 45Q credit to ensure facilities claiming the credit are reducing CO2 emissions at the level for which they are claiming.

- Q9. According to a recent report by the International Energy Agency (IEA), 2,700 data centers across the United States required more than 4 percent of the country's total electricity demand in 2022. By 2026, that number is expected to grow to 6 percent of total electricity demand.

Can you please summarize how the Fiscal Year (FY) 2025 DOE Budget Request would tackle growing energy demand and allow for further collaboration with industry stakeholders to bolster energy efficiency, resilience, and environmental sustainability opportunities?

- A9. DOE's FY 2025 Budget Request would allow DOE to continue its efforts to manage the growing demand of data centers and further collaborate with stakeholders to bolster energy efficiency and resilience.
- The DOE's Advanced Materials and Manufacturing Technologies Office will continue to support the Energy Efficiency Scaling for 2 Decades (EES2) initiative which is focused on RD&D to support innovations for microelectronics energy efficiency to counter the surge in computing and other microelectronics related electricity use. The EES2 partnership, which now includes 65 major companies, national labs and universities, has a goal of reaching 1000X energy efficiency increase over the next 20 years.
 - DOE Office of Science's Advanced Scientific Computing Research office released a FOA in February on AI software-hardware co-design that included a topic on Energy Efficiency and DOE SC released a Lab call on Microelectronics Science Research Center Projects for Energy Efficiency and Extreme Environments as authorized by

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the CHIPS and Science Act's "Micro Act" Bot of these are expected to result in awards that tackle data center efficiency.

- To better understand future energy consumption, DOE's Lawrence Berkeley National Laboratory is currently performing a detailed national analysis of regional energy and water use across our nation's data centers, as required by the Energy Act of 2020.
- To make microelectronic semiconductors hardware and associated software dramatically more energy efficient, DOE will undertake roadmapping, analysis, and stakeholder engagement efforts, including the preparation and sharing of data and analysis to inform investment in manufacturing technologies needed to produce high efficiency microelectronics.
- To reduce data center resource usage, DOE offers technical assistance programs in support of data centers, including the Better Plants Challenge, Better Climate Challenge, Energy Management Program, and the Onsite Energy Program. Ongoing activities in water and waste-water treatment through the Cross-Sector Technologies subprogram will explore efforts to reduce water and energy consumed for cooling of data centers.
- DOE will continue efforts to power data centers with clean, renewable energy by investing in R&D to advance clean energy technologies, providing technical assistance to overcome regulatory barriers, and enabling the integration of more renewable energy into the grid. For example, DOE will continue support of the Enhanced Geothermal Shot by investing in well stimulation and construction R&D, and provide validated data, tools, and technical assistance to public utility commissions and state energy offices to help them meet clean energy targets using renewable power sources.
- Further, Secretary Granholm's Energy Advisory Board chartered a new working group to make recommendations on meeting energy demand for AI and data center

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infrastructure. DOE's Office of Cybersecurity, Energy Security, and Emergency Response will be convening energy stakeholders and technical experts to collaboratively assess ways in which AI could potentially strengthen grid resilience.

- The DOE's Office of Fossil Energy and Carbon Management FY25 Budget Request supports the development of tools and information that help decisionmakers better understand the role of carbon management technologies in an ever-evolving energy and industrial economy. The associated FY25 Budget Request also supports development of modeling capabilities and analytical products that can be used to help inform decisions on ensuring U.S. electricity supplies will be adequate to accommodate demand growth while the U.S. electricity sector is simultaneously transitioned to achieve net-zero carbon emissions by 2035.
- DOE is continuing to support researchers and industry in developing novel data center cooling technologies to reduce energy consumption and water usage through the Advanced Research Projects Agency-Energy's COOLERCHIPS program.
- The primary mission of the Nuclear Energy (NE) program is to advance nuclear power as a 24/7, baseload, reliable resource capable of contributing toward the nation's energy supply, environmental, and national security needs. To ensure that nuclear energy remains a viable energy option for the nation, NE supports research, development, and demonstration activities, when appropriate, designed to resolve the technical, cost, safety, waste management, proliferation resistance, and security challenges of increased use of nuclear energy. NE leads the federal research effort to develop nuclear energy technologies, including generation, safety, waste storage and management, and security technologies to help meet energy security, proliferation resistance, and climate goals. And we work with a variety of stakeholders to achieve these goals equitably for communities
- In addition, DOE recently announced several actions to advance AI hardware and software to manage the growing energy demand of data centers and AI. Including:

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- DOE invested \$13M in the *VoltAIC* initiative to explore AI's potential to streamline permitting and assist Federal, state, and local stakeholders.
- As part of Interconnection Innovation e-Xchange, DOE opened a funding opportunity to support improved analytical and modelling capabilities to accelerate renewable energy interconnection and released a solutions roadmap towards solving the interconnection backlog.

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QUESTIONS FROM SENATOR MIKE LEE

The responses to the QFRs were written with the information available to DOE at the time of the hearing “Oversight of the Biden Administration’s Pause on Liquefied Natural Gas Exports”, which occurred prior to the preliminary injunction issued on July 1, 2024 by the U.S. District Court for the Western District of Louisiana in *Louisiana v. Biden*.

On July 1, 2024, in *Louisiana v. Biden*, the U.S. District Court for the Western District of Louisiana granted a Motion for Preliminary Injunction and enjoined DOE and other defendants “from halting and/or pausing the approval process for pending and future applications for LNG exports of liquified natural gas to non-FTA countries, effective immediately, to remain in effect pending the final resolution of this case, or until further orders from this Court, the United States Court of Appeal, or the Supreme Court of the United States.” DOE is complying with the Court’s order and is reviewing pending non-FTA applications.

Separately, DOE is continuing to update its economic and environmental analyses that will inform its public interest decisions on non-FTA applications under section 3(a) of the Natural Gas Act. Once the analyses are completed, DOE will publish a notice of availability of the new analyses in the *Federal Register* for public comment.

- Q1. The North American Electric Reliability Corporation and the Federal Energy Regulatory Commission have sounded the alarm: the United States faces an energy reliability crisis and supply shortage. What specific sources of energy are being prioritized by the Department to replace the baseload, dispatchable power previously supplied by shuttered coal-fired power plants?
- A1. DOE has identified and is pursuing a portfolio of resources and tools as discussed in *The Future of Resource Adequacy*. A portfolio approach embraces a diverse mix of technologies which best provide reliable electricity service throughout the year and takes advantage of the full range of solutions available to ensure reliable, clean, secure, and affordable power. These solutions include generation and storage resources, grid enhancements and expansion, and demand resources, including:
- Nuclear, hydro, wind, solar, battery storage, advanced geothermal, fossil plants with carbon capture and storage (CCS), and long duration energy storage

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- Grid enhancing technologies (GETs) and reconductoring to increase capacity on existing power lines and transmission expansion to facilitate long-term growth on the grid
- Energy efficiency, distributed energy resources, flexible demand, and virtual power plants

The Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA) provide DOE with over \$25 billion to invest in these solutions and support grid reliability, above and beyond our normal annual funding. As a result of the BIL and the IRA, DOE and the private sector have an opportunity to make historic investments in these available solutions to upgrade our power system and expand power generation capacity. As an indicator, EIA projects that this year the U.S. will install 36 GW of solar (about double the previous record), 14 GW of battery storage (more than double the record amount installed in 2023), 8 GW of wind, 2.5 GW of natural gas, and 1 GW of nuclear.

- Q2. Along with Senators Heinrich, Risch, and Cortez Masto, I recently introduced the Geothermal Energy Optimization Act. This bill aims to promote geothermal energy exploration and production as a viable baseload power source. Does the Department of Energy support expanding geothermal energy production on federal lands?
- Does the Department of Energy agree that the current permitting process for geothermal exploration and development on federal lands needs to be streamlined?
 - Does the Department of Energy support legislative categorical exclusions for geothermal test wells and development?
- A2. The Department of the Interior is responsible for geothermal development on public lands. The Department of Energy supports expanding geothermal energy production on federal lands. Ninety percent of the estimated 30 GW of undiscovered naturally occurring geothermal resources in the United States are located on federal lands. The ability to access those resources is vital to expanding U.S. geothermal development and can be done in a way that protects public lands.

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The Department of Energy agrees that the current permitting process for geothermal exploration and development on federal lands needs to be streamlined, and understands the Department of the Interior has recently adopted two new categorical exclusions for geothermal exploration, and is working on establishing others. Streamlining the number of steps and the timeline to develop a geothermal project are on the critical path to reach geothermal deployment goals in the Enhanced Geothermal Shot™,⁷ and the Next-Generation Geothermal Liftoff Report.⁸ DOE's Geothermal Technologies Office is proactively working to improve interagency permitting collaboration. These efforts include co-chairing a Renewable Energy Coordination Office (RECO) Interagency Geothermal Permitting Working Group that includes federal and state agency representatives to collaboratively address opportunities for streamlining, coordination with the Bureau of Land Management, and regular meetings with DOD.⁹

The Department of Energy supports legislative categorical exclusions (CXs) for geothermal test wells and development. By reducing paperwork, resource-intensive reviews, and other delays for activities that do not have a significant environment impact, categorical exclusions shorten timeframes of the environmental review process while still ensuring necessary adherence to environmental standards. CXs have been a key tool in enabling widespread domestic oil and gas exploration. DOE estimates that creating a geothermal-specific categorical exclusion consistent with those established for oil and gas in the Energy Policy Act of 2005, and as proposed in the Energy and Natural Resources Act of 2017, would allow further permitting timeline reductions and further enable geothermal electricity-generating deployment. U.S. geothermal interests would also benefit significantly from new administrative CX authorities to expedite geothermal and other renewable permitting for project development as well as exploration and resource confirmation drilling for geothermal energy projects on previously disturbed lands (i.e.,

⁷ <https://www.energy.gov/eere/geothermal/enhanced-geothermal-shot>

⁸ https://liftoff.energy.gov/wp-content/uploads/2024/03/LIFTOFF_DOE_NextGen_Geothermal_v14.pdf

⁹ Representatives from DOD include Navy Geothermal Program Office, Air Force, Army, Defense Logistics Agency, and the Defense Innovation Unit

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brownfield sites), and co-located renewables projects on existing geothermal and/or oil and gas leases. The Department of Energy applauds the recent announcement from the Department of the Interior in adopting CXs¹⁰ from the U.S. Forest Service and Department of the Navy in order to streamline pre-drilling geothermal exploration activities and add more tools to the permitting toolbox.

- Q3A. According to a 2022 McKinsey report titled “The net-zero transition: What it would cost, what it could bring,” the global infrastructure costs to reach net zero by 2050 would be approximately \$275 trillion, or \$9.2 trillion per year.¹ What portion of this cost is expected to be covered by the United States?
- A3A. Only a small portion of this amount will be financed by global public funds, and an even smaller amount will be financed by the United States government. Combined U.S. public and private investments will depend on government fiscal and monetary policies, economic conditions, and private investors’ decision-making over the next quarter century.
- A3B. Is it fiscally responsible for the United States to contribute funding to net-zero projects in other countries?
- A3B. Yes, not only is it responsible, but it is necessary for the U.S. to grow resilient manufacturing at home. We cannot provide all of the upstream inputs needed across our clean energy and other industrial supply chains domestically. Investments abroad particularly to allied and friendly nations, advance a secure and resilient energy supply chain and system at home.
- Q4. I understand that the *goal* of the Biden administration’s support for a net zero transition is to prevent warming of more than 1.5 to 2 degrees. What *impact* will the United States’ transition to net zero have on global temperatures? Please provide a numeric response and cite the data that informs this estimate.

¹⁰ <https://www.federalregister.gov/documents/2024/04/19/2024-08382/adoption-of-categorical-exclusions-under-section-109-of-the-national-environmental-policy-act>

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- By how many degrees will global temperatures decrease as a direct result of the United States' transition to net zero by 2050? Please provide a numeric response and cite the data that informs this estimate.
- What are the expected increases in average energy costs per household due to the transition to net zero? Please respond with specific a dollar amount and cite the data that informs this estimate

A4. The impact of the United States' transition to net zero emissions on global temperatures will depend on the actions taken by other countries following our leadership around the world. The United States is currently the second largest annual emitter, emitting 5.49 billion metric tons of carbon dioxide equivalent (GtCO₂e) in 2022, equivalent to 9.6 percent of net global greenhouse gas emissions (57.4 GtCO₂e).^{11,12} According to the United Nations Environment Programme's Emissions Gap Report 2023, if current policies are continued, global warming is estimated to be limited to 3°C throughout the century. As of September 2023, the United States and 100 other countries covering approximately 82 percent of global GHG emissions have adopted net-zero emissions targets. A total of 37 percent of global GHG emissions—including the United States—are covered by net-zero targets for 2050 or earlier and will keep a 1.5°C limit on global temperature rise within reach.

The Long-Term Strategy of the United States lays out pathways to reach net-zero greenhouse gas emissions economy-wide no later than 2050 and finds the transition to net-zero emissions will deliver strong net benefits for Americans. Reducing air pollution through clean energy will avoid 85,000-300,000 premature deaths, and health and climate damages of \$150-\$250 billion through 2030, and will avoid \$1-3 trillion in damages through 2050 in the United States alone.

Q5. Do you believe natural gas usage is necessary to ensure reliable and affordable energy in the foreseeable future?

¹¹ https://www.epa.gov/system/files/documents/2024-04/us-ghg-inventory-2024-main-text_04-18-2024.pdf

¹² <https://www.unep.org/resources/emissions-gap-report-2023>

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- Q5A. How is the Department of Energy supporting a domestic supply of natural gas?
- A5A. The U.S. Department of Energy does not have a role in permitting natural gas production or infrastructure and is not taking any actions that would impair the United States from being able to produce, import, transport or utilize natural gas within the United States. Over 6 billion cubic feet per day of natural gas pipeline capacity (both interstate and intrastate combined) was added in 2023.¹³ Additionally, all of the investments the Department of Energy is making in methane mitigation technologies, including helping the Environmental Protection Agency (EPA) to distribute \$1.55 billion in funding being made available through the Methane Emissions Reduction Program (MERP), will support the reduction of venting and flaring activities and thereby avoid waste and make more natural gas supplies available to the market.
- Q5B. Does the Department of Energy support increasing the supply of natural gas pipelines?
- A5B. DOE does not have a role in siting natural gas infrastructure, but we note that there is over 20 Bcf/d of natural gas pipelines under construction.¹⁴
- Q6. On January 26, 2024, President Biden announced a pause on pending decisions for permits to export liquid natural gas (LNG) to non-free trade agreement countries until the Department of Energy updates the underlying analysis for authorizations. Specifically, the DOE is examining “the perilous impacts of methane on our planet.”¹⁵
- Q6A. By what specific dates will the DOE complete its review, publish its findings, and resume permitting new export permits to non-free trade agreement countries?
- A6A. DOE is continuing to update its economic and environmental analyses that will inform its public interest decisions on non-FTA applications under section 3(a) of the Natural Gas Act. Once the analyses are completed, DOE will publish a notice of availability of the new analyses in the Federal Register for public comment.

¹³ See <https://www.eia.gov/todayinenergy/detail.php?id=61623>

¹⁴ See <https://www.eia.gov/todayinenergy/detail.php?id=61062>

¹⁵ “Fact Sheet: Biden-Harris Administration Announces Temporary Pause on Pending Approvals of Liquefied Natural Gas Exports.” *The White House*, The United States Government, 26 Jan. 2024, www.whitehouse.gov/briefing-room/statements-releases/2024/01/26/fact-sheet-biden-harris-

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- Q6B. Has the DOE issued a request for proposal to contract the economic analysis of the pause on permitting decisions to a third-party entity?
- A6B. DOE headquarters staff are leading the effort to update the analyses with contract support vehicles already in place with National Energy Technology Laboratory and Pacific Northwest National Laboratory.
- Q6C. Is the DOE conducting both the economic impact analysis and the environmental analysis itself?
- A6C. DOE headquarters staff are leading the effort with support from both PNNL and NETL.
- Q6D. Will environmental and economic analysis be performed concurrently?
- A6D. Yes.
- Q7. What are the criteria the DOE uses to determine whether an LNG permit is in the public interest?
- Q7A. What is the weight that climate change or threats to the climate have on determining whether an LNG permit is in the public interest?
- A7A. All of the factors that DOE considers in LNG export decisions, including (i) the domestic need for the LNG proposed to be exported, (ii) whether the proposed exports pose a threat to the security of domestic natural gas supplies, (iii) whether the arrangement is consistent with DOE's policy of promoting market competition, and (iv) any other factors bearing on the public interest as determined by DOE—which, to date, has included a variety of economic, environmental, and international considerations, are reviewed for each non-free trade agreement export application. DOE does not rely on a formula that formally weights the various factors.
- Q6B. Does the disruption of LNG exported from the United States enable Russian LNG to fill the market gap?
- A6B. DOE's update of its analyses needed to evaluate applications for future exports does not have an impact on prior approvals or short- or medium-term supply, and the U.S. is currently exporting at record high levels that are set to double by the end of this decade as new export capacity, under construction based on prior approvals, gets completed. U.S.

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and EU sanctions against Russian LNG and Russian LNG projects will likely prevent Russia from increasing its market share.

- Q6C. Do you believe this pause will have an impact on future investment in fossil fuel projects in the United States?
- A6C. A decision whether to invest in an LNG export facility is primarily based on business contingencies—not just whether DOE is updating its analyses. Currently, DOE's cumulative approvals of non-FTA exports stands at 48 Bcf/d, well in excess of the amount of corresponding capacity that is operating or under construction (26 Bcf/d). And several approvals have been vacated or expired because of the authorization holder's inaction or upon the authorization holder's request—such as where the holder has made a business decision not to proceed with the exports or the project facilities.
- Q7. What impact will the transition to electric vehicle use in the United States have on global temperatures by 2050? Please give a numerical response.
- A7. Transportation is the largest source of GHG emissions and light duty vehicles make up over half of those emissions. A transition to electric vehicles will play a key role in achieving the goal of net zero GHG emissions economy-wide by 2050. We estimate that this transition to EVs, as outlined in the U.S. National Blueprint for Transportation Decarbonization, could eliminate roughly 20 billion tons of GHG emissions by 2050 when combined with the transition of the electricity sector.
- Q8. Is the critical mineral supply-chain in the United States robust enough to supply sufficient materials to meet the requirement that 80 percent of all electric vehicle battery content be extracted domestically at this time?
- Does the Department of Energy support increasing critical mineral extraction and process on federal lands within the United States?
 - What is the cost of infrastructure upgrades necessary to accommodate widespread electric vehicle use in the United States, including upgrades to roads due to the heavier weight of electric vehicles relative to internal combustion engine vehicles?
- A8. With recent investments from Congress through the Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law (BIL), and the Inflation Reduction

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Act (IRA), the Department is taking steps to prioritize the production of metals and minerals that are critical in meeting the Administration's clean energy goals from domestic sources. To meet critical mineral demand by 2030 and reach clean energy deployment goals, it is estimated that the mineral requirements will be:

- 332k tonnes of lithium carbonate equivalent
- 83k tonnes of cobalt sulfate
- 665k tonnes of nickel sulfate
- 10.8k tonnes of neodymium
- 2.73k tonnes of dysprosium

A recent report by Argonne National Laboratory, commissioned by the DOE, found that for five key critical materials – lithium, nickel, cobalt, graphite and manganese – the United States and its economic partners and allies have significant geological resources of critical materials. These resources can be developed while also strengthening processing, refining, and recycling capabilities. The U.S. is engaged in a multifaceted approach to diversify the upstream critical minerals supply, which includes expanding domestic mining alongside non-U.S. sourcing strategies. Coupled with continued investments to develop critical minerals resources by the U.S. government, international allies and partners, and private industry, these efforts have the potential to secure the supply chain for U.S. EV battery materials.¹⁶

Another recent analysis by Argonne found that industry has made aggressive plans for deployment of lithium-ion battery cells made in North America, expecting a 28-fold increase in battery cell production from 2021 to 2032. Modeling shows that this

¹⁶ <https://publications.anl.gov/anlpubs/2024/03/187907.pdf>

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production is expected to meet the demand for a rapidly electrifying economy from 2026 onward.¹⁷

Grid Infrastructure

A recent study commissioned by the DOE evaluated the necessary investment in charging and distribution grid infrastructure to meet the likely demand from transportation electrification across five states by 2032. The states in the study represented a diversity of transportation demand and utility distribution infrastructure scenarios across the country. The study found that the EV penetration likely resulting from the EPA's final rulemakings for GHGs across light, medium, and heavy duty vehicles could result in the following outcomes across the five states, with the same trends expected nationwide:

- An incremental distribution grid investment which would be approximately 3% of current annual utility investments,
- A possible 30% reduction of those annual utility investments using basic managed charging techniques, and
- Net consumer benefits of at least double the incremental costs.¹⁸
- Furthermore, several recent studies have shown that EVs are already driving down electricity rates as they are deployed, because the EV drivers are contributing more in revenue to the utility than the associated cost to provide service to them, which drives down rates for all electric customers.^{19,20}

Roadway Infrastructure

¹⁷ <https://publications.anl.gov/anlpubs/2024/03/187735.pdf>

¹⁸ <https://www.energy.gov/sites/default/files/2024-03/2024.03.18%20NREL%20LBNL%20Kevala%20DOE%20Multi-State%20Transportation%20Electrification%20Impact%20Study%20FINAL%20DOCKET.pdf>

¹⁹ https://www.synapse-energy.com/sites/default/files/EV_Impacts_June_2020_18-122.pdf

²⁰ <https://www.aceee.org/blog-post/2024/01/charging-ahead-how-evs-could-drive-down-electricity-rates>

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Currently, heavy trucks cause the vast majority of weight-related damage to U.S. roadways. Other major sources are temperature, rain, and other environmental factors. The contribution from passenger cars and light trucks is insignificant by comparison, and furthermore there is no discernible difference.²¹ between EVs and conventional vehicles in terms of damage to pavements from these classes of vehicles. For medium and heavy-duty vehicles, while current battery technology affords notably heavier EVs than their conventional counterparts, DOE expects that increasingly better batteries will result in weight parity with diesel trucks in the long term. In fact, DOE expects that battery weight will come down in these vehicles by another 65% by 2050. DOE considers battery weight reduction a key metric in guiding our R&D decisions related to EV batteries. But it is important to note that the U.S. National Blueprint for Transportation Decarbonization.²² envisions a diversity of potential fuels to support trucking, from electrification to sustainable liquid fuels to hydrogen.

- Q9. What is the estimated timeline to acquire a distribution transformer compliant with new transformer efficiency standards?
- A9. While it is difficult to predict the likely procurement lead time for a distribution transformer when the new standards take effect in 2029, the final rule did take into consideration a variety of factors raised by stakeholders related to production capacity and current product lead times. Stakeholders included numerous electric cooperatives, utilities, and utility advocacy groups including:
- Indiana Electric Cooperatives (Indiana)
 - Rappahannock Electric Cooperative (Virginia)
 - National Rural Electric Cooperative Association

²¹ <https://www.politifact.com/article/2023/jun/21/carry-that-weight-electric-vehicles-outweigh-gas-c/>

²² <https://www.energy.gov/cere/us-national-blueprint-transportation-decarbonization-joint-strategy-transform-transportation>

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- Highline Electric Associate (Northeast Colorado and Southwest Nebraska)
- Idaho Falls Power (Southwest Idaho)
- Consumers Power Inc. (Oregon)
- Falls River Electric (Idaho, Montana, and Wyoming)
- Central Lincoln (Oregon)
- Alliant Energy (Iowa and Wisconsin)
- Portland General Electric (Oregon)
- Idaho Power Company (Idaho)
- Exelon
- Entergy
- WEC Energy Group
- Tennessee Valley Public Power Association
- Northwest Public Power Association
- Northeast Public Power Association
- Coalition for the Advancement of Reliable Electric Systems
- American Public Power Association
- Edison Electric Institute

The final amended standards represent an arrangement designed to mitigate concerns regarding production capacity. Further, DOE notes that the compliance period for the

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amended standards was extended beyond what was proposed in the January 2023 proposed rule, which will provide manufacturers additional time to redesign transformers and build capacity, further mitigating any risk of disrupting the production necessary to meet current demand.

- Q10. Does the United States currently produce sufficient amorphous steel to fulfill demand for new distribution transformers?
- A10. Actions underway by the DOE support the ability of U.S. amorphous steel and grain-oriented electrical steel (GOES) providers to produce sufficient electrical steel to fulfill demand for new distribution transformers.

The recently adopted distribution transformer efficiency standards allow for approximately 75 percent of distribution transformers to be manufactured using GOES. Remaining distribution transformers will be manufactured using amorphous or other high-efficiency materials for the transformer cores. This diversification of types of electrical steel to be used in distribution transformers guards against overreliance on any one type or one source of electrical steel and it produces a market signal for investment in the domestic growth for both types of electrical steel.

In addition, the recently adopted standards provide for a five-year compliance period, which will allow U.S. electrical steel producers adequate time to tool up and staff up to meet expected future growth in demand for amorphous steel and GOES for manufacturing transformers.

To further assist producers of both amorphous steel and GOES to keep pace with the expected growth in demand, DOE also provides industry with technical and financial assistance for expanding manufacturing capacity to bolster our domestic supply chains and support good-paying American jobs.

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- Q11. What impact will the shortage of distribution transformers have on grid reliability and energy prices over the next ten years?
- A11. While distribution transformers are a critical component of America's distribution grid, the current supply chain delays are not significantly impacting overall bulk-system-level electric grid reliability and are limited to individual loads or small groups of customers. Recent near-term shortages of distribution transformer availability and longer lead times for manufacturing, however, have delayed service for new customer requests at many utilities (especially for new construction) and raise the near-term concern that current supply chain constraints might affect a utility's ability to replace aging and damaged transformers if the serving utility does not have access to adequate reserves.

In addition to longstanding and ongoing DOE efforts to bolster overall system reliability, DOE began a concerted engagement with the private sector to address the specific industry issues around distribution transformers in 2022, when the Electricity Subsector Coordinating Council launched a tiger team effort to characterize and analyze the underlying issues contributing to growing delays in the production of distribution transformers. After the effort was completed, DOE convened key U.S. government agencies, distribution transformer manufacturers, and representatives from U.S. power sector associations to identify and act upon solution paths to current availability constraints. Because of these public/private efforts to address near-term issues and the expansion in domestic transformer production capacity that is expected, planned, or already underway (along with longer-term DOE R&D into improvements in transformer design), DOE does not expect current supply-chain constraints to persist over the next ten years.

- Q12. Has the Department of Energy evaluated the sufficiency of regional emergency fuel storage for disaster response in the Western United States?
- What is the status of any evaluations the Department of Energy is conducting into Western regional emergency fuel storage?
- A12. The Department of Energy's (DOE) Office of Cybersecurity, Energy Security, and Emergency Response (CESER) is conducting a study that is looking at the future of the

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Strategic Petroleum Reserve and regional refined product reserves. It is anticipated that this study will enter review within DOE sometime this summer. Included in the report will be an analysis of refined product reserves in Utah. Once finalized, this report will provide useful data for emergency planning, response, and restoration efforts in Utah, the West, and other U.S. regions.

- Q13. How much money is being spent on diversity, equity, inclusion at DOE?
- A13. The Department of Energy has made diversity, equity, inclusion, and accessibility (DEIA) an integral part of the agency's mission, embedding this work across the Department in many ways. DOE does not currently track Department-wide DEIA spending.
- Q14. How many programs at the Department of Energy include preferential status for minority, disadvantaged, or specific racial groups? Please include a list of all programs.
- A14. DOE has taken steps to assure its programs comply with all legal requirements regarding preference to minority or racial groups, including in compliance with all Constitutional requirements. The Department of Energy (DOE) has many programs that focus on ensuring that all communities have access to clean, reliable, affordable energy. Furthermore, DOE and President Biden know that the successful implementation of the Bipartisan Infrastructure Law and the Inflation Reduction Act depends on ensuring that disadvantaged communities that have historically not benefitted from infrastructure investment or energy jobs are prioritized and considered in the design and implementation of applications and programs. DOE's Office of Energy Justice and Equity has led the important work of making sure that the goals of President Biden's Justice40 Initiative are realized in DOE's implementation of these laws. DOE carries this ethos across its entire mission.
- Q15. Under your lead, DOE has established 71 new programs and received \$385 billion in new loan authority. The Department plans to get these loans out the door quickly before \$290 billion of the new authority expires in 2026.

The DOE Inspector General has warned that this new funding is vulnerable to large-scale fraud. Your Department is funding high-risk projects at an unprecedented speed and volume. We have essentially made the federal government the bank, forcing American

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taxpayers to guarantee loans too risky for any real bank to touch. One must question the level of oversight.

- What recourse do taxpayers have when fraud occurs?
- Who is ultimately responsible when some of these projects inevitably fail?

A15. The Loan Programs Office (LPO) takes seriously its responsibility to protect taxpayer resources. Ensuring proper transparency into and oversight of LPO is paramount to attracting United States companies to work with the office to apply for a loan or loan guarantee and to maintaining the public's trust that taxpayer resources for these programs are protected.

From its establishment shortly after the Energy Policy Act of 2005, LPO is continuously evolving and making improvements that have increased both internal and interagency oversight, clarified its management responsibilities, institutionalized risk management practices, and put in place portfolio-wide safeguards and monitoring of all LPO projects, among other enhancements. Thanks to Congressional oversight and direction – and in part due to recommendations from the DOE Office of the Inspector General, the Government Accountability Office, and from a 2012 independent review led by Herb Allison – LPO has implemented important reforms that codified and strengthened LPO's structure and governance improvements. We welcome a strong partnership with Congress, the Office Inspector General, and others on items including prospective considerations for continued improvements within LPO and other DOE programs to prevent waste, fraud, and abuse and to promote transparency to ensure the public trust.

Establishing a proactive risk management culture at LPO has been necessary given its mission to provide a bridge to bankability for innovative technologies and other projects essential to our energy future that are unable to access commercial debt markets.

The Department conducts rigorous due diligence that is comparable to, if not more stringent than, what might be done in the private sector. Due diligence includes eligibility determinations and technical, market, financial, credit, legal, and regulatory reviews,

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among other items. This involves thorough, comprehensive credit underwriting of the transaction with robust risk management processes infused throughout. Through this process LPO identifies clear conditions that must be met prior to closing and funding a given transaction.

Even with these mitigants, providing high-impact debt financing in line with the LPO mandate carries some risk. While we proactively manage risk when underwriting a loan and monitoring the performance of that loan across the life of a project, it is possible that some projects with a reasonable prospect of repayment might not be repaid or recovered in full. Once a loan closes, the Portfolio Management Division (PMD) leads LPO's loan monitoring process through the end of a loan term. PMD serves as the principal liaison between the borrower and LPO post-close; manages approval of disbursements, consent, waivers, modifications, amendments, and other action requests; monitors project cash flows to ensure debt repayment; and reports portfolio performance to senior leadership on an ongoing basis. PMD also conducts proactive surveillance on the loan portfolio; routinely assesses the credit risk of its borrowers; and continues to update LPO's internal risk rating, which indicates the expected probability of default and loss in the event of a default. When borrowers present warning signs of distress, PMD acts by leading workout and remediation efforts to maximize recoveries.

LPO's risk management process and proactive loan surveillance take extensive measures to prevent fraud by validating use of proceeds of any loan. Additionally, loan financing documents and current law do allow LPO to take legal action if fraud were to occur.

Taken together, ongoing proactive portfolio management measures help projects succeed even when, because of LPO's unique mission, those projects may possess lower credit ratings or higher technology risk. Congress has also anticipated these potential losses and accordingly has appropriated credit subsidy, which allows the government to budget for expected losses.

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LPO maintains a healthy loan portfolio concentrated in creditworthy assets. As of the end of FY 2023, the LPO portfolio contained 25 active loans supporting 18 projects and had an internal exposure-weighted average credit rating of BBB-. During FY 2023, borrowers repaid a combined \$556 million in principal and an additional \$484 million in interest to the Federal Financing Bank of the U.S. Treasury. Principal repayments over the portfolio's lifetime now total \$14.3 billion, representing 43% of total funds disbursed. Interest payments to the U.S. Treasury total an additional \$4.9 billion over the portfolio's lifetime.

A combination of the robustness of LPO's underwriting and oversight capabilities, and the approach LPO has taken to selecting and modeling projects and approving financing, has amounted to a healthy, effective portfolio. LPO's proactive risk and portfolio management approach has been designed to minimize such losses and maximize recovery in the event of a default. As LPO continues to implement its mandate, we look forward to doing so in a transparent and responsible manner.

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QUESTIONS FROM SENATOR STEVE DAINES

The responses to the QFRs were written with the information available to DOE at the time of the hearing “Oversight of the Biden Administration’s Pause on Liquefied Natural Gas Exports”, which occurred prior to the preliminary injunction issued on July 1, 2024 by the U.S. District Court for the Western District of Louisiana in *Louisiana v. Biden*.

On July 1, 2024, in *Louisiana v. Biden*, the U.S. District Court for the Western District of Louisiana granted a Motion for Preliminary Injunction and enjoined DOE and other defendants “from halting and/or pausing the approval process for pending and future applications for LNG exports of liquified natural gas to non-FTA countries, effective immediately, to remain in effect pending the final resolution of this case, or until further orders from this Court, the United States Court of Appeal, or the Supreme Court of the United States.” DOE is complying with the Court’s order and is reviewing pending non-FTA applications.

Separately, DOE is continuing to update its economic and environmental analyses that will inform its public interest decisions on non-FTA applications under section 3(a) of the Natural Gas Act. Once the analyses are completed, DOE will publish a notice of availability of the new analyses in the *Federal Register* for public comment.

- Q1. Secretary Granholm, during the hearing you stated that “we need to really lean in on this clean baseload power” when discussing hydropower funding. However, this statement seems at odds with the recent agreement this administration entered into to address the Columbia River System Operations litigation which seeks to replace the power generation at the Lower Snake River dams. In fact, “replacement” was a word used repeatedly in the agreement documents when discussing these critical Lower Snake River hydropower resources. Does your statement in support of hydropower also include support for the Lower Snake River dams?
- A1. The goals of the agreement are “to work in partnership with Pacific Northwest Tribes and States to restore wild salmon populations, expand Tribally sponsored clean energy production, and provide stability for communities that depend on the Columbia River System.” Unless otherwise directed by Congress, the Department continues to support the Columbia River System Operations, including the Lower Snake River dams, consistent with existing laws and authorities.
- Q2. Secretary Granholm, will you oppose efforts to breach the Lower Snake River dams?
- A2. Any decision to breach the Lower Snake River dams would require an act of Congress.

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- Q3. Secretary Granholm, if the Lower Snake River dams are forced to spill more water instead of generating power as was agreed by this administration, how does that affect the Bonneville Power Administration, local community-owned electric cooperatives and ratepayers?
- A3. The settlement reached in the CRS litigation resulted in a stay of up to ten years that provides operational certainty for the Lower Snake River dams. According to Bonneville's estimates, these stable operations will result in minimal rate impacts to Bonneville's ratepayers.
- Q4. Secretary Granholm, did you consult with electric cooperatives and public power providers during the arbitration of the Columbia River System Operations litigation?
- A4. Electric Cooperatives and public power providers were involved in the arbitration in a number of ways including meetings with all litigation parties hosted by the Federal Mediation Conciliation Service and a number of one-on-one meetings with the Department of Energy.
- Q5. Secretary Granholm, what actions are you taking to ensure that the Lower Snake River dams continue operating and reliably supplying power to the Pacific Northwest for the next 20 years?
- A5. The Department of Energy does not own or operate the Lower Snake River dams. These dams are owned and operated by the U.S. Army Corps of Engineers Walla Walla district, who can update you on their operations and maintenance plans.
- Q6. Secretary Granholm, what actions are you taking to reduce supply chain constraints for electric transformer production?
- A6. In addition to DOE's longstanding and ongoing efforts to bolster overall system reliability, DOE began a concerted engagement in 2022 with the private sector to address the specific industry issues surfacing around distribution transformers. The Electricity Subsector Coordinating Council (ESCC), which serves as the principal liaison between the Federal Government and the electric power industry, launched a tiger team effort to characterize and analyze the underlying issues contributing to growing delays in the production of distribution transformers. When that effort was completed, DOE convened

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key U.S. Government agencies, distribution transformer manufacturers, and representatives from U.S. power sector associations to identify and act upon solution paths to current availability constraints. DOE has a multitude of activities underway under four distinct workstreams identified through engagement with industry:

- supply chain analysis to reduce investment uncertainty;
- support for workforce recruitment, training, and retention;
- improvements in transformer materials and design; and
- financial support for industry investment in greater domestic production and capacity expansion.

Through its supply chain analysis, DOE sought to address industry's concerns that current transformer demand might disappear in a boom-and-bust cycle, as it has in the past. This uncertainty has hampered industry's willingness to make investments in modernizing and expanding manufacturing facilities and workforce. To address this, DOE augmented the ESCC tiger team's insights with quantitative and qualitative analysis on distribution transformers conducted by our Office of Manufacturing and Energy Supply Chains and engaged a national laboratory to analyze the long-term drivers for distribution transformer demand.

To support industry's workforce recruitment, training, and retention, DOE shared financial assistance and other support services from various DOE offices that the manufacturers could avail themselves of and introduced the manufacturers to nongovernmental resources that could provide assistance.

To uncover and develop transformer design improvements that can alleviate some of the current stress on supply chains, DOE's Office of Electricity has been leading industry-wide workshops on advanced transformer designs and is facilitating ongoing collaboration between power sector and transformer manufacturer representatives to

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identify and adopt improvements to current design specifications. These improvements can decrease manufacturing time, relieve strain on individual component supply chains, and increase the ability of utilities to share spare transformers with others in need. The Office of Electricity is also conducting materials research to develop better alternative materials for use in transformers and providing financial assistance for the development of flexible, innovative advanced transformer designs.

In addition to these work streams, DOE is providing significant financial assistance to industry to manufacture or purchase transformers through grants under the Bipartisan Infrastructure Law and DOE support of 48C tax credits through the Office of Manufacturing and Energy Supply Chains.

Finally, the U.S. Government–Industry collaboration convened by DOE includes other agencies and DOE offices that continue to bring resources to bear to assist industry to address current supply chain constraints.

- Q7. Secretary Granholm, how does the newly finalized Energy Efficiency Standards for Distribution Transformers affect supply chain constraints that our power providers are facing?
- A7. The newly finalized standards will not exacerbate any existing supply chain constraints. As discussed in the April 22, 2024, Final Rule, current distribution transformer shortages are related to a significant increase in demand for many electric grid related products, which includes not only distribution transformers, but many other products associated with expansion of the electrical grid. Distribution transformer manufacturers have reported record production, in terms of number of shipments, but still noted that demand has grown even faster.

The transformer industry is actively responding to current shortages of distribution transformers, with multiple major suppliers having announced capacity expansions in recent months and years. These capacity expansions provide the opportunity for industry to bring capital equipment online through additions to existing capacity. The adopted efficiency levels will allow a key manufacturing material, grain-oriented electrical steel

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(GOES), to remain cost-competitive for a substantial volume of distribution transformer shipments. This means that manufacturers will be able to avoid a significant amount of conversions of manufacturing equipment, which could have worsened near-term supply chain issues.

Further, the compliance period for amended standards has been extended beyond what was proposed in the January 2023 proposed rule, which will provide manufacturers additional time to redesign transformers and build capacity, further mitigating any risk of disrupting the production necessary to meet current demand.

- Q8. Secretary Granholm, did you meet with electric cooperatives when drafting the Energy Efficiency Standards for Distribution Transformers and what actions did you take to address their concerns?
- A8. DOE carefully considered the comments and data submitted by over 90 stakeholders on the proposal, the feedback from our public hearing, and the information shared during stakeholder meetings. Numerous electric cooperatives, utilities and utility advocacy groups submitted comments on the proposal including:
- Indiana Electric Cooperatives (Indiana)
 - Rappahannock Electric Cooperative (Virginia)
 - National Rural Electric Cooperative Association
 - Highline Electric Associate (Northeast Colorado and Southwest Nebraska)
 - Idaho Falls Power (Southwest Idaho)
 - Consumers Power Inc. (Oregon)
 - Falls River Electric (Idaho, Montana, and Wyoming)
 - Central Lincoln (Oregon)

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- Alliant Energy (Iowa and Wisconsin)
 - Portland General Electric (Oregon)
 - Idaho Power Company (Idaho)
 - Exelon
 - Entergy
 - WEC Energy Group
 - Tennessee Valley Public Power Association
 - Northwest Public Power Association
 - Northeast Public Power Association
 - Coalition for the Advancement of Reliable Electric Systems
 - American Public Power Association
 - Edison Electric Institute
- Q9. Secretary Granholm, do you believe that enhanced oil recovery is an important tool for carbon capture, utilization and storage?
- A9. Enhanced oil recovery with carbon dioxide (CO₂-EOR) is a mature technology and has been commercially viable since the 1970s. Incidental geologic carbon storage can occur with CO₂-EOR and there are international standards for permanent geologic storage associated with CO₂-EOR. The 45Q tax credit, first available in 2008, can be applied to carbon capture with secure geological storage in conjunction with CO₂-EOR. In the United States, only a portion of the CO₂ that is used for CO₂-EOR is captured from industrial sources. According to EPA's Greenhouse Gas Reporting Program, in 2022, 10 million of the 37 million tons of CO₂ supplied to EOR was from CO₂ captured from an

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industrial source. That fraction is increasing due to the Inflation Reduction Act and its amendments to the 45Q tax credit. The know-how that has been built through decades of CO₂-EOR and 100s of millions of tons of CO₂ injected and incidentally stored as part of these operations is directly applicable and an important tool for carbon capture, utilization and storage.

- Q10. Secretary Granholm, Montana is a leader in carbon sequestration and using enhanced oil recovery to produce carbon negative oil. Last year DOE announced \$17 million for enhanced oil recovery. What's the status of that program?
- A10. The U.S. Department of Energy's (DOE) Office of Fossil Energy and Carbon Management (FECM) announced on April 24, 2024, two projects selected to receive a total of \$23.2 million, including one located in the Williston Basin's Bakken Formation of North Dakota and Montana, to evaluate the potential of oil and gas production combined with geologic storage of carbon dioxide (CO₂) from unconventional reservoirs through a process that uses captured CO₂ emissions to recover residual oil—called CO₂ enhanced oil recovery (CO₂-EOR). The projects will help evaluate the feasibility for permanent storage of CO₂ in depleted unconventional shale oil and gas reservoirs, repurposing existing infrastructure in support of the Biden-Harris Administration's historic decarbonization goals.²³

The two selected projects will focus on examining the effectiveness of the CO₂-EOR with geologic storage when applied to low-permeability, light-oil unconventional reservoirs that have dominated new production in recent years, as well as understand the potential to safely store CO₂ in these complex systems. In conjunction with this testing, the projects

²³ <https://www.energy.gov/fecm/articles/doe-invests-23-million-evaluate-potential-use-captured-carbon-dioxide-emissions>

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will collect critical data on how CO₂-EOR and carbon storage can be co-optimized with the goal of reducing the carbon footprint of the incremental oil produced.

- GTI Energy (Des Plaines, Illinois) will develop an integrated field laboratory study for incremental oil recovery to test the feasibility of CO₂ storage in depleted unconventional reservoirs in Texas's Midland Basin.
- University of North Dakota Energy & Environmental Research Center (Grand Forks, North Dakota) will conduct laboratory, modeling, and field studies for injecting CO₂ into an unconventional reservoir located in the Williston Basin's Bakken Formation for incremental oil recovery along with CO₂ storage.

Q11. Secretary Granholm, what steps is DOE taking to work with other agencies to speed up the permitting of pipelines and wells to support the expansion of enhanced oil recovery?

A11. DOE/FECM is currently working with EPA and the Groundwater Protection Council (GWPC) on designing a training workshop for project developers. Additionally, DOE/FECM supports pipeline development through investments and funding opportunities in CO₂ pipeline research initiatives which address knowledge gaps. An integrated pipeline consortium has been established to convene diverse representatives to identify and coordinate initiatives for carbon transport RD&D efforts.

The U.S. Department of Energy's (DOE) Office of Fossil Energy and Carbon Management (FECM) is supporting CO₂ enhanced oil recovery (CO₂-EOR) through research and development, focused on evaluating the potential of oil and gas production combined with geologic storage of CO₂ from unconventional reservoirs. On April 24, 2024, DOE/FECM announced the selection of two CO₂-EOR R&D projects, which will receive a total of \$23.2 million. These projects will seek Class II permits. The permitting process for Class II wells is typically shorter than for Class VI wells. In order to expedite the permitting of class VI wells, which are wells for CO₂ geologic storage not involving incremental oil production, DOE/FECM is currently working with EPA and the Groundwater Protection Council (GWPC) on designing a training workshop for project

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developers, as well as providing technical expertise from DOE's national labs to support EPA.

DOE/FECM also provides capacity-building support to federal agencies involved in carbon management. In 2022 and 2023, DOE/FECM delivered a three-day in-person training and 10 virtual trainings to federal staff responsible for permitting, right of way approvals, and other requirements associated with carbon management project implementation. Additionally, DOE/FECM coordinates government-wide efforts to enhance interagency communication and collaboration on carbon management. DOE/FECM led active engagement with more than 160 carbon management contacts from 10 federal agencies and has initiated discussions and ongoing collaboration on focused topics such as land management and CO₂ transport. The teams are developing interagency tools to communicate processes, facilitate coordination, and track progress of carbon capture and storage (CCS) projects. DOE/FECM expects its interagency coordination efforts will result in more efficient use of agencies' resources, reduced redundancy, leveraged expertise, and more effective implementation of federal CCS requirements.

- Q12. Secretary Granholm, the EPA continues to be slow at approving Class 6 wells for enhanced oil recovery. Can you commit to working with them to show the value, both environmentally and economically, for approving more enhanced oil recovery wells?
- A12. EPA's Underground Injection Control (UIC) program consists of six classes of injection wells. Each well class is based on the type and depth of the injection activity, and the potential for that injection activity to result in endangerment of an underground source of drinking water. Class II wells are used to inject fluids associated with oil and natural gas production. CO₂ injected for purposes of enhanced oil recovery (CO₂-EOR) is regulated under Class II, including those CO₂-EOR operations that inject anthropogenic CO₂ from industrial sources and demonstrate secure geologic storage for the purposes of claiming the 45Q tax credit. By contrast, Class VI wells are used for injection of CO₂ into geologic formations for the purpose of dedicated geologic storage that does not involve additional hydrocarbon production.

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Primary enforcement responsibility, often called primacy, refers to state, territory, or Tribal responsibilities associated with implementing EPA approved UIC programs. A state, territory, or Tribe with UIC primacy, or primary enforcement authority, oversees the UIC program in that state, territory, or Tribe. Approximately 40 states have approved primacy programs for Class II wells and three states have approved primacy programs for Class VI wells. We understand the current timeframe for completion of the permitting process for Class II wells is typically shorter than for Class VI wells.

Close collaboration between U.S. government agencies in the context of permitting is crucial for the responsible development and deployment of carbon management. DOE is continually working to build and maintain these cross-agency relationships, share technical information and expertise, and work with other U.S. government agencies to improve the permitting process. For example, at the staff level, DOE and the Department of Transportation's Pipeline and Hazardous Materials Administration are co-leading a team focused on enhancing communication and coordination on CO₂ transport and DOE and the Bureau of Land Management are co-leading a team focused on carbon management development on federal lands.

Additionally, DOE has an interagency agreement with EPA in which we provide technical assistance and capacity building support to EPA through the National Laboratories to aid in review of certain technical information associated with Class VI permit applications. Six National Laboratories evaluate subsurface modeling and review of geologic site characterization associated with Class VI permit applications and provide technical capacity building to EPA headquarters and regional staff.

DOE also has a memorandum of understanding with the White House Council on Environmental Quality (CEQ) to provide administration and technical support for carbon capture utilization and sequestration (CCUS) permitting task forces that were established pursuant to the USE IT Act. These task forces are focused on the efficient, orderly and responsible development of CCUS in the United States.

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- Q13. Secretary Granholm, funding for the Department of Energy National Quantum Information Science Research Centers expired at the end of FY2023. Do you believe that this program should be reauthorized?
- A13. Although the original authorizing legislation provided funding only through 2023, the Office of Science has continued to receive sufficient appropriations to support the research performed at the current Centers. We intend to continue to fund this research, subject to appropriations, through the end of FY 2025. The National Quantum Information Science Research Centers have accomplished much since their inception in 2020, from establishing quantum foundries for advanced device fabrication, building underground facilities for characterizing quantum devices in low-background radiation environments, developing highly successful open-source control-software platforms and useful quantum algorithms, advancing innovative superconducting, neutral atom, and ion-trap quantum devices, to using spin squeezing and quantum scrambling to improve the precision of atomic clocks. More information about the great work happening at the Centers can be found at <https://nqisrc.org/>. In accordance with our basic science mission, DOE has the appropriate authorization to renew/recompete these Centers in FY 2025, again, pending appropriations. However, DOE believes, given the success of the National Quantum Information Science Research Centers, the program should be reauthorized and stands ready to assist Congress, should it choose to extend the authorizations for this program.
- Q14. Secretary Granholm, what actions did the Department take to fulfill the obligation in Title IV of the National Quantum Initiative Act (P.L. 115-368)
- A14. The National Quantum Initiative (NQI) Act was signed into law on December 21, 2018. The NQI authorized DOE to carry out a basic research program in Quantum Information Science (QIS) and DOE's Office of Science to establish and operate 2-5 National Quantum Information Science Research Centers to "conduct basic research to accelerate scientific breakthroughs in quantum information science and technology."
- In FY 2020, DOE's Office of Science established five National QIS Research Centers as called for in the NQI Act. These centers focus on accelerating transformational advances

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in basic science and quantum-based technology needed for world-leading capabilities in QIS. The National QIS Research Centers are led by five of the DOE National Labs and currently combine the expertise and resources of over 87 academic, industry, non-profit, and lab partners from 24 states, the District of Columbia, Canada, Italy, and the United Kingdom.

The National QIS Research Centers program, an investment of \$575 million over five years, represents a diverse portfolio of research topics across QIS and QIS-inspired areas including co-designing algorithms, quantum devices, and engineering solutions to deliver quantum advantage in scientific applications; overcoming roadblocks in quantum state resilience, controllability, and scalability of quantum technologies; eliminating the decoherence mechanisms in superconducting 2D and 3D devices; and reducing limitations of today's noisy intermediate scale quantum (NISQ) computer systems. In FY 2021, the Office of Science initiated a program to advance strategic research priorities through the design, development, and demonstration of a quantum internet testbed while continuing its investments in key areas of basic research and in infrastructure and supporting technology development for QIS. The Office of Science continues to closely coordinate its activities in QIS with the other Federal Agencies and the National Quantum Coordination Office via a variety of interagency working groups.

Q15. Secretary Granholm, how does the Department of Energy's FY25 budget support quantum research?

A15. In FY 2025, the Office of Science will continue to invest in core basic QIS research, fully support the renewal/recompetition of the National QIS Research Centers, advance R&D for infrastructure and supporting technologies and grow a quantum-ready workforce.

In FY 2024, the Office of Science convened a team of experts to develop application-based roadmaps to address future QIS programmatic opportunities and chart the path in enabling high-impact QIS applications relevant to DOE. FY 2025 investments will be informed by these roadmaps, estimated to be complete in early FY 2025. ASCR will

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continue to prioritize its quantum computing testbeds program to explore pre-competitive technologies and buy down risk for industry.

- Q16. Secretary Granholm, how does the Department of Energy's FY25 budget support advanced research for semiconductors and semiconductor manufacturing?
- A16. The Department has a wide range of FY25 proposals to support advanced research for semiconductors and semiconductor manufacturing that address its vital national security and clean energy missions. Within the Office of Energy Efficiency and Renewable Energy (EERE), DOE's Advanced Materials and Manufacturing Office (AMMTO) supports research, development, and demonstration (RD&D) on high-performance, wide-bandgap semiconductors for power electronics. It also supports semiconductor RD&D for advanced manufacturing of ultra-high efficiency microelectronics, which are core to supporting energy efficiency in high energy consuming sectors, such as in data centers. In order to continue this important work, AMMTO's FY25 request for its Semiconductors Electronics, and Other Technology Manufacturing is \$18,500,000. EERE's Vehicle Technology Office and Solar Energy Technology Office also both support research related to use of wide-bandgap semiconductors in their application areas.

The Department is also investing in basic research in microelectronics and has leveraged our leadership in advanced computing to drive innovation in energy efficiency. The Exascale Computing Project (ECP) partnered with all of the major U.S. microelectronics manufacturers to improve the efficiency and capability of their products. The results allowed us to achieve one of the most ambitious goals of the National Strategic Computing Initiative and deliver the world's first official exascale computing systems that used less than 20 megawatts of power—one tenth of what experts projected at the start of the initiative and 400% improvement in energy utilization over our pre-exascale systems. The Department will soon announce a new round of research partnerships with industry to build on these gains for the next generation of microelectronics products and advanced computing systems.

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DOE is investing in additional fundamental research to accelerate the advancement of microelectronic technologies in a co-design innovation ecosystem. Emphasis will be on basic research to advance new materials, chemistry, synthesis, and fabrication; new computing paradigms and architectures, including those specialized for energy-efficient AI; integrated sensing, edge computing, and communications; and microelectronics resilience in high radiation or cryogenic environments. DOE's Isotope Program participation ensures availability of isotopes needed for semiconductor manufacturing. In May, DOE announced \$160 million to advance President Biden's vision to secure the future of American leadership in semiconductor innovation by implementing a key provision in the historic CHIPS and Science Act of 2022 (42 U.S.C. §19331), Microelectronics Research for Energy Innovation. This funding will support the formation of Microelectronics Science Research Centers (MSRCs) focused on energy efficiency and extreme environments.

Q17. Secretary Granholm, how does the Department of Energy's FY25 budget support next generation nuclear technology and small modular reactors?

A17. A key initiative of the Administration is to support the deployment of innovative clean energy technologies and DOE is working diligently to move nuclear energy forward. Advanced nuclear technology can assist the United States (U.S.) achieving net-zero emissions, economy-wide, by no later than 2050. In fiscal year (FY) 2025, the Department's budget supports next generation nuclear technologies, to include small modular reactors (SMR), through pursuing industry-informed research and development (R&D) that will provide widely applicable benefits across many different advanced reactor concepts. R&D will be pursued for innovative reactor concepts, including high temperature gas-cooled reactors (HTGR), fast reactors, microreactors, and molten salt reactors (MSR) using liquid salt coolants and/or fuels.

In FY 2025, the Department will also continue private-public partnerships selected to resolve key technical, operational, and regulatory challenges to enable future demonstrations of those technologies, as well as continue to establish key infrastructure

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at national laboratories to aid in the testing of multiple advanced reactor concepts. DOE will enhance supply chain resilience by supporting industry advancements in manufacturing capabilities through private-public partnerships supporting the near-term domestic build-out of supply chain capacity needed to deploy advanced reactors.

The above items will build on multi-year efforts, to continue advancing the next generation of nuclear technologies towards commercialization.

- Q18. Secretary Granholm, how does the Department of Energy's FY25 budget support nuclear fuel recycling?
- Q18. The Department recognizes that continued efforts are necessary to assure U.S. leadership in the research, design, and development of advanced processing technologies, and to ensure the potential deployment of these technologies in the United States under the high standards of safety, security, and nonproliferation. The Office of Nuclear Energy funds fundamental and applied research and development activities that meet the goals of establishing U.S. leadership in nuclear technologies that promote long-term sustainability, efficient waste management, and integrated security. Research efforts include development of simplified chemical and physical recycling processes (e.g. advanced aqueous, fluoride volatility, electrochemical, or hybrids) that maximize reuse, minimize residual waste materials, and meet the safeguards, nonproliferation, and security expectations of the United States.

In FY 2025, we will continue to support research and development efforts consistent with U.S. nonproliferation and nuclear security policies to accelerate advanced fuel recycling technologies and address gaps in materials separations and recovery challenges that present technical risks and financial uncertainties. In addition, we will continue to engage with the U.S. industry to de-risk the technical costs and technology uncertainties of domestic fuel recycle facilities options under the high standards of safety, security, and nonproliferation.

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Q19. Secretary Granholm, how does the Department of Energy's FY25 budget support in-stream hydrokinetic power?

A19. In-stream hydrokinetics – particularly as it relates to small hydropower and marine energy systems – remains a priority area of research for the Department. At small, low-head dam sites, it may be more cost-effective to preclude conventional dam and conveyance costs in favor of hydrokinetics. The Water Power Technologies Office (WPTO) has funded several investments in recent years, including the Energy Transitions Initiative Partnership Project (ETIPP) and the Irrigation Modernization projects, in partnership with Idaho National Laboratory (INL) and Pacific Northwest National Laboratory (PNNL), to help us understand the benefits of water power technologies for remote communities who often have low-head sites suitable for in-stream hydrokinetic technologies.^{24,25} WPTO has also funded in-river marine hydrokinetic (MHK) projects, notably the Ocean Renewable Power Company (ORPC) RivGen Power System, a submerged cross-flow river current turbine system, deployed in Igiugig Village in partnership with the native Alaskan tribal entity and community. WPTO has continued the technical assistance projects in Igiugig and McGrath, Alaska, focusing on river current devices, representing over \$2M combined in planned investment from FY23 to FY25. WPTO is continuing industry engagement through TEAMER (Testing Expertise and Access to Marine Energy Research) and through support of EMRGY Inc., an emerging innovator in this space deploying hydrokinetic turbines at existing irrigation canals.^{26,27} Finally, in-stream hydrokinetic facilities might qualify for the Low-Income Communities Bonus Credit Program in the future and could particularly benefit residents in low-income rural communities, where existing canal infrastructure may already be in place.²⁸ In-stream hydrokinetic projects are also a category specifically identified in the recent Hydropower Investment Opportunities Report produced by National Renewable Energy Laboratory (NREL) and funded by WPTO, and could become more financially

²⁴ <https://www.energy.gov/eere/about-energy-transitions-initiative-partnership-project>

²⁵ <https://inl.gov/waterpower/irrigation-systems-reimagined/>

²⁶ <https://teamer-us.org/>

²⁷ <https://emrgy.com/>

²⁸ <https://www.energy.gov/justice/low-income-communities-bonus-credit-program>

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viable for low-income communities with the bonus credit if made available for this technology in the future.²⁹

- Q20. Secretary Granholm, how does the Department of Energy's FY25 budget support large scale carbon capture projects at coal and natural gas generation sites?
- A20. For FY25 the Department's Point Source Carbon Capture portfolio R&D budget supports development of enabling technologies for successful implementation of carbon capture pilot and demonstration projects. Technologies needed for large scale point-source capture include but are not limited to processes and approaches to:
- reduce solvents, solid sorbents degradation;
 - reclaim the degraded solvents, sorbents;
 - reduce non-CO2 emission through engineering controls (e.g., flue gas pre-treatment, and capture system emissions); and
 - monitor, report, and verify (MRV) non-CO2 emissions.

Additionally, the Department has test centers where carbon capture vendors can test the technology using actual flue gas derived from coal or natural gas combustion.

- Q21. Secretary Granholm, do you agree that the premature closure of the Colstrip Power Plant would result in higher prices for Montanans and less reliable electric service for the region?
- A21. The costs and reliability of electricity service depend on much more than any one plant. Both reliability and affordability depend on the full portfolio of generation, storage, transmission, distribution, and demand resources that make up a power system. As described in DOE's report *The Future of Resource Adequacy*, portfolios of clean energy sources can provide a range of electric reliability services in concert with other existing

²⁹ <https://www.energy.gov/eere/water/articles/hydropower-investment-opportunities-remain-untapped>

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assets. We can improve reliability by deploying a diverse mix of existing and future technologies, including wind, solar, battery storage, nuclear, hydropower, advanced geothermal, fossil fuel plants with CCS, grid enhancing technologies, energy efficiency, and virtual power plants.

The Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA), passed under the Biden Administration, have made new clean energy investments an even more affordable option for communities across the country. Many IRA incentives include bonus tax credits for resources sited at the sites of retired coal generators. New solar, wind, battery energy storage, or nuclear energy at former coal sites are eligible for a 40% investment tax credit, which increases to a total of 50% if the project sources its component materials domestically. In addition, loans are available to provide low-cost financing, including DOE's Energy Infrastructure Reinvestment program that can be used for a variety of purposes such as replacing retiring generating resources with clean energy.

Each state and utility has the responsibility to choose a resource mix that best meets the needs of its residents, businesses, and customers for reliable, affordable, and clean electricity. It will ultimately be up to the owners and regulators of the Colstrip Power Plant to determine if and how it fits into an energy mix that best meets Montanans' needs. As part of that decision, it will be essential for stakeholders to consider how BIL and IRA incentives can both make reliable clean energy portfolios a more affordable option and ensure energy communities like Colstrip, Montana, continue to see the benefits of energy investments.

- Q22. Secretary Granholm, what actions are you taking to work with the Environmental Protection Agency to ensure their rules do not negatively affect electric rates and reliability?
- A22. DOE and the Environmental Protection Agency (EPA) united our long-standing efforts to help ensure a robust and resilient power system by signing a joint Memorandum of Understanding (MOU). The MOU outlined activities both agencies would undertake

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individually and collectively to monitor, share information, and consult to support the continued reliability of the power system. Under the MOU, DOE and EPA engage in regular outreach and consultation with the Federal Energy Regulatory Commission on electric reliability challenges. DOE and EPA also engage with the North American Electric Reliability Corporation, independent system operators and regional transmission organizations, and state public utility commissions. This engagement has been and continues to be vital in identifying reliability risks, as well as actions that both agencies can take within their respective authorities to maintain the reliability of the power system and the protection of public health. Although DOE and EPA have distinct institutional mandates and legal authorities, both agencies share the objective of supporting the ability of federal and state governments, grid operators, regional reliability entities, and power companies to continue to deliver a high standard of reliable electric service.

Further, DOE affirms that a portfolio approach that takes advantage of the full range of resources and technology can best ensure a reliable, affordable, secure, and sustainable power system.

- Q23. Secretary Granholm, this winter low temperatures in Montana resulted in solar and wind generation nearly ceasing. Baseload power like coal and hydropower were running at maximum levels, yet Montana was still forced to import power to ensure that we were able to meet demand. Had this baseload power not been dispatchable, many Montanans could have been left without power on some of the coldest days of the year. It is my understanding that in the near future large amounts of baseload coal generation in the Pacific Northwest will come offline, further exacerbating concerns that the region will be unable to meet peak demand. How do you expect utilities to meet demand when closures of baseload generation are outpacing development of baseload generation?
- Q23A. States and utilities have the responsibility to choose a resource mix that best meets the needs of their residents, businesses, and customers for reliable, affordable, and clean electricity. As described in DOE's The Future of Resource Adequacy report, portfolios of clean energy sources can provide a range of electric reliability services in concert with other existing assets. We can improve reliability by deploying a diverse mix of existing and future technologies, including offshore and onshore wind, solar, battery storage,

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nuclear, hydropower, advanced geothermal, fossil fuel plants with carbon capture and storage, grid enhancing technologies, energy efficiency, and virtual power plants.

The Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA), passed under the Biden-Harris Administration, have made new clean energy investments an even more affordable option for communities across the country. Many IRA incentives include bonus tax credits for resources sited at the sites of retired coal generators. New solar, wind, battery energy storage, or nuclear energy at former coal sites are eligible for a 40% investment tax credit, which increases to a total of 50% if the project sources its component materials domestically. In addition, loans are available to provide low-cost financing, including DOE's Energy Infrastructure Reinvestment program that can be used for a variety of purposes such as replacing retiring generating resources with clean energy.

Transmission can also play a central role in supporting grid reliability by carrying lower cost and cleaner energy to places where demand is highest, especially during times of grid stress, including caused by the winter low temperatures you have described. On August 6, DOE announced an award of \$700 million through its Grid Innovation Program to build a 3,000 MW High-Voltage Direct Current transmission line that will better connect Montana to three large grid regions across the western and central U.S. This project will improve reliability by allowing utilities to share power across a broad geographic area with diverse climates and weather.

Through the BIL, Congress also provided DOE with \$10.5 billion to invest in the Grid Resilience Innovation Partnerships (GRIP) program. As you may know, the GRIP program consists of three funding mechanisms (Grid Resilience Utility and Industry Grants, Smart Grid Grants, and Grid Innovation Program grants) designed to enhance grid flexibility and improve the resilience of the power system against growing threats of extreme weather and climate change. In 2023, during the first round of GRIP funding, the DOE announced approximately \$3.46 billion in federal investments and more than \$8 billion in total investments for 58 projects across 44 states, representing the federal

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government's single largest direct investment in our nation's history. Through these investments, the DOE will help bring more than 35 gigawatts of new renewable energy online, providing Americans with fewer and shorter blackouts and more affordable energy and reliable power.

Q24. Secretary Granholm, do you support streamlining and reducing timelines for hydropower licensing and relicensing?

A24. DOE's Water Power Technologies Office (WPTO) is leading efforts to help regulators improve the regulatory process for hydropower licensing and relicensing to reduce timelines and accelerate expansion of hydropower and pumped storage hydropower. This includes the development of the Hydropower Regulatory and Permitting Information Desktop (RAPID) toolkit, the publication of an extensive industry report, "An Examination of Hydropower Licensing and Federal Authorization Process," and WPTO's continued support of the Hydropower Vision Roadmap, with one of its key priorities being to optimize the regulatory process.^{30,31}

Q25. Secretary Granholm, in President Biden's "WHAT THEY ARE SAYING: Leaders Praise Biden-Harris Administration Pause on Pending Decisions of Liquefied Natural Gas Exports", the President included a quote that stated, "HUGE NEWS! @POTUS @SecGranholm have taken bold and historic action to #StopLNG". Do you agree with that statement?

A25. This current update of our analyses is necessary so that DOE can avoid reliance on stale data and analyses in review of non-FTA applications under NGA section 3(a). The update ensures that DOE relies on the most up-to-date and robust data and analyses, to the benefit of not only U.S. consumers and the Nation's economic competitiveness, but also applicants.

Q26. Secretary Granholm, in President Biden's "WHAT THEY ARE SAYING: Leaders Praise Biden-Harris Administration Pause on Pending Decisions of Liquefied Natural Gas Exports", the President included a quote that stated, "President Biden and Secretary

³⁰ <http://en.openci.org/wiki/RAPID/Hydropower>

³¹ <https://www.energy.gov/eere/water/articles/new-report-examines-us-hydropower-permitting-process-0>

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Granholm's bold step today continues this administration's historic efforts to meet the global commitment to phase out fossil fuels." Do you agree with that statement?

- A26. Both reducing the use of fossil fuels, as well as decarbonizing energy production and use across the fossil fuel value chain, are critical in meeting global climate commitments as we transition to a greater share of clean energy sources. However, the transition is not a straight line and must be carefully managed with industry and government partners. As we fully deploy our tax credits, grants and loans to boost domestic production of clean energy technologies, we're on a winning path for U.S. companies, workers, and our allies as we diversify global energy supply chains and reduce global carbon pollution.
- Q27. Secretary Granholm, in President Biden's "WHAT THEY ARE SAYING: Leaders Praise Biden-Harris Administration Pause on Pending Decisions of Liquefied Natural Gas Exports", the President included a quote that stated, "It's time to phase out fossil fuels." Do you agree with that statement?
- A27. Transitioning to clean energy will take time and will require continued use of fossil fuels in coming decades. Investment in a wide range of clean energy technologies needs to be accelerated as much as possible, including next-generation nuclear, virtual power plants, carbon management, long-duration energy storage, industrial decarbonization, and clean hydrogen.
- Q28. Secretary Granholm, what specific factors and studies is the Department reviewing or updating during the LNG export authorization pause?
- A28. DOE is not changing the public interest factors it has long used in evaluating non-FTA export applications. DOE is updating the studies DOE has used in the past to inform its public interest determinations and, in some cases, configuring and/or adding to the analyses in new ways to ensure a comprehensive update, using the most up-to-date and robust data and analyses.

The studies that have been used in recent non-FTA export decisions that are part of the update include:

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- Addendum to Environmental Review Documents Concerning Exports of Natural Gas from the United States (2014).³²
- Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States (2014) and Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States: 2019 Update (2019).³³ and
- Macroeconomic Outcomes of Market Determined Levels of U.S. LNG Exports (2018).³⁴

Q29. Secretary Granholm, what are the pending projects affected by the LNG export authorization pause?

A29. There are currently four pending non-FTA applications, requesting a combined 3.58 Bcf/d in exports, to which the update of DOE's analyses relates because the environmental review process for the associated export facility is complete under NEPA and, for the FERC-jurisdictional projects, FERC has issued its authorization for the export facility. These four "NEPA-complete" applications include:

- Three applications requesting export authorization from new projects: Commonwealth LNG, LLC (Louisiana), Port Arthur LNG Phase II, LLC (Texas), and NFE Altamira FLNG, S. de R.L. de C.V. (off the Gulf Coast of Mexico) and
- One application requesting an increase in an authorization holder's already-approved non-FTA export volume: Venture Global Calcasieu Pass, LLC (Louisiana).

Under DOE's Procedures for Liquefied Natural Gas Export Decisions (79 Fed. Reg. 48,132 (Aug. 15, 2014)), LNG Procedures, each of these applications would be

³² See <https://www.energy.gov/fecm/addendum-environmental-review-documents-concerning-exports-natural-gas-united-states>

³³ See <https://www.energy.gov/fecm/life-cycle-greenhouse-gas-perspective-exporting-liquefied-natural-gas-united-states> and <https://www.energy.gov/sites/prod/files/2019/09/f66/2019%20NETL%20LCA-GHG%20Report.pdf>

³⁴ See <https://www.energy.gov/sites/prod/files/2018/06/f52/Macroeconomic%20LNG%20Export%20Study%202018.pdf>

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considered ready for action by DOE, but for the fact that the existing economic and environmental studies no longer provide “sufficient information on which to base a public interest determination”—such that DOE must complete the update before it can evaluate the applications under Section 3(a) of the Natural Gas Act. DOE is therefore temporarily deferring its public interest determination of these four applications until the update (and associated public process) is completed.

Additionally, there are three other non-FTA applications currently pending that are subject to the update by virtue of their NEPA status. These three applications are Mexico Pacific Limited LLC (Mexico); Lake Charles Exports, LLC (Louisiana); and Magnolia LNG, LLC (Louisiana). For these applications, which request a combined 2.03 Bcf/d in non-FTA exports, DOE (rather than FERC or U.S. Maritime Administration, MARAD) is leading or anticipates that it will be leading the environmental review under NEPA based on the facts of the application. Because DOE’s NEPA process relies, in significant part, on the environmental analyses subject to the update (including DOE’s life cycle analysis for GHG emissions), DOE has determined that it cannot move forward with the NEPA process in these three proceedings until the update is completed.

- Q30. Secretary Granholm, in December of 2023 the Department of Energy released a Policy Statement “reaffirming the seven-year deadline for authorization holders to commence exports of domestically produced natural gas, including liquefied natural gas (LNG), to non-free trade agreement (non-FTA) countries”. If a project does not meet the requirements in the policy statement, what actions do they have to take at the Department of Energy and FERC to re-apply for authorizations and how does the current pause affect their ability to re-apply?
- A30. Any authorization holder that is not able to comply with the seven year period to commence exports after receiving their non-FTA authorization and is not able to meet the conditions for consideration of extension (having the associated export facility under construction and a demonstration of the extenuating circumstances beyond the control of the authorization holder leading to why exports could not commence in seven years) is free to apply for a new non-FTA authorization. The application will be a new proceeding and will undergo the same steps as any new non-FTA application, including a notice of

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application in the Federal Register. The applicant may or may not need any additional environmental review at FERC, but that is a separate proceeding from DOE. To date, two authorization holders have filed new applications with DOE, either in anticipation of not being able to meet their commencement date or having already missed it.

- Q31. Secretary Granholm, many mines in Montana and across the country have been forced to go through endless litigation resulting in decades long delays and a never-ending permitting process. Do you support litigation reform that would allow mines to move forward and begin operation in a timely manner?
- A31. DOE does not permit new mines but recognizes that new critical minerals will be needed to be mined to meet the future national security, clean energy, and advanced technology needs of the country. To that end, DOE is working to develop novel technologies that will revolutionize mining in a way that significantly reduces the environmental impacts and associated costs of mining. These technologies including advances in geophysics, drilling, artificial intelligence and machine learning, robotics and automated systems, in situ extraction and processing technologies, improved tailings management, and material traceability. The goal of these efforts is to bring a more surgical approach to mining that significantly reduces the ratio of waste to metal brought out of the ground, the amount of water used, the energy needed, the associated greenhouse gas emissions, and the overall emissions to land, water, and air. This research should help improve the impacts of mining to the surrounding communities, which may improve the social license to mine, which in turn, is expected to impact domestic mining and associated permitting times in a positive way.

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QUESTIONS FROM SENATOR BILL CASSIDY, M.D.

The responses to the QFRs were written with the information available to DOE at the time of the hearing “Oversight of the Biden Administration’s Pause on Liquefied Natural Gas Exports”, which occurred prior to the preliminary injunction issued on July 1, 2024 by the U.S. District Court for the Western District of Louisiana in *Louisiana v. Biden*.

On July 1, 2024, in *Louisiana v. Biden*, the U.S. District Court for the Western District of Louisiana granted a Motion for Preliminary Injunction and enjoined DOE and other defendants “from halting and/or pausing the approval process for pending and future applications for LNG exports of liquified natural gas to non-FTA countries, effective immediately, to remain in effect pending the final resolution of this case, or until further orders from this Court, the United States Court of Appeal, or the Supreme Court of the United States.” DOE is complying with the Court’s order and is reviewing pending non-FTA applications.

Separately, DOE is continuing to update its economic and environmental analyses that will inform its public interest decisions on non-FTA applications under section 3(a) of the Natural Gas Act. Once the analyses are completed, DOE will publish a notice of availability of the new analyses in the *Federal Register* for public comment.

- Q1. During the hearing, you asserted that one of the justifications for the reviews is that the Department of Energy has not conducted any lifecycle emissions research on liquefied natural gas (LNG) exports since the 2019 study entitled, “Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States.” Have any of the Department of Energy’s National Labs, including the National Energy Technology Laboratory, studied lifecycle emissions of LNG exports between the time of publication of the 2019 study and today?
- A1. With support from the National Energy Technology Laboratory, DOE performed life cycle analysis as part of the Supplemental Environmental Impact Statement for the Alaska LNG proceeding that was initially published in July 2022 and finalized in January 2023.³⁵ For the current effort to update the analyses used to make non-free trade agreement export decisions, DOE is working with the National Laboratories to use the output of the global economic analyses to inform DOE’s understanding of the direct and indirect consequential market effects of increased global supply of U.S. LNG exports on

³⁵ Available at https://www.energy.gov/sites/default/files/2023-01/final-seis-0512-s1-alaska-lng-summary-2023-01.pdf?_hscnc=p2ANqtz--_x_tnzkguPuewp9M49_6Mc-_cn-sw8xxZtm0F7r7z3iMCTvyzw18-f6AADZ219Ab_rZMR

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GHG emissions. This approach could be used by DOE to reflect the consequential environmental GHG emissions contributions of U.S. LNG export projects as part of possible future authorizations.

- Q2. Natural gas, oil, or the Department of Energy's own Office of Fossil Energy and Carbon Management are not mentioned once in your testimony. It is incredibly important that DOE leverage all sources of energy, including oil and natural gas produced in the Gulf—which, by the way, has the lowest greenhouse gas emissions profile globally. What role do you see for DOE's Office of Fossil Energy and Carbon Management going forward?
- A2. To achieve net-zero emissions by midcentury, several models indicate that the United States will need to capture, transport, and permanently store hundreds of millions of tons of carbon dioxide each year. This will require a concerted effort to build out the infrastructure to store large quantities of carbon dioxide in geologic storage facilities. The work of the Office of Fossil Energy and Carbon Management (FECM) is carrying out the Department and the Administration's commitment to ensuring that carbon management projects are designed, built, and operated safely and responsibly, and in a way that reflects the best science and responds to the needs and inputs of local communities. In addition, FECM is carrying out work to invest in technologies that are reducing emissions from natural gas supply, delivery, and storage infrastructure, reducing the surface and subsurface risks and impacts from oil and natural gas development, and developing technologies and practices that allow us to use our natural gas resources while meeting our climate goals. FECM is also doing important work to ensure a secure domestic supply of critical minerals that accelerates production from unconventional and secondary sources. These include mined coal and legacy fossil energy and mining wastes, such as coal waste, coal ash, acid mine drainage, mine tailings, and produced waters from oil and gas operations.

The FY 2025 Budget Request for FECM, an increase of \$35M compared to FY 2024 Enacted, reflects the importance and urgency of this work.

- Q3. I am very supportive of direct air capture and the DOE's award to the Project Cypress regional Direct Air Capture (DAC) hub in Louisiana, and I want to make sure that federal investments truly scale this technology. Can you speak to the Department's plans for the

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remainder of the DAC hub program, and what are your plans for the long-term? How are the large hub projects progressing and how are you balancing technology innovation with the scale requirements? When will DOE release the FOA for those two additional major DAC hubs?

- A3. FECM and OCED have developed a long-term approach for Regional DAC Hubs since the initial FOA. The diverse selections of regions, technologies, and project configurations enable a strategic approach for a nascent industry. These projects will have key learnings that inform next phases of DOE solicitations. DOE also sought external input on key aspects of DAC industry commercialization. Specifically, OCED issued an RFI to understand whether there could be a role for DOE to serve in supporting mid-scale (5-25 kilotons of CO₂ per year.) DAC demonstrations. FECM and OCED collectively use a suite of programs, including Small Business Innovation Research, Technology Commercialization Fund, and R&D solicitations to support early-stage technology innovation for DAC.

As has been publicly noted, OCED has awarded two Topic Area 3 (TA-3)-3 projects (Project Cypress in Louisiana and the South Texas DAC Hub in Texas). Subsequent funding opportunities development and timing will be coordinated jointly and will aim to not only achieve the program goals of four hubs with megaton potential but align with the progress of TA 1 (feasibility) and TA 2 (Front-End-Engineering-Design-Study) and industry needs.

- Q4. We were disappointed that the HALO hub was not among the states chosen by the Biden administration for a regional hydrogen power hub. Louisiana will miss out on sharing \$7 billion from the bipartisan infrastructure law despite having infrastructure, expertise, and interest available to be successful in hydrogen. How can the department make hydrogen more accessible and cost-effective so that businesses and consumers can utilize this reliable energy resource in states that were excluded from the announced hydrogen hubs?
- A4. The goal of the Regional Clean Hydrogen Hubs program is to kickstart a national network of clean hydrogen producers, consumers, and connective infrastructure while supporting the production, storage, delivery, and end-use of clean hydrogen. The aim of the program is to not only successfully build the selected Hubs, but in the process build confidence in the clean hydrogen economy, furthering investment to areas outside the

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Hubs; creating supply chains, growing access, and lowering costs for clean hydrogen. The Department continues to engage with entities that would like to learn more about DOE's efforts, the Hubs, or how they could work with the Department to grow the clean hydrogen economy.

- Q5. Foreign Entity of Concern definitions are supposed to ensure taxpayer dollars do not go to adversarial nations, or entities within or controlled by those nations. While I have general support for foreign investment, I also have concern that recent interpretations of FEOC have been weakened to enable Chinese-owned or controlled companies to benefit if they are headquartered in a non-FEOC country. What safeguards has your Department put in place to ensure that Chinese companies can't exploit existing credits or grants established in the Bipartisan Infrastructure Law or IRA?
- A5. DOE's final guidance is the best source of information on what DOE has determined constitutes a FEOC. Briefly, this final guidance designates an entity to be a FEOC if it is incorporated in, has its principal place of business in, or is performing relevant activities in the PRC. As a result, any battery-related activity occurring in China would automatically be ruled non-compliant for the purposes of the 30D consumer clean vehicle tax credit. For battery-related operations occurring outside of China's borders, an entity would be considered a FEOC if:
- that entity is controlled, either directly or indirectly, by the government of the PRC; or
 - the entity doing the activity is effectively controlled, via a license or contract with a FEOC.

In addition, through both its Battery Materials Processing and Battery Manufacturing and Recycling Grant Programs, as well as its role in the 30D review process, DOE will carefully monitor the battery supply chain to inform my authority under BIL Section 40207(a)(5)(E) to designate a specific entity as a FEOC if it is "engaged in unauthorized conduct that is detrimental to the national security or foreign policy of the United States."

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QUESTIONS FROM SENATOR JOSH HAWLEY

- Q1. On June 9, 2023, you wrote to inform the Senate Committee on Energy and Natural Resources that, contrary to your prior testimony, you in fact held stocks in six individual companies. In the letter, you identified one of these as Ford.
- Q1A. What were the other five companies that you held stock in as of April 2023?
- A1A. My spouse and I held stock in seven companies, in addition to Ford, as of April 2023: Take-Two Interactive Software, Inc., Cedar Fair LP, Invesco Ltd., Redfin Corp., Gilead, Teledoc Health, Inc., and Uber Technologies, Inc.
- Q1B. How much did you have invested in each of these companies?
- A1B. Below is a list of the value of my spouse and my investments in these companies on the date they were sold, consistent with my financial disclosures available on the U.S. Office of Government Ethics website, <https://oge.gov/web/oge.nsf/Officials%20Individual%20Disclosures%20Search%20Collection?OpenForm>:
- Cedar Fair LLC \$15,001 - \$50,000
 - Invesco Ltd. \$15,001 - \$50,000
 - Redfin Corp. \$1,000 - \$15,000
 - Gilead \$1,000 - \$15,000
 - Teledoc Health \$1,000 - \$15,000
 - Uber Technologies \$1,001 - \$15,000

In addition, the value of my spouse's interest Take-Two Interactive Software, Inc. as of December 2023 was \$1,000-\$15,000.

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- Q1C. When did you first purchase these shares?
- A1C. These shares were purchased prior to my nomination for Secretary of Energy in January 2021, except for my spouse's shares in Take-Two Interactive Software, Inc., which were purchased in May 2022.
- Q1D. When did you sell these shares?
- A1D. Cedar Fair LP, Invesco Ltd., Redfin Corp., Gilead, Teledoc Health, Inc., and Uber Technologies, Inc. were sold on May 18, 2023. The Ford stock I disclosed in 2023 was sold on May 15, 2023. In addition, the Take-Two Interactive Software, Inc. stock was sold on January 16, 2024.
- Q1E. How much profit did you make when you sold these shares?
- A1E. Information pertaining to investment income is included in my financial disclosures available on the U.S. Office of Government Ethics website, <https://oge.gov/web/oge.nsf/Officials%20Individual%20Disclosures%20Search%20Collection?OpenForm>.
- Q2. Please produce copies of all ethics disclosures and reports that you have filed with the Department of Energy, Office of Government Ethics, or any other federal agency.
- A2. My public financial disclosure reports are available on the U.S. Office of Government Ethics website.³⁶
- Q3. What was the nature of your relationship with Proterra?
- A3. I served as a member of Proterra's Board of Directors from February 2017 until February 2021.
- Q4. What was the nature of your compensation at Proterra?
- A4. The nature of my compensation was equity based. At the time of my nomination, I held both vested and unvested stock options in Proterra. Upon my resignation in February

³⁶ <https://oge.gov/web/oge.nsf/Officials%20Individual%20Disclosures%20Search%20Collection?OpenForm>.

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2021, I forfeited my unvested stock options. I committed to divesting my vested stock in Proterra not later than 180 days after my confirmation, which was February 25, 2021. I sold my Proterra stock less than 90 days after my confirmation on May 24, 2021.

- Q5. During your time as Secretary, have you ever met with Ceres, its representatives, or donors? If so, please describe the times, individuals, and nature of the meetings?
- A5. As the Secretary of Energy, I meet with many different individuals and groups. Since 2021, I have taken part in three events where Ceres was involved:
- September 17, 2021, at 12:00-12:10 PM ET: Virtual Keynote Address at Climate Action 100+'s Just Transition Webinar (Ceres was member of host coalition).
 - November 15, 2022, at 8:45-9:15 AM Local Time: Fireside chat with Ceres Chief Economist Amit Bando (event held in Sharm el-Sheikh, Egypt, adjacent to Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27)).
 - March 6, 2024, at 10:15-10:30 AM ET: 1:1 on-stage fireside chat with Axios energy reporter Ben Geman in Washington, DC (Ceres co-hosted with Axios and others).

The Department does not maintain records about the donor affiliations of the individuals who request meetings with Departmental officials.

- Q6. Please provide a comprehensive list of all meetings that Department of Energy officials have attended with members of the Chinese Communist Party in the last six months?
- A6. The Department does not maintain records about the political affiliations of individuals who request meetings with Departmental officials. I will note that the Department has a suite of policies and programs in place designed to characterize and mitigate the risks that adversarial foreign governments pose to our scientific enterprise.

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- Q7. What steps are you taking to promote domestic automobile manufacturing in the face of efforts by China to enter this market?
- A7. The Department's Office of Manufacturing and Energy Supply Chains (MESC) is presently administering the Domestic Automotive Manufacturing Conversion Grants program. This program, funded by the IRA, is investing in the domestic production of light-, medium-, and heavy-duty hybrid, plug-in hybrid, electric, and fuel cell vehicles. Recipients are existing vehicle and component manufacturers who are transitioning from internal combustion to electrified markets, and statutory preference is given to those who have or are at risk of closure. In July, DOE selected 11 projects supporting auto manufacturing and assembly facilities building motorcycles, SUVs, and school buses, battery packs, hybrid powertrains, and other products across 8 states—Michigan, Ohio, Pennsylvania, Georgia, Illinois, Indiana, Maryland, and Virginia—totaling \$1.7 billion of federal funding matched by private sector investment. Collectively, the awards will help ensure 15,000 skilled workers are retained, create 2,900 new high-quality jobs, and position the U.S. automotive sector to compete globally with onshore, resilient supply chains.

Additionally, MESC is administering BIL grants for projects that will create new, retrofitted, and expanded domestic facilities for battery-grade processed critical minerals, battery precursor materials, battery components, and cell and pack manufacturing. With the demand for electric vehicles (EVs) and stationary storage alone projected to increase the size of the lithium battery market by five- to ten-fold by the end of the decade, it is essential that the United States invests in the capacity to accelerate the development of a resilient supply chain for high-capacity batteries.

In addition, the Loan Programs Office (LPO) is issuing loans through programs like the Advanced Technology Vehicles Manufacturing Loan Program to support the advanced technology vehicle and critical materials value chain. LPO's due diligence of all borrowers, including the rigorous financial, technical, legal, and market analysis by the

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DOE's professional staff, ensure identified risks are mitigated to the extent possible to protect the taxpayer and support the American auto industry.

Q8. Was the Department of Energy consulted before the Department of the Treasury issued guidance on the Section 45W Commercial Clean Vehicle Credit?

A8. Yes. The Department of Energy provides technical expertise and support to the Department of Treasury on many of the Inflation Reduction Act's energy-related tax credits.

Q9. Did you provide any input on the Department of the Treasury's guidance on the Section 45W Commercial Clean Vehicle Credit?

A9. Yes. The Department of Energy provides technical expertise and support to the Department of Treasury on the Inflation Reduction Act tax credits.

Q10. How many foreign-made car models currently qualify for the Section 30D and Section 45W tax credits?

A10. There are 112 models of light-duty battery electric and plug-in hybrid vehicles for sale in the US. Of these, 21 models currently qualify for a credit under Section 30D.

Businesses and tax-exempt organizations that buy a qualified commercial clean vehicle may qualify for a clean vehicle tax credit under Section 45W. This credit does not have a requirement for assembly in North America. Thus, 112 models of light-duty battery electric and plug-in hybrid vehicles for sale in the US qualify for the Section 45W tax credit. More than half of the light-duty vehicles that claim the 45W credit are assembled in North America. The commercial clean vehicle credit also applies to medium and heavy-duty vehicles, as well as mobile machinery.

Q11. What steps are you taking to ensure that the Strategic Petroleum Reserve is adequately replenished?

A11. The Department of Energy aims to refill the Strategic Petroleum Reserve (SPR) by the end of the year, accounting for, most, if not all, of the 180 million barrels sold through emergency authorizations by President Biden. This will be achieved by advancing the

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Administration's three-part SPR replenishment strategy. The strategy, announced in 2023, underscored the President's commitment to safeguarding and replenishing this critical energy security asset. As outlined in the strategy, progress includes the direct purchasing of over 32 million barrels to be delivered by the end of October (with additional purchases possible after October), the return of exchange barrels, and the cancellation of 140 million barrels in Congressionally mandated SPR sales from FY 2024 to FY 2027, pursuant to section 1301 of Division M, Title III, of the Consolidated Appropriations Act, 2023. By the end of 2024, the SPR will have nearly replenished the volume sold, primarily to address the global supply disruption caused by Putin's war in Ukraine. Congress ultimately sets the level of the SPR, and despite providing approximately \$10.4 billion to the U.S. Treasury, the SPR will not return to its pre-2017 levels due to Congressionally mandated sales. The SPR is expected to reach about 390 million barrels by the end of September and between 420 million and 450 million barrels by the end of FY 2027.

- Q12. How much will the development of artificial intelligence increase demand for energy in the United States over the next decade and what policies are you pursuing to prepare for this increase in demand?
- A12. A 2024 report from the International Energy Agency (IEA) forecasts that globally data centers' total electricity consumption could reach more than 1,000 terawatt-hours (TWh) in 2026.³⁷ That report estimates that the U.S. data centers' electricity consumption will rise from about 200 TWh in 2022 to almost 260 TWh in 2026, with much of the increase attributed to exponential growth in Artificial Intelligence (AI).

DOE's Lawrence Berkeley National Laboratory (LBNL) is working on a report to Congress assessing current and projected energy use across our nation's data centers. My Secretary of Energy Advisory Board (SEAB) is also looking closely at this issue. An analysis from the Electric Power Research Institute (EPRI) shared with me during the

³⁷ <https://ica.blob.core.windows.net/assets/6b2fd954-2017-408e-bf08-952fdd62118a/Electricity2024-Analysisandforecastto2026.pdf>

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April 9, 2024, SEAB meeting, shows projections of domestic data center annual electricity consumption reaching anywhere from 130 TWh to 270 TWh in 2030, with some estimates pointing up to 370 TWh. We understand that while these projections are characterized by significant uncertainty, many stakeholders are expecting very significant increases in annual electricity consumption by data centers driven by growth in the deployment and use of AI. We also understand that the projections for data center growth are currently regionally concentrated.

DOE is leading numerous programs to prepare for increased demand by enhancing transmission and generation capacity.³⁸ The National Transmission Needs Study identifies existing data and current and near-term future transmission needs through 2040.³⁷ The GRIP program has \$10.5 billion to invest in innovative and transformative projects that will help to ensure the reliability of the power sector's infrastructure. GRIP funds grid enhancing technologies that can quickly and cost-effectively increase transmission system capacity as well as new transmission projects that can unlock new clean generation resources. The Transmission Facilitation Program (TFP) is a \$2.5 billion revolving fund to provide Federal support to overcome the financial hurdles in the development of large-scale new transmission lines and upgrading existing transmission.³⁹ DOE is also taking action to accelerate permitting for new transmission and generation resources. DOE's Coordinated Interagency Transmission Authorizations and Permits Program will significantly streamline Federal environmental reviews and permitting processes for qualifying onshore electric transmission facilities, while ensuring meaningful engagement with Tribes, local communities, and other stakeholders.⁴⁰ Alongside our efforts to enhance the nation's electric transmission system, DOE is working to accelerate the deployment of new generation resources. The Interconnection Innovation e-Xchange (i2X) enables simpler, faster, and fairer

³⁸ <https://www.energy.gov/gdo/national-transmission-needs-study>

³⁹ <https://www.energy.gov/gdo/transmission-facilitation-program>

⁴⁰ <https://www.energy.gov/gdo/coordinated-interagency-transmission-authorizations-and-permits-program>

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interconnection of clean energy resources all while enhancing the reliability, resiliency, and security of our electric grid.⁴¹

While we prepare for growing electricity demand, DOE is also making investments to ensure that data centers are using electricity as efficiently as possible to mitigate grid upgrade needs. The CHIPS and Science Law authorized the Department of Energy to significantly increase investments in the energy efficiency of semiconductors through public private partnerships. As of April 2024, the Department's Energy Efficiency Scaling for 2 Decades (EES2) pledge to improve the energy efficiency of semiconductors has 65 signatories, including Google, Intel, Microsoft, Micron, Synopsys, ARM, AMD, and other leading organizations in government, academia, and high-technology industries. These signatories intend to work together to reduce energy consumption from rapidly expanding semiconductor applications, such as industrial-scale data centers. The ultimate goal of the EES2 initiative is to reverse the growth in energy consumption, by increasing the energy efficiency of semiconductor applications 1,000-fold over the next 20 years. Through collaboration with stakeholders in industry, academia, and government—including the U.S. National Laboratories—the initiative has established several priorities for the American semiconductor industry, including: reducing semiconductor energy consumption at the material, device, circuit, and architecture scale; guiding new technology investments funded through the CHIPS and Science Act; and expanding and diversifying the future workforce by significantly increasing the pool of STEM students who are passionate about advanced semiconductor technology. The EES2 initiative is led by DOE's Advanced Materials and Manufacturing Technologies Office (AMMTO). Over the last year, AMMTO and its partner organizations have been developing a semiconductor roadmap, which features a comprehensive strategy for improving the efficiency, sustainability, and competitiveness of the American semiconductor and related products, which is planned for release in the near future.

⁴¹ <https://www.energy.gov/eere/i2x/interconnection-innovation-e-xchange>

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The Department also currently has a \$42 million active ARPA-E Program, COOLERCHIPS. ARPA-E funds moonshot technology concepts to develop high risk/high reward technologies that lead to a U.S. Global leadership in energy technologies. The target for COOLERCHIPS is to reduce total cooling energy expenditure to less than 5% of a typical data center's IT load at any time and any U.S. location for a high-density compute system. A data center's total cooling energy is the energy needed to ensure that all heat generated from its IT and non-IT loads is rejected. Reducing data center cooling energy will reduce the operational CO2 footprint of data center operations and allow for the U.S. to lead globally in managing the most (AI) chipsets efficiently. COOLERCHIPS aims to be commercially competitive with current state-of-the-art solutions by offering a lower total cost of ownership without compromising data center reliability and availability. Fifteen teams were selected out of over a hundred advanced technology concepts proposed and include teaming of industry leading companies, small businesses, national labs, and academia. The funded ARPA-E teams aim to develop first prototypes at server-level in 2025 and partial rack and modular data center solutions by 2026.

The Department is also investing in basic research in microelectronics and has leveraged our leadership in advanced computing to drive innovation in energy efficiency. The Exascale Computing Project (ECP) partnered with all of the major U.S. microelectronics manufacturers to improve the efficiency and capability of their products. The results allowed us to achieve one of the most ambitious goals of the National Strategic Computing Initiative and deliver the world's first official exascale computing systems that used less than 20 megawatts of power—one tenth of what experts projected at the start of the initiative and 400% improvement in energy utilization over our pre-exascale systems. The Department will soon announce a new round of research partnerships with industry to build on these gains for the next generation of microelectronics products and advanced computing systems.

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DOE is investing in additional fundamental research to accelerate the advancement of microelectronic technologies in a co-design innovation ecosystem. Emphasis will be on basic research to advance new materials, chemistry, synthesis, and fabrication; new computing paradigms and architectures, including those specialized for energy-efficient AI; integrated sensing, edge computing, and communications; and microelectronics resilience in high radiation or cryogenic environments. DOE's Isotope Program participation ensures availability of isotopes needed for semiconductor manufacturing. In May, DOE announced \$160 million to advance President Biden's vision to secure the future of American leadership in semiconductor innovation by implementing a key provision in the historic CHIPS and Science Act of 2022 (42 U.S.C. §19331), Microelectronics Research for Energy Innovation. This funding will support the formation of Microelectronics Science Research Centers (MSRCs) focused on energy efficiency and extreme environments.

In addition to the benefits of the ECP's co-design approach, which fostered collaborations among the developers of the software ecosystem, the hardware technology, and a new generation of computational science applications, the Department is investing in new research.⁴² targeting the co-design of energy-efficient AI algorithms and hardware architectures. Results of these efforts are expected to include models that can predict the resource efficiency of AI systems and techniques that will minimize energy consumption during both the training and the utilization of AI systems.

The Department's Leadership Computing Facility at Oak Ridge National Laboratory has also leveraged AI to build a digital twin of the Frontier exascale system to understand how use of the system, down to software and even the programming language, impacts energy efficiency. The Department will use these insights to further drive innovation and enable data centers, researchers, and individuals to contribute to saving energy by

⁴² <https://science.osti.gov/ascl/-/media/grants/pdf/foas/2024/DE-FOA-0003264-000001.pdf>

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analyzing the many ways energy is utilized in computing and developing robust and effective ways to improve operating efficiencies.

Among other Departmental efforts:

- DOE's Office of Cybersecurity, Energy Security, and Emergency Response will be convening energy stakeholders and technical experts over the coming months to collaboratively assess potential risks to the grid, as well as ways in which AI could potentially strengthen grid resilience and our ability to respond to threats – building off the Department's new public assessment..⁴³
- DOE's National Laboratories issued Advanced Research Directions in AI For Energy, which includes key grand challenges in applied energy over the next decade..⁴⁴
- DOE's Office of Electricity and the Pacific Northwest National Lab issued a report that provides a foundation for understanding the transformative role of AI and ML in power systems..⁴⁵
- DOE has announced new VoltAIc Initiative to use AI to help streamline siting and permitting at the Federal, state, and local level. DOE is investing \$13 million in the initiative to build AI-powered tools to improve siting and permitting of clean energy infrastructure and has partnered with Pacific Northwest National Laboratory (PNNL) to develop PolicyAI, a policy-specific Large Language Model test bed that will be used to develop software to augment National Environmental Policy Act (NEPA) and related reviews..⁴⁶
- DOE has released a liftoff report on advanced grid solutions and grid enhancing technologies, which can enable a smarter grid. By more efficiently using the grid

⁴³ <https://energy.gov/ceser/articles/doe-delivers-initial-risk-assessment-artificial-intelligence-critical-energy>

⁴⁴ <https://www.anl.gov/ai/reference/ai-for-energy-report-2024>

⁴⁵ https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-35735.pdf

⁴⁶ <https://www.pnnl.gov/projects/policyai>

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infrastructure we have today, we can do more with what we have, reduce costs for ratepayers, and support more clean energy on the grid..⁴⁷

- DOE has outlined a wide spectrum of solutions to address increased electricity demand on the nation's power grid while continuing to reduce emissions. DOE released the Future of Resource Adequacy report which affirms that investing in technology solutions, including clean energy generation and storage, transmission expansion and enhancement, and efficiency and demand management tools can provide ample, reliable and secure power in an age of rising electricity demand..⁴⁸
- Over the next several months, DOE will convene utilities, clean energy developers, data center owners and operators, and regulators in localities experiencing large load growth. DOE has also detailed an array of opportunities to support clean energy deployment, advanced grid technologies, and energy efficiency relevant to data centers.
- DOE partnered with national laboratories to draft the "AI for Energy: Opportunities for a Modern Grid and Clean Energy Economy" report, pursuant to the Executive Order (E.O.) on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence (AI) (14110), issued October 30, 2023. The report identifies where AI can be immediately deployed to improve the grid while achieving the Administration's goals for reducing emissions and providing affordable and reliable electricity to all Americans: grid planning, permitting and siting, operations and reliability, and resilience.

⁴⁷ <https://lifthoff.energy.gov/innovative-grid-deployment/>

⁴⁸ <https://www.energy.gov/sites/default/files/2024-04/2024%20The%20Future%20of%20Resource%20Adequacy%20Report.pdf>

**UNITED
AGAINST
NUCLEAR
IRAN**

Ambassador Mark D. Wallace | CEO | AmbWallace@uani.com | 212.922.0063

March 25, 2024

Jennifer Granholm
U.S. Secretary of Energy
U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585
United States
By email: The.Secretary@hq.doe.gov

Martin Keller
President
National Renewable Energy Laboratory
901 D St SW #930
Washington, DC 20024
United States
By email: martin.keller@nrel.gov
Cc: julie.baker@nrel.gov; meyer.seligman@nrel.gov

Re: National Renewable Energy Laboratory and Sharif University of Technology

Dear Secretary Granholm and Dr. Keller:

On behalf of United Against Nuclear Iran (“UANI”¹), I am writing to seek your clarification on the policy of the U.S. Department of Energy’s National Renewable Energy Laboratory (“NREL”) with respect to Iran and in particular, NREL’s ties to Sharif University of Technology (“SUT”). The U.S. Department of the Treasury has sanctioned several divisions and individuals within SUT pursuant to counterproliferation authorities, while SUT is also sanctioned by the EU and the UK, for involvement in the development of Weapons of Mass Destruction (“WMD”).²

National Renewable Energy Laboratory and SUT

On February 23, 2024, the Institute of Electrical and Electronic Engineers (“IEEE”) published an article titled, “Grid-Forming Inverter-Based Resource Research Landscape:

¹ UANI is a not-for-profit, bi-partisan, advocacy group that seeks to prevent Iran from fulfilling its ambition to obtain nuclear weapons. UANI was founded in 2008 by Ambassador Mark D. Wallace, the late Ambassador Richard Holbrooke, and Middle East expert Dennis Ross. UANI’s private sanctions campaigns and state and federal legislative initiatives focus on ending the economic and financial support of the Iranian regime by corporations until Iran verifiably abandons its drive for nuclear weapons, support for terrorism and gross human rights violations. Former U.S. Senator Joseph Lieberman is UANI’s Chairman. UANI’s Advisory Board consists of distinguished leaders in government, academia and business. See www.unitedagainstinucleariran.com/about/leadership.

² Wisconsin Project on Nuclear Arms Control, “[Sharif University of Technology](https://www.wisconsinproject.org/iran/sharif-university-of-technology/),” updated February 14, 2023.

Understanding the Key Assets for Renewable-Rich Power Systems,”³ co-authored by seven researchers, including one from NREL⁴ and one from SUT.⁵ IEEE also notes that the research was grant-funded by the U.S. Department of Energy’s Solar Energy Technologies Office (“SETO”).

The screenshot shows the IEEE Xplore Digital Library entry for the paper. The title is "Grid-Forming Inverter-Based Resource Research Landscape: Understanding the Key Assets for Renewable-Rich Power Systems". The publisher is IEEE. There are buttons for "Cite This" and "PDF". The authors listed are Behrooz Bahrani, Mohammad Hasan Ravanji, Benjamin Kroposki, Deepak Ramasubramanian, Xavier Guillaud, and Thibault Prevost. The author Mohammad Hasan Ravanji is highlighted with a blue box, and his affiliation, Sharif University of Technology, Tehran, Iran, is also shown. There are 164 full-text views and a "Text Views" button. Social media sharing icons for ResearchGate, Facebook, and Twitter are visible.

(IEEE)

The screenshot shows the profile page for Mohammad Hasan Ravanji on the Sharif University of Technology website. The header includes the university logo and name, and a navigation menu with links for Home, About Me, Research, Teaching, Publications, Team, and Calendar. The main heading is "Mohammad Hasan Ravanji". Below the name, it lists his position as Assistant Professor in the Department of Electrical Engineering at Sharif University of Technology. A portrait photo of Mohammad Hasan Ravanji is shown on the right. At the bottom, his address is given as Room 312W - Department of Electrical Engineering, Sharif University of Technology, Azadi Ave., Tehran, Iran.

(Sharif University of Technology)

³ IEEE, “[Grid-Forming Inverter-Based Resource Research Landscape: Understanding the Key Assets for Renewable-Rich Power Systems](#),” February 23, 2024.

⁴ NREL, “[Ben Kroposki](#)”

⁵ SUT, “[Mohammad Hasan Ravanji](#).”

Grid-Forming Inverter-Based Resource Research Landscape: Understanding the Key Assets for Renewable-Rich Power Systems


Publisher: IEEE [Cite This](#) [PDF](#)

Behrooz Bahrani ; Mohammad Hasan Ravanji ; Benjamin Kroposki ; Deepak Ramasubramanian ; Xavier Guillaud ; Thibault Prevos... [All Authors](#)

164 Full Text Views

Power Systems Engineering Center at the National Renewable Energy Laboratory, Golden, CO, USA

(IEEE)



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Ben Kroposki
Director - Power Systems Engineering Center

Benjamin.Kroposki@nrel.gov
[303-275-2979](tel:303-275-2979)

Ben Kroposki is the director of the Power Systems Engineering Center at NREL where he leads NREL's strategic research in the design, planning, and operations of electrical power systems. As center director, he manages

(NREL)

SUT, Sanctions, and WMD Proliferation

As noted, SUT (a.k.a. Arya-mehr University of Technology a.k.a. Sharif Technical University) is a sanction-designated Iranian institution. SUT and several SUT research units, departments, and affiliated individuals are variously sanctioned by the United States, Canada, the European Union, and the United Kingdom for supporting entities involved in Iran's military and in production and procurement for Iran's ballistic missile program proliferation of weapons of mass destruction.

U.S. authorities have designated various SUT divisions and individuals. SUT oversees the Advanced Information and Communication Technology Center ("AICTC"), Digital Media Lab

(“DML”), and the Mobile Value-Added Services Laboratory (“VASL”). All three entities were sanctioned by the United States Department of the Treasury, Office of Foreign Assets Control (“OFAC”), as Specially Designated Nationals (SDN) in 2012, pursuant to Executive Order (EO) 13382 which targets WMD proliferators.⁶ AICTC, DML and VASL are all additionally subject to “secondary sanctions,” which target not only the sanctioned entity itself but any third-party actors doing business with the sanctioned entity.

OFAC
Office of Foreign Assets Control

Sanctions List Search

Special Designated Nationals and Blocked Persons list (“SDN List”) and all other sanctions lists administered by OFAC, including the Foreign Sanctions Evaders List, the Non-SDN Iran Sanctions Act List, the Sectoral Sanctions Identifications List, the List of Foreign Financial Institutions Subject to Correspondent Account or Payable-Through Account Sanctions and the Non-SDN Palestinian Legislative Council List. Given the number of lists that now reside in the Sanctions List Search tool, it is strongly recommended that users pay close attention to the program codes associated with each returned record. These program codes indicate how a true hit on a returned value should be treated. The Sanctions List Search tool uses approximate string matching to identify possible matches between word or character strings as entered into Sanctions List Search, and any name or name component as it appears on the SDN List and/or the various other sanctions lists. Sanctions List Search has a slider-bar that may be used to set a threshold (i.e., a confidence rating) for the closeness of any potential match returned as a result of a user’s search. Sanctions List Search will detect certain misspellings or other incorrectly entered text, and will return near- or approximate matches, based on the confidence rating set by the user via the slider-bar. OFAC does not provide recommendations with regard to the appropriateness of any specific confidence rating. Sanctions List Search is one tool offered to assist users in utilizing the SDN List and/or the various other sanctions lists; use of Sanctions List Search is not a substitute for undertaking appropriate due diligence. The use of Sanctions List Search does not limit any criminal or civil liability for any act undertaken as a result of, or in reliance on, such use.

[Download the SDN List](#) [Sanctions List Search: Rules for use](#) [Visit The OFAC Website](#)
[Download the Consolidated Non-SDN List](#) [Program Code Key](#)

Details:

Type:	Entity	List:	SDN
Entity Name:	ADVANCED INFORMATION AND COMMUNICATION TECHNOLOGY CENTER	Program:	NPWMD; IFSR
Remarks:			

Identifications:

Type	ID#	Country	Issue Date	Expire Date
Website	www.aictc.ir			
Additional Sanctions Information -	Subject to Secondary Sanctions			

Aliases:

Type	Category	Name
a.k.a.	strong	AICTC

Addresses:

Address	City	State/Province	Postal Code	Country
No. 5, Golestan Alley Shahid Ghasemi St. Sharif University of Technology		Tehran		Iran

(OFAC, Sanctions Search [AICTC, Sharif University of Technology])

According to the official SUT website and OFAC, the SUT Associate Professor at the Department of Computer Engineering is Rasool Jalili.⁷ Jalili was individually sanctioned by OFAC and is also

⁶ OFAC, “[Non-proliferation Designations](#),” July 12, 2012, and See Appendix.

⁷ SUT, “[Dr. Rasool Jalili](#)”

subject to secondary sanctions.⁸ According to the U.S. Department of the Treasury, Office of Public Affairs:⁹

As of February 2009, Rasool Jalili was attempting to acquire equipment related to monitoring of SMS traffic from abroad and as of early July 2012, Rasool Jalili was actively assisting the Government of Iran's internet censorship activities and was involved in blocking Iranian citizens' internet access to Facebook, ebay, and YouTube, in addition to other sites. Rasool Jalili also assisted in blocking any website that contained content criticizing the Iranian Government such as independent and international newspapers, blogs, and activist sites. In addition, Rasool Jalili's company, AmnAfzar, provided internet censorship and filtering software to the Government of Iran. On March 7, 2012, Rasool Jalili was appointed by the Supreme Leader of Iran as a member of Iran's Supreme Council of Virtual Space (AKA Supreme Council of Cyberspace). The Council is charged with establishing a center of national cyberspace to define policy and coordinate and make decisions regarding cyberspace.

In addition to U.S. Government sanctions, SUT is also specifically placed on the "Restricted Universities List" of some U.S. universities.¹⁰ In February 2019, various Iranian media reports quoted Iranian Minister of Science Research and Technology Mansour Gholami who reportedly stated, "Due to their nuclear research, Shahid Beheshti University and Sharif University of Technology were included in the [U.S.] sanctions list."¹¹

The European Union has also imposed sanctions on SUT "in relation to the non-proliferation of weapons of mass destruction."¹² On July 31, 2021, the EU designated SUT for having "a number of cooperation agreements with Iranian Government organisations which are designated by the UN and/or the EU and which operate in military or military-related fields, particularly in the field of ballistic missile production and procurement."¹³

SUT was originally listed by the European Council in 2011 for nuclear proliferation activities: "Sharif University of Technology (SUT) is assisting designated entities to violate the provisions of UN and EU sanctions on Iran and is providing support to Iran's proliferation sensitive nuclear activities. As of late 2011 SUT had provided laboratories for use by UN-designated Iranian nuclear entity Kalaye Electric Company (KEC) and EU-designated Iran Centrifuge Technology

⁸ OFAC Sanctions Search, "[Rasool JALILI](#)"

⁹ U.S. Treasury Department, Office of Public Affairs, "[FACT SHEET: SANCTIONS ON IRANIAN GOVERNMENT AND AFFILIATES](#)," 11/8/2012.

¹⁰ Columbia University, "[Sanctions & Export Controls: Identifying The Risks](#)," 4/18/2018.

¹¹ University World News, "[US adds two Iranian universities to sanctions list](#)," 2/22/2019; PersiaDigest, "[Two Iranian universities are sanctioned](#)," 2/18/2019; the accuracy of these reports is unconfirmed.

¹² EU Sanctions Map, "[Sharif University of Technology](#)"

¹³ EU Sanctions Tracker, "[Sharif University of Technology](#)"

Company (TESA).¹⁴ The Institute for Science and International Study (“ISIS”) has likewise detailed SUT’s extensive, illicit, and clandestine nuclear program procurement efforts:

In the early 1990s, the Physics Research Center engaged in an extensive procurement effort that included using Sharif University of Technology and other entities to assist in outfitting a nuclear program. In many cases, Sharif University appears to have been used as a front for purchases made by PHRC. Some goods could have gone to Sharif University, but the bulk of the procurements appear destined for the PHRC or its sponsors. Sharif University also housed significant relevant expertise on nuclear technology, and there may have been cooperation between Sharif University and PHRC on undeclared nuclear activities that went beyond procurement.¹⁵

On April 28, 2016, the General Court of the European Council upheld the original decision to designate SUT by dismissing SUT’s suit to have it removed from the list. This decision was upheld by the European Court of Justice in April 2017.¹⁶ The European Council reaffirmed in 2016 that SUT has provided support to Iran’s nuclear and ballistic missile programs, and has several “cooperation agreements with Iranian Government organisations which are designated by the UN and/or the EU and which operate in military or military-related fields, particularly in the field of ballistic missile production and procurement.”¹⁷ These agreements include:

an agreement with the EU-designated Aerospace Industries Organisation for inter alia the production of satellites; co-operating with the Iranian Ministry of Defence and the Iranian Revolutionary Guards Corps (IRGC)¹⁸ on smart boat competitions; a broader agreement with the IRGC Air Force which covers developing and strengthening the University’s relations, organisational and strategic cooperation; SUT is part of a 6-university agreement which supports the Government of Iran through defence-related research; and SUT teaches graduate courses in unmanned aerial vehicle (UAV) engineering which were designed by the Ministry of Science among others. Taken together, these show a significant record of engagement with the Government of Iran in military or military-related fields that constitutes support to the Government of Iran.¹⁹

¹⁴InfoCuria – Case Law of the Court of Justice, Council of the European Union, “[JUDGMENT OF THE GENERAL COURT \(Seventh Chamber\)](#),” 4/28/2016.

¹⁵ ISIS, “[The Physics Research Center and Iran’s Parallel Military Nuclear Program](#),” 2/23/2012.

¹⁶ European Sanctions “[Sharif University ECJ appeal rejected](#),” April 17, 2017.

¹⁷ InfoCuria – Case Law of the Court of Justice, Council of the European Union, “[JUDGMENT OF THE GENERAL COURT \(Seventh Chamber\)](#),” April 28, 2016.

¹⁸ The IRGC was designated as a Foreign Terrorist Organization (“FTO”) by the United States in 2019.

¹⁹ InfoCuria – Case Law of the Court of Justice, Council of the European Union, “[JUDGMENT OF THE GENERAL COURT \(Seventh Chamber\)](#),” April 28, 2016.

Sharif University of Technology

Sharif University of Technology (SUT) has a number of cooperation agreements with Iranian Government organisations which are designated by the UN and/or the EU and which operate in military or military-related fields, particularly in the field of ballistic missile production and procurement.

DESIGNATION DATE	REGIME	NATIONALITY
7/31/2021	<u>IRAN</u>	<u>UNKNOWN</u>
<hr/>		
FINANCIAL SANCTION	2021/1242 (QJ L272)	

(EU Sanctions Tracker: Sharif University of Technology)

The United Kingdom, too, re-listed SUT on its “Consolidated List of Financial Sanctions Targets in the UK” on December 31, 2020.²⁰

119. **Organisation Name:** SHARIF UNIVERSITY OF TECHNOLOGY
a.k.a.: (1) Arya Mehr University of Technology (2) Sharif Technical University (3) SHFT (4) SUT **Address:** (1) Azadi Ave, 11365 8639, Tehran, Iran, (2) Azadi Ave/Street, PO Box 11365 11155, Tehran, Iran, (3) P.O. Box 11155 9466, Tehran, Iran, (4) P.O. Box 11365 9161, Tehran, Iran, (5) P.O. Box 11365 9466, Tehran, Iran, (6) PO Box 11365 8639, Azadi St, Tehran, Iran. **Other Information:** (UK Sanctions List Ref):INU0042. (UK Statement of Reasons) Sharif University of Technology provides support for and is associated with designated entities involved in Iran’s nuclear proliferation activities. (Phone number)(1) +98 21 600 5419 (2) +98 21 6022727 (3) +98 21 6602 2721 (4) +98 21 66022727 (5) +98 21 6616 5201 (6) +98 21 6616 5202 (7) +98 21 918 8287 (8) +98 21 S5366 161 (Website) www.sharif.ac.ir, www.sharif.ir (Email address) Ghorbani@sharif.ir, info@sharif.ir, oisc@sharif.edu, vafai@sharif.edu (Type of entity) University **Listed on:** 24/12/2012 **UK Sanctions List Date Designated:** 31/12/2020 **Last Updated:** 04/03/2022 **Group ID:** 12816.

Office of Financial Sanctions Implementation HM Treasury, “[CONSOLIDATED LIST OF FINANCIAL SANCTIONS TARGETS IN THE UK](#),” updated November 27, 2023.

²⁰ Office of Financial Sanctions Implementation HM Treasury, “[CONSOLIDATED LIST OF FINANCIAL SANCTIONS TARGETS IN THE UK](#),” updated June 14, 2022; Department for Business Innovation & Skills, UK, “[IRAN LIST](#),” 8/15/2012.



March 25, 2024
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Conclusion

We welcome your explanation for NREL’s apparent cooperation with SUT, which works in highly sensitive regime-controlled sectors, is complicit in the development of WMD, and of which is subject to multiple sanctions designations from a range of authorities, including the U.S. We are sure that you agree that a national laboratory of the U.S. Department of Energy should not be cooperating with such entities or their researchers/employees—under any circumstances. We therefore trust that you share our concerns and we respectfully request that you conduct a thorough review into the foregoing. As a first step, please clarify the status of NREL’s ties to SUT, and confirm the suspension of all Iranian research/cooperation ties.

Thank you for your attention and we look forward to hearing from you.

Very truly yours,

Ambassador Mark D. Wallace

UANI is a not-for-profit, bi-partisan, advocacy group that seeks to prevent Iran from fulfilling its ambition to obtain nuclear weapons. UANI was founded in 2008 by Ambassador Mark D. Wallace, the late Ambassador Richard Holbrooke, and Middle East expert Dennis Ross. UANI’s private sanctions campaigns and state and federal legislative initiatives focus on ending the economic and financial support of the Iranian regime by corporations until Iran verifiably abandons its drive for nuclear weapons, support for terrorism and gross human rights violations. Former U.S. Senator Joseph Lieberman is UANI’s Chairman. UANI’s Advisory Board consists of distinguished leaders in government, academia and business. See www.unitedagainstmucleariran.com/about/leadership

APPENDIX

Additional Sanctions on SUT

№ з/п	Ідентифікаційні дані (повне найменування та реквізити юридичної особи)	Вид обмежувального заходу (відповідно до Закону України "Про санкції")	Строк застосування
77.1.	Шарифський технологічний університет (Sharif University of Technology), Мехістолізація юридичної особи: Ісламська Республіка Іран, м. Тегеран (Tehran, Azad Street, Sharif University of Technology, Iran).	товариства, підприємства, у яких резидент іншої держави, іншої держави, юридична особа, учасником якої є нерезидент або іншою державою, воєниці; 1) (більше відомого статутного капіталу або має вплив на управління юридичною особою чи її діяльність); 12) запровадження додаткових заходів у сфері екологічного, санітарного, фітосанітарного та ветеринарного контролю; 13) заборона дії торговельно-угод, соціальних проектів та промислових програм у певних сферах, зокрема у сфері безпеки та оборони; 14) заборона передачі технологій, прав на об'єкти права інтелектуальної власності.	десять років
		1) блокування активів – тимчасове позбавлення права користуватися та розпоряджатися активами, що належать фізичній або юридичній особі, а також активами, щодо яких така особа може прямо чи опосередковано (через інших фізичних або юридичних осіб) вжити дії, готових замість здійснення права розпорядження ними; 2) обмеження торговельних операцій (повне припинення); 3) обмеження, часткове чи повне припинення транзиту ресурсів, подолати та пересилати територією України (повне припинення); 4) заборона вивезення капіталу за межі України; 5) заборона випомощування економічних та фінансових зобов'язань; 6) аудитування або зупинення ліній та інших дозволів, одержання (підписів) яких є умовою для здійснення певного виду діяльності, зокрема: аудитування чи зупинення дії спеціальних дозволів на користування надрами; 7) заборона участі у приватизації, оренді державного майна резидентами іншої держави та особами, які прямо чи опосередковано контролюються резидентами іншої держави або діють в їх інтересах; 8) заборона здійснення публічних та оборонних закупівель, товарів, робіт і послуг у юридичних осіб – резидентів іншої держави державної форми власності та юридичних осіб, частка статутного капіталу яких належить	

President of Ukraine Sanctions Notice - SUT

O F A C
Office of Foreign Assets Control

Sanctions List Search

Search: Organized Networks and Blocked Persons List (ONBPL) and all other sanctions lists administered by OFAC, including the Foreign Sanctions Evaders List, the Non-SDN Specially Designated Nationals and Blocked Persons List (SDN Specially Designated Nationals and Blocked Persons List), the List of Foreign Financial Institutions Subject to Correspondent Account or Payment Through Account Sanctions and the Non-SDN Financial Institutions Control List. Close the number of hits that are shown in the Sanctions List Search box. It is strongly recommended that users use close attention to the program codes associated with each returned record. These program codes indicate how a hit fits in a sanctions value should be treated. The Sanctions List Search tool uses appropriate entry handling to identify possible matches between user or database inputs and entries in the Sanctions List Search, and any name or name component in a response on the SDN List within the Sanctions List Search tool cannot be used for any other purpose. It is important to note that the Sanctions List Search tool does not provide any guarantee of accuracy. The Sanctions List Search will accept certain misspellings or other non-ASCII symbols, but will return results in accordance with the confidence rating set by the user. In the future, OFAC may update the search tool to include additional search capabilities, such as the ability to search for specific confidence ratings. Sanctions List Search is not intended to assist users in identifying the SDN List and the various other sanctions lists, use of Sanctions List Search is not a substitute for understanding appropriate due diligence. The use of Sanctions List Search does not limit any criminal or civil liability for any act undertaken as a result of, or in reliance on, such use.

[Download the SDN List](#) [Sanctions List Search: Rules for use](#) [Visit The OFAC Website](#)
[Download the Consolidated Non-SDN List](#) [Program Code Key](#)

Details:

Type:	Entity	List:	SDN
Entity Name:	DIGITAL MEDIA LAB	Program:	NPVMD, IFSR
Remarks:			

Identifications:

Type	ID#	Country	Issue Date	Expire Date
Additional Sanctions Information	Subject to Secondary Sanctions			

Aliases:

Type	Category	Name
a.k.a	strong	DML

Addresses:

Address	City	State/Province	Postal Code	Country
No. 5, Golestan Alley Chaharmahal St Sharif University of Technology	Tehran			Iran

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OFAC: Sanctions Search [Digital Media Lab, Sharif University of Technology]

O F A C
Office of Foreign Assets Control

Sanctions List Search

Search: Organized Networks and Blocked Persons List (ONBPL) and all other sanctions lists administered by OFAC, including the Foreign Sanctions Evaders List, the Non-SDN Specially Designated Nationals and Blocked Persons List (SDN Specially Designated Nationals and Blocked Persons List), the List of Foreign Financial Institutions Subject to Correspondent Account or Payment Through Account Sanctions and the Non-SDN Financial Institutions Control List. Close the number of hits that are shown in the Sanctions List Search box. It is strongly recommended that users use close attention to the program codes associated with each returned record. These program codes indicate how a hit fits in a sanctions value should be treated. The Sanctions List Search tool uses appropriate entry handling to identify possible matches between user or database inputs and entries in the Sanctions List Search, and any name or name component in a response on the SDN List within the Sanctions List Search tool cannot be used for any other purpose. It is important to note that the Sanctions List Search tool does not provide any guarantee of accuracy. The Sanctions List Search will accept certain misspellings or other non-ASCII symbols, but will return results in accordance with the confidence rating set by the user. In the future, OFAC may update the search tool to include additional search capabilities, such as the ability to search for specific confidence ratings. Sanctions List Search is not intended to assist users in identifying the SDN List and the various other sanctions lists, use of Sanctions List Search is not a substitute for understanding appropriate due diligence. The use of Sanctions List Search does not limit any criminal or civil liability for any act undertaken as a result of, or in reliance on, such use.

[Download the SDN List](#) [Sanctions List Search: Rules for use](#) [Visit The OFAC Website](#)
[Download the Consolidated Non-SDN List](#) [Program Code Key](#)

Details:

Type:	Entity	List:	SDN
Entity Name:	MOBILE VALUE-ADDED SERVICES LABORATORY	Program:	IFSR, NPVMD
Remarks:			

Identifications:

Type	ID#	Country	Issue Date	Expire Date
Additional Sanctions Information	Subject to Secondary Sanctions			

Aliases:

Type	Category	Name
a.k.a	strong	VALUE-ADDED SERVICES LABORATORY VASIL

Addresses:

Address	City	State/Province	Postal Code	Country
8th Floor, Azad St. Sharif University of Technology	Tehran			Iran

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OFAC: Sanctions Search [Digital Media Lab, Sharif University of Technology]